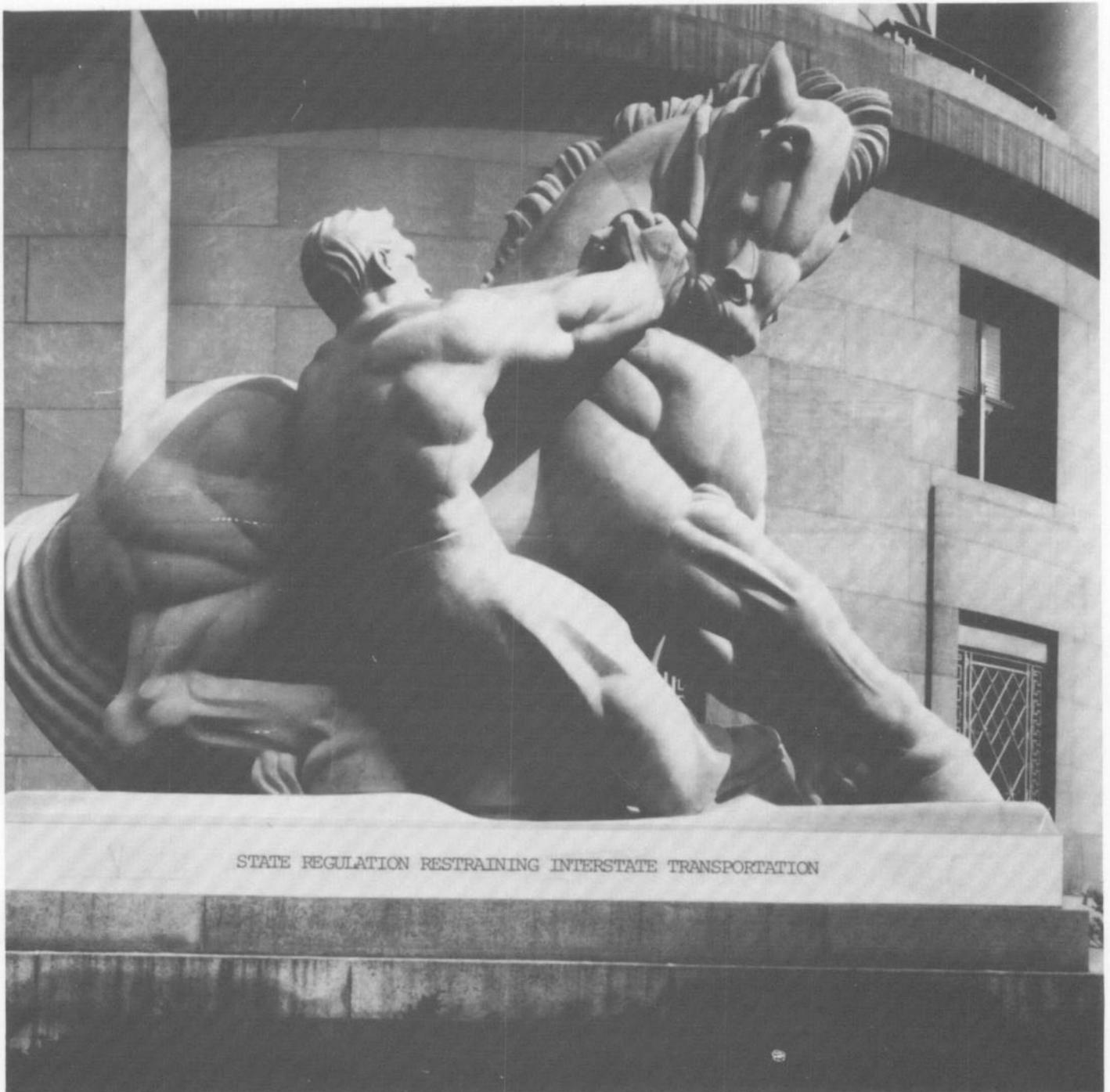U.S. Department of
Transportation

The Impact of State Economic Regulation of Motor Carriage on Intrastate and Interstate Commerce

STATE REGULATION RESTRAINING INTERSTATE TRANSPORTATION

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The Impact of State Economic Regulation of Motor Carriage on Intrastate and Interstate Commerce

Final Report
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Executive Summary

The Motor Carrier Act of 1980 (MCA) significantly liberalized economic regulation of interstate motor carriage in the United States. In addition, the Interstate Commerce Commission (ICC) has interpreted the statute in a very "liberal" (i.e., deregulatory) fashion. The result has been an interstate motor carrier industry in which entry and rates are determined by the needs of the market. In contrast, the 50 states have a variety of different policies in force regarding the regulation of intra-state freight by motor carriage.

At the state level, New Jersey and Delaware never enacted laws to regulate common or contract motor carriage of freight. Since 1980, several states have either deregulated or become less regulated. Alaska, Arizona, Florida, Maine, Wisconsin, and Vermont have deregulated. South Dakota and a number of other states have enacted less sweeping regulatory reforms. Pennsylvania has loosened its regulation without a statutory change. Some other states have become stricter in their regulation. California has vacillated between liberal and strict rate regulation.

However, 42 states still maintain some form of state economic regulation. Some of these states exercise very strict regulation, e.g., Texas, Illinois, and Washington.

Many studies have been undertaken to show the benefits of economic deregulation of motor carriage on the interstate level. A number of these studies were done prior to the passage of the MCA. Several others have been done since 1980 to document the savings realized from the MCA. Credible estimates of these savings are in the range of $10-11 billion annually.

The purpose of this study is to show the cost impact of the remaining motor carrier regulation in the states that still impose such regulation, as well as the impacts of such regulation on interstate commerce, i.e., on consumers in states other than the regulating states. This study shows that states that continue to regulate place a considerable burden of excess costs on their own shippers and consumers, as well as those of other states.

The analysis links the standard economic welfare model of the benefits attributed to lower prices to consumers (the Posner model) to the U.S. Multiregional Input-Output Model (MRIO). The Posner model demonstrates the harm to society of prices which are held above the market level by regulation. It then measures the gain to society that results from lowering prices (both on existing output as well as additional output that would be stimulated by the lower prices).

Motor carrier class rates for interstate and intrastate moves (allowing for typical discounts, where applicable) were collected for the most common commodity categories in 37 states. "Triads" were developed in these states, composed of pairs of markets with a common origin having one interstate and one intrastate destination. Destinations in each triad were chosen to be comparable in both population and distance from the origin, so that the rates for each leg of a triad would be expected to differ only because of differences in regulation. That is, the interstate rate would be either higher or lower than the intrastate rate primarily because there was a different regulatory scheme governing each.

Interstate rates were found to be lower than intrastate rates, on average, in 20 of the 37 states analyzed (New Hampshire, Massachusetts, Rhode Island, New York, Pennsylvania, West Virginia, Georgia, Alabama, Mississippi, Kentucky, Illinois, Minnesota, Iowa, South Dakota, Oklahoma, Louisiana, Texas, New Mexico, Nevada, and Washington). In the other 17 states, no significant disparity was found. This may be because the latter states practice liberal regulation or use the regulatory process to hold rates down.

These rate differences were then used as exogenous price changes for the input-output model. The base year for the MRIO was 1977, but adjustments were made to put the results in 1988 dollars.

The MRIO model has 125 economic sectors (ranging from raw materials through manufacturing and services to capital investment, government, and final consumption), for 50 states plus the District of Columbia. Interregional trade involving these economic sectors, as well as intrastate trade, is part of the model. To make the model more manageable, the economic sectors were aggregated to 73, and the states were aggregated to 28 (the 20 where interstate rates were lower than intrastate rates plus eight aggregates of contiguous states).

Input-output analysis produces a "technical coefficients matrix" representing the production function of the industry, i.e., how many cents' worth of each input is required to produce a dollar's worth of output in the industry. One of those inputs is motor carrier transport.

The input-output analysis enables one to examine the impact of an exogenous price change on the economic system it models: a change in the price of transporting input M will change the price of M, but since M is used in the production of N, the price of N will also change, and so on. The model used yields the price changes in all economic sectors in all 28 states and regions, as the result of the rate changes produced by deregulation in the intrastate motor carrier sector in the above 20 states.

Using these price changes, the total amount spent on economic sector X in state Y before the price change, and an estimate of the demand elasticity of the sector (i.e., how sensitive is quantity demanded to a change in price), the Posner welfare impact is estimated.

The analysis shows that the aggregate national savings from state economic motor carrier deregulation in the 20 states listed above would be $2.863 billion per year (1988 dollars). Most of that savings ($2.252 billion) would accrue in these 20 states (the states where intrastate rates were higher than interstate rates), while the remaining $611 million would be savings in remaining 31 states.

Thus, while regulated states bear the brunt of state trucking regulation (either from their own state's regulation or from the effects of regulation in the other 19 states), about 20 percent of the burden of current state motor carrier regulation falls on the other 31 states. This constitutes a burden on interstate commerce.

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CHAPTER 1

INTRODUCTION

Introduction to the Motor Carrier Industry:

The first mechanized motor carriage appeared in the U.S. after the turn of the twentieth century. Since that time, the motor carrier industry has grown rapidly: it now carries approximately 24.9% of all domestic intercity ton-miles[1] and 40.1% of domestic intercity tons and receives approximately 76.4% of all domestic intercity freight revenues.[2] The growth over time of motor carrier ton-miles, tons, and revenues is shown in Table 1-1.

Table 1-1

Motor Carrier Share of Domestic Intercity Freight
Tons, Ton-Miles, and Revenues

Year	Ton-Miles	Tons	Revenues
1940	10.0%		
1947	10.0%	19.4%	
1950	16.3%	26.1%	
1960	21.7%	32.7%	69.8%
1970	21.3%	36.1%	74.3%
1980	22.3%	36.5%	72.9%
1986	25.4%	39.9%	76.4%
1987	24.9%	40.1%	NA

Source: Transportation in America, Transportation Policy
        Associates, Washington, D.C., March, 1988

Table 1-2 shows that truck dominates its main competitor for manufactured goods traffic in shipment sizes less than 10,000 pounds (the traditional cut off weight for defining less than truckload--LTL-- shipments) over all mileage shipped and strongly dominates in shipment distances of under 300 miles in all shipment sizes except those over 30 tons (many of which would exceed the weight limits allowable on the highway).

Cells in Table 1-2 containing a T (R) have 90% or more of

its tonnage moved by truck (rail). Cells with a $\overline{T}$ ($\overline{R}$) have 50% or more of its tonnage moved by truck (rail). Short haul, light weight manufactured tonnage is thus virtually all truck, and truck over time continues to move southeasterly in Table 1-2, winning longer distance, heavier weight hauls from rail. The trends away from heavy, basic industry; increased regional self sufficiency-which lowers hauling distances; the substitution of light weight

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materials for heavy ones, e.g., plastic for glass and steel; the movement to low just-in-time inventory levels; the development of the interstate highway system; etc., all have contributed to the rapid growth of motor carrier transportation.

Trucks also play a major role in the movement of non-manufactured products such as agricultural commodities (both long and short distances), forest products (short distances), and mining products (short distances).

TABLE 1-2

Truck and Rail Shares in Manufactured Tonnage
by Shipment Size and Distance Shipped

P O U N D S

		Under 1000	1000-9999	10000-29999	30000-59999	60000-89999	Over 90000
	Under 100	T	T	T	T	$\overline{T}$	$\overline{R}$
M	100-199	T	T	T	T	$\overline{R}$	R
I	200-299	T	T	T	T	$\overline{R}$	R
L	300-499	T	T	T	$\overline{T}$	$\overline{R}$	R
E	500-999	T	T	$\overline{T}$	$\overline{T}$	R	R
S	1000-1499	T	T	$\overline{T}$	$\overline{T}$	R	R
	Over 1500	T	T	$\overline{T}$	$\overline{R}$	R	R

Source: Ronald D. Roth, "An Approach to Measurement of Modal Advantage", American Trucking Associations, Washington, DC, 1977.

Trucking is also large in terms of the numbers of carriers and amount of employment. Between 30,000 and 40,000 Interstate Commerce Commission (ICC) regulated carriers exist.[3] Private carriers[4] number over 100,000.[5] Owner operators'[6] numbers, at one time, probably exceeded 100,000.[7] Employment in the industry is estimated to be approximately 1,250,000.[8]

Motor carrier transportation has many forms. As mentioned above, firms move their own products, i.e., private carriage. Common carriers hold themselves out to move the freight of all who tender their goods to the carrier. Contract carriers make a number of large volume commitments over a period of time.[9] General

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freight carriers move virtually anything that will fit into a trailer, while specialized carriers haul commodities which require equipment especially designed to handle them, e.g., refrigerated cargos, automobiles, oil and gasoline, etc. Trunkline carriers move long distances, regional carriers move within a given region of the country and while local carriers serve metropolitan areas. Regular route carriers offer scheduled service between fixed terminals, while irregular route carriers offer on-demand service from a point to a geographic area, from an area to a point, or from
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an area to another area. Exempt carriers   are not subject to any form of economic, (e.g., rate, entry, exit, merger, etc.)
          11
regulation.

     Most of the carrier types above exist in the interstate market (moving between/among the states) and in the intrastate market (moving solely within a given state).

     The American Trucking Associations (ATA), an industry trade association, is fond of noting that "if you have it, it was brought to you by truck". This is virtually true, as most of the final distribution of products to stores is by truck. Clearly, as demonstrated by the numbers above, trucking is a major industry that impacts directly on all consumers and has a major role to play in the economy of the nation.

Early Motor Carrier Regulation:

     As the motor carrier industry grew, it became clear that the pattern was like a patchwork quilt. Carrier types of all the forms mentioned above appeared. Since entry was easy, many individuals participated in and left the market. Concerns arose from existing carriers that "fly-by-night" operators, pricing only at levels that would pay their day-to-day bills, would destabilize the industry. Shippers were concerned that carriers hauling their products would go bankrupt, making their loads unrecoverable. Government was worried about safety and the wear and tear on the highways. Railroads, heavily regulated with respect to entry and rates, were faced with a new breed of competition that could enter freely into markets and price freely to win the business. All of these groups created pressures to control the motor carrier industry.

     Some states attempted to regulate their markets early in the second decade of this century (as explained below). They regulated motor carriers within their state, including those carriers transporting goods to other states. A Supreme Court case ultimately banned them from the latter, leaving a regulatory void in the interstate market. This prompted many state officials to advocate interstate regulation by the federal government as a method to control carriers who used interstate subterfuges to serve intrastate markets, e.g., carriers would drive across a state line and back again in order to make a move interstate. "State officials actually wrote the first bills which proposed interstate regulation of trucking and maintained support for such actions throughout the

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ten years of (legislative) debate."

The Great Depression exacerbated the above complaints of the motor carriers, the shippers, the railroads, and the states, and in 1935, the Motor Carrier Act of 1935 (MCA-1935) was passed. This act and its interpretation by the Interstate Commerce Commission (ICC) strictly regulated the interstate carriers with regard to entry and rates and other economic aspects. Carriers operating prior to regulation were allowed to apply for entry into the new regulated interstate market. Those admitted were said to be "grandfathered" into the industry. After the MCA-1935, entry by new firms was very difficult, and the net number of carriers in the industry shrunk as bankruptcies and mergers thinned the carriers' ranks.

Most critics of regulation do not deny that justification for some government intervention may have existed in the early years of motor carrier regulation. Excess competition in the young industry developed during the Depression era as net entry occurred and drivers would work for "gas money", i.e., variable costs. As these drivers would ultimately go bankrupt, their equipment was sold to a new aspirant and the cycle started over again. Shippers, motor carriers, and railroads all sought motor carrier regulation to stabilize the industry (in the former two cases) and to control competition (in the latter case.)

Regulatory Reform in the Late 1970's:

From 1935 to 1977, the ICC strictly regulated the motor carrier industry. In 1977, President Carter appointed A. Daniel O'Neal as Chairman of the ICC. O'Neal's ICC interpreted the MCA-1935 in a "liberal" fashion. Entry was eased, and some loosening in rates was instituted. This trend was heightened by the appointment of Darius Gaskins as Chairman of the ICC and continued under the chairmanship of Marcus Alexis.

Economic regulation of motor carriage on the federal level was formally relaxed as a result of the passage of the Motor
Carrier Act of 1980 (MCA-1980). This Act mostly codified deregulatory administrative decisions of the post-1977 ICC. Regulation had been the subject of intense political debate for the previous five years, moderate debate from 1970 to 1975, and basically academic arguments before 1970.

Opponents of economic regulation argued that, at best, the structure of the regulation in place was inappropriate for the trucking industry of the 1970's. The industry was far from the fledgling, depression ravaged industry that was first put under federal control by the MCA-1935. The industry had matured in the intervening 45 years, and the general economic conditions of the 1970's were not the conditions of the 1930's. Economic market theory and the supporting empirical data had developed enough to argue that major segments of the trucking markets were naturally competitive. Some empirical studies of motor carrier operations in

less or totally deregulated environments demonstrated the viability of less regulation.

Many researchers and policymakers concluded that the original arguments for regulation, e.g., monopoly, destructive competition, infant industry protection, were not relevant now (if, indeed, they ever had been.) Ardent deregulationists, fortified by economic theory arguments, some limited data, and their personal convictions, suggested that no economic regulation of the industry was necessary.

On the other hand, a number of entities, mostly carriers and organized labor, initially supported the status quo in regulation, i.e., the MCA-1935, and, in fact, argued for a strict interpretation of the MCA-1935. Strict interpretation basically meant a pre-1977/1978 interpretation of regulation.

The carriers and the Teamsters later adopted a second, more moderate position. This position called for the passage of "reform" legislation which would nominally make regulation less strict. Such regulation was rejected by Congress in favor of the more sweeping changes of the MCA-1980.

Industry-labor groups realized that their initial status quo position (which had worked in the deregulation battles of the early 1970's) was no longer a realistic strategy. The tone in Congress had switched from the regulation end to the deregulation end of the regulatory spectrum.

Their new strategy was to move moderately toward deregulation in the hope of capturing those legislators who favored some deregulation but who also felt that the deregulators were going too far. Their objective was to "control the deregulation". However, because they underestimated how many members of Congress were closer to the deregulator's position than to their own position, their strategy did not work and the MCA-1980 was passed. For a complete discussion of the events and strategies leading to the
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passage of the MCA-1980, see Robyn.

As was the case in the late 1970's, when the O'Neal and Gaskins ICC's liberally interpreted the MCA-1935, the current ICC is also liberally interpreting the MCA-1980. Thus while some regulation nominally exists with the MCA-1980, the de facto interpretation of the current statute results in virtual free entry and in rate freedom. Today some carriers still favor a return to the days of strict MCA-1935 regulation, while others favor complete deregulation.

Recent Regulatory Reform Efforts:

Many observers believe that the reforms accomplished by the MCA-1980 have worked extremely well and note that a great majority of shippers believe that the reforms have been advantageous to them. In contrast to some original predictions, "numerous studies show that the overwhelming majority of rural small town shippers
15
are getting service at least as good as before the reforms."

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Many shippers have stepped forward and advocated complete
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deregulation.
The MCA-1980 is described as a good first step by the
supporters of deregulation. Many advocate that the final steps to
complete deregulation of the trucking industry should now be taken.
With this in mind, the Administration proposed the Trucking
Deregulation Act of 1985 in the Fall of 1985 and the Trucking
Productivity Improvement Act in 1987. These bills would essentially
eliminate motor carrier regulation.
These bills would have eliminated the remaining antitrust
immunity enjoyed by the trucking industry for collective
ratemaking. Under current law, a "joint rate" for a movement from
point A to point C is set by the two carriers who move it from
point A to point B and from point B to point C respectively.
General rate increases of x% are still implemented across the
board, and the industry still defines collective commodity
classifications to facilitate determining what rate will
govern a movement. All of these collective actions are still
allowed under current law.
Former Secretary Dole stated that "the evidence compiled
shows clearly that such immunity has raised rates unnecessarily and
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has not prevented undue discrimination." The Motor Carrier
Ratemaking Study Commission substantiates this in its finding
number seven where it is stated that " the overall rate level for
motor carrier services is higher than it would be in the absence
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of collective ratemaking" and in its finding number twelve, "The
collective ratemaking process is not designed to and does not have
the widespread practical effect of preventing preference,
prejudice, or discrimination with respect to different shippers,
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shipments, and commodities." "The entry and rate regulation of
the trucking industry that currently remains is unneeded and
undesirable because there is ample competition within the trucking
industry as well as competition from other modes. Such regulation
suppresses managerial initiative and innovation, wastes valuable
taxpayer dollars and resources that the trucking industry could
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employ more usefully in improving its productivity."
These bills would also eliminate all remaining ICC regulation
of trucking rates and entry, eliminate tariff filing and
publication requirements, eliminate the common carrier obligation,
and contain several other provisions in addition to the elimination
of collective ratemaking. In addition, the Administration's bill
would provide for federal preemption of the state regulation of
motor carriage (more on this topic below).
The current ICC is also a significant advocate of deregulation
under the leadership of Chairperson Heather Gradison, who has
advocated the termination of the ICC's functions.
It seems likely that, given the current leadership in the

White House and in the ICC, de facto deregulation will continue. Deregulators, however, would feel more comfortable with a law providing for more complete deregulation. They are concerned that a future ICC, more conservative in nature, could make a different interpretation of the MCA-1980 and thereby effectively re-regulate. If the ICC's motor carrier authority is totally terminated by law, they feel that the situation would be like a scrambled egg, i.e., impossible to put back in the egg shell.[21]

Recent budget proposals eliminated all funding for the ICC, effectively stating that the executive branch feels that federal motor carrier regulation should disappear. However, the likelihood of the Congress leaving a zero budget for the ICC is extremely small, and the Congress has voted back ICC funding everytime the Executive Office has cut it.

Many truck interests, especially private carriers[22] but also a number of major for-hire carriers,[23] now favor deregulation. This division among the carriers splinters the American Trucking Association's (ATA) historic opposition to deregulation.[24]

One major motor carrier, Leaseway Transportation, has sharply criticized the ATA, the Regular Common Carrier Conference (RCCC) of the ATA, and the Teamsters for protecting the remaining entry and rate controls in trucking. They blame these groups for restricting competition, holding up prices, and inflating labor costs. Robert Delaney, then a vice president of Leaseway, likened the three groups to the Bermuda Triangle because "any fact that goes through this triangle disappears,[25] i.e., the three groups refuse to believe the evidence that the deregulated transportation industry works or, alternatively, they refuse to give up their vested property rights in the regulated system.

The present labor-industry strategy seems to be to fight against any further deregulation and to attempt to have the regulatory agency follow the letter of the law in the MCA-1980.[26]

Deregulators cited evidence that economic distortions existed because of the regulation of a market inherently suitable for competition. These arguments will be elaborated on below.

Importance of Intrastate Motor Carriage:

While the above activity is going on at the interstate/federal level, much of the actual motor carriage exists on the state level. Since there are 50 independent states, it is not surprising that there are 50 independent state policies with respect to the economic regulation of motor carriage. These policies can generally be aggregated into several classes as will be shown below. It is

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these state policies and their power to impact on interstate commerce which are the subject of this report. The lack of federal regulation potentially creates a void which state regulation may seek to fill.

The importance of intrastate shipping in the nation's for-hire hauling of manufactured goods by motor carriage is shown in Table 1-3. For the nation as a whole, the Census of Transportation shows that 45.44% of all manufactured tonnage shipped by for-hire truck in 1977 (the last year for which actual flow data is available) was moved in strictly intrastate markets. This number is likely to be understated because the Census source of the above figure only includes the first movement of the goods from the point of manufacture. Thus moves from distribution centers and ports to wholesalers and retailers and the movement from wholesalers to retailers, which are likely to be by truck and which are likely to be shorter distance in nature (and hence more likely to be intrastate), are excluded.

In some states, e.g., California and Texas, intrastate traffic dominates interstate traffic, e.g., in California 83% of motor carriage is shipped intrastate and in Texas 64%. Other states with intrastate dominance include Arizona 71%, Florida 80%, Maine 88%, Montana 83%, Oregon 66%, and Washington 74%. Of the major traffic states, Indiana at 28% and Wisconsin at 29% have the lowest percentage of intrastate traffic. North Dakota, Vermont, Nevada, Rhode Island, and the District of Columbia have low overall traffic volume and a very small amount of intrastate shipments.

Private carriage (not for-hire) dominates the tonnage movement of manufactured products by motor carrier within the United States (with 63% of the tonnage). In addition, 79% of this private

carriage is intrastate. This traffic is attractive to private carriage because of its short haul nature. Short haul traffic can not take advantage of the distance taper in the rate structure and,[27] therefore, bears high rates per unit distance.   This short haul traffic is also attractive to private carriage because empty backhaul are less of a burden. But some of this traffic is undoubtedly private because of the lack of the for-hire market to provide the desired service at the desired rate. Less regulation would likely provide more price-service options and hence more intrastate for-hire traffic (as has been the case on the virtually[28] deregulated interstate level).

The above analysis shows that approximately two thirds of all truck tonnage manufactured goods shipped in the United States is intrastate traffic (i.e., .37 times .4544 for hire plus .63 times .79 for private equals .665828.) Thus the state role in motor carrier control is at least as important as the federal role. The above percentages, and hence level of importance, have been basically undocumented until now. The same degree of participation would not be evident for an analysis of ton-miles because of the longer haul nature of interstate versus intrastate movements. That

TABLE 1-3

INTRASTATE MOTOR CARRIER FREIGHT AS A PERCENTAGE OF INTERSTATE PLUS INTRASTATE MOTOR CARRIER FREIGHT FOR MANUFACTURED COMMODITIES: 1977

STATE	FOR-HIRE MOTOR CARRIAGE	ICC REGULATED FOR-HIRE	NON-ICC REGULATED FOR-HIRE	PRIVATE CARRIAGE
Alabama	43.60	42.87	54.92	61.08
Alaska	--	--	--	100.00
Arizona	71.29	60.04	99.89	96.00
Arkansas	18.37	19.66	2.81	63.29
California	83.27	76.66	93.23	96.79
Colorado	41.14	25.29	98.67	95.91
Connecticut	5.72	5.60	8.99	76.19
Delaware	25.55	4.78	82.56	47.79
District of Columbia	2.41	2.41	--	95.30
Florida	79.87	75.95	96.26	92.64
Georgia	46.02	34.83	79.71	77.42
Hawaii	30.51	44.86	8.49	99.34
Idaho	24.15	20.17	83.78	79.00
Illinois	47.58	41.04	91.93	82.32
Indiana	27.57	24.88	68.02	62.70
Iowa	20.04	12.08	81.89	73.15
Kansas	30.77	30.05	47.21	49.36
Kentucky	17.18	15.56	65.43	58.72
Louisiana	39.70	34.38	74.66	74.49
Maine	88.28	73.32	99.20	80.50
Maryland	22.22	9.97	91.16	77.21
Massachusetts	20.84	19.51	48.54	85.27
Michigan	47.78	38.15	97.54	81.02
Minnesota	46.12	42.78	86.85	86.29
Missouri	18.70	17.45	60.05	74.91
Mississippi	39.44	39.46	35.71	37.93
Montana	68.66	68.92	--	77.27
Nebraska	19.95	18.88	69.44	81.22
Nevada	3.23	3.23	--	30.27
New Hampshire	19.50	19.60	--	76.29
New Jersey	34.07	29.71	74.65	45.66
New Mexico	20.21	20.21	--	93.52
New York	32.76	30.84	64.51	87.77
North Carolina	36.45	32.45	75.73	81.01
North Dakota	2.80	2.73	2.90	59.46
Ohio	45.25	38.28	95.87	77.31
Oklahoma	43.15	43.44	24.30	88.69
Oregon	65.94	63.06	97.52	79.38
Pennsylvania	32.88	29.01	80.62	75.41
Rhode Island	2.59	2.61	--	42.70

TABLE 1-3 (Con't)

South Carolina	25.53	27.45	5.56	55.59
South Dakota	35.74	35.70	100.00	20.50
Tennessee	23.22	24.34	37.93	77.78
Texas	64.36	59.96	90.84	68.25
Utah	33.32	33.50	13.64	91.10
Vermont	4.68	2.30	78.57	24.91
Virginia	23.43	10.87	91.30	72.29
Washington	74.44	59.66	99.12	91.31
West Virginia	18.50	17.76	30.05	54.50
Wisconsin	29.04	26.33	72.66	83.77
Wyoming	38.10	38.20	0.00	89.32

United States
INTRASTATE   45.44   78.77

Source: Calculated from the United States Census of Transportation, Commodity Transportation Survey, United States Department of Commerce, Washington, DC, 1978

analysis can not be carried out, however, because the Census data available does not include a state based origin-destination matrix of ton-miles.

A recent ICC decision on the definition of interstate motor freight commerce has strongly impinged on the inter/intrastate debate by defining movements historically treated as intrastate as being in interstate commerce (Armstrong World Industries,

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Inc.-Transportation Within Texas, No. MC-C-10963, April 23, 1986).

If the ICC decision withstands a court test, the Commission will have deregulated (i.e., put under the auspices of MCA-1980) a major portion of the "intrastate" traffic defined above by merely redefining it as interstate and hence subject to the MCA-1980 and not the state laws.

The ICC was recently handed a defeat by the US Supreme Court in the Armstrong case. In case 87-1938, the ICC had requested that the Court stop Texas from requiring that an interstate carrier obtain intrastate authority and following Texas' intrastate rate schedule before delivering carpet that originated in Georgia. The fifth US Circuit Court of Appeals of New Orleans sided with Texas by declining to issue an injunction against the state's

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prescription. However, in 1989, the Court upheld the ICC's decision that these shipments are interstate in nature.

The ICC has refused to make a blanket pronouncement on all such cases which might arise under warehousing-in-transit and has stated that they will view the situation on a case by case basis. Presumably, however, if the tariff moving the goods into a state from another state contains a warehousing-in-transit provision and the intent is to subsequently move the product to customers within the destination state (even if the customer's identity is not known at the time that the shipment is made from another state), then such shipments will be adjudged interstate from their initial origin to their ultimate destination. The ICC has stated that their decision "should serve as a guide to other persons in similar

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situations." In general, all subsequent cases have ruled in favor of classifying the traffic as interstate.

The USDOT petitioned the ICC to institute a rulemaking proceeding to clarify when a single state movement is in interstate commerce and hence subject to ICC jurisdiction and not state jurisdiction. Two general clarifications were desired:

(1) is a single state movement by a for-hire carrier which is interlined with interstate or foreign non-regulated movements by private or exempt for-hire carriers intrastate or interstate when the shipper has the persistent intent to ship in interstate or foreign commerce?

(2) is a single state movement of a for-hire carrier following

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a stop at a storage or distribution facility interstate or intrastate when it is the shipper's intent that the goods move in interstate or foreign commerce?

Specifically, the DOT asked:

(1) shouldn't single state for-hire movements be considered interstate when they follow or precede an exempt or private interstate or foreign movement?

(2) shouldn't a single state movement by a for-hire carrier following or preceding an interstate movement by a private carrier that also holds for-hire authority be considered in interstate commerce?

(3) if a rail carrier provides interstate transportation under a contract rate or for an exempt movement, shouldn't a prior or subsequent single state movement by a for-hire carrier be subject to Commission jurisdiction?

(4) shouldn't a shipper's intent that goods move beyond a temporary storage or distribution point be sufficient to make a subsequent single state movement a continuous part of interstate or foreign commerce?

(5) should for-hire single state motor and rail carrier movements be subject to different standards relative to each other when there is a subsequent or prior foreign or interstate movement?

(6) will a for-hire connecting carrier interlining a shipment which it hauls within one state be able to determine whether its portion of the move is interstate or foreign transportation subject to ICC jurisdiction or whether it
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is subject to state jurisdiction?

If the ICC ruling that the traffic in question is interstate holds up, then significant traffic volumes currently regulated by the states could become subject to ICC jurisdiction only. Since the ICC currently chooses not to regulate motor carrier commerce under their jurisdiction very severely, an affirmative Commission ruling would result in de facto deregulation of a significant amount of current intrastate traffic. Pro-regulators fear such a ruling.

Certain questions naturally arise: if federal deregulation is such a good idea, wouldn't state deregulation also be logical? What benefit could be accomplished with state deregulation? Can state regulation frustrate the federal deregulatory objectives? Should federal deregulatory statutes preempt the right of the states to enter into regulatory areas vacated by the federal government? Should the federal government control all state regulatory policies that impact on interstate commerce? These and

other questions will be explored in this report.

History of State Motor Carrier Regulation:

In 1914, Pennsylvania became the first state to regulate motor carriers. By the end of 1925, 28 states regulated freight and passenger carriers, nine regulated only passenger carriers, and three had freight motor carrier jurisdiction but had not yet applied it.

There being no federal motor carrier regulation, states began regulating interstate motor freight transportation as well. In 1925, however, two cases relating to whether an interstate operator required an intrastate certificate had reached the U.S. Supreme Court. These cases were Buck versus Kuykendall (267 US 307) and Bush and Sons Company versus Maloy (267 US 317).

In Buck versus Kuykendall, the state of Washington denied a certificate of public convenience and necessity to a bus operator who wished to operate in the interstate market. The Supreme Court ruled that the state of Washington was obstructing interstate commerce, which violated the commerce clause of the US Constitution.

In Bush and Sons Company versus Maloy, the Maryland Public Service Commission had denied a permit required for operation to a carrier which had proposed an interstate operation. The Supreme Court described the state's action as an invasion of the federal right (not at the time exercised) to regulate interstate commerce.

Thus state requirements for permission to operate through or within a state (where the intent is to move a person or good from a point in one state to a point in another state) was found to be unconstitutional. These two decisions did not say, however, that states couldn't regulate strictly intrastate carriage (moving freight or passengers from one point in the state to another point in that same state) of an interstate carrier.

Thus despite the absence of federal regulation for 10 years until 1935, the Buck and Bush cases pre-empted state regulation of interstate commerce. In the eight years after the Buck and Bush cases, many more states joined in the regulation of motor freight so that 42 of the then 48 states were so regulated by 1933. Only Connecticut, Delaware, Nebraska, New Jersey, New York, and Rhode Island did not regulate motor freight by 1933, although all but Delaware had regulated motor passenger service for quite some time.

The Depression era of the early 1930's led to an increase in state motor carrier regulations. Tremendous pressure existed to stabilize the industry, which was deeply hurt because of the

Depression. In addition to the above common carrier regulation, thirty one states were regulating contract carriers by 1933. Eight states regulated private carriage. Interstate carriers passing through a state and serving customers within a state would have to apply for state authority which was automatically granted.

Thus, by 1935, the states were heavily involved in the regulation of freight motor carriage. However, laws passed in the mid to late 1910's and in the 1920's were very diverse in nature from state to state and suffered from checked enforcement. Updated regulation was needed, because the industry had evolved so much from its regulatory beginnings 20 years earlier and because of the drastic changes in the economic conditions. The lack of state uniformity was to be changed substantially by the passage of the MCA-1935 as many, but not all, states changed their laws to conform to it.

The MCA-1935 provided a model act from which the states could make deviations to suit their own unique conditions. However, the core of the state's regulation would be analogous to the MCA-1935. This brought a great deal of similarity among the regulations of the various states.

By regulating interstate movements, the MCA-1935 eliminated a subterfuge which some carriers had used to circumvent state regulation. Some carriers established terminals just across state borders and provided, therefore, nominal interstate service for de facto intrastate shipments. Others merely drove into a neighboring state and then back to the originating state, thus making the movement "interstate" and not subject to state regulation. While these types of moves could still be used to circumvent state regulation post MCA-1935, they could no longer be used to circumvent all regulation since the MCA-1935 would now regulate most interstate moves. (An exception was a movement in a commercial zone which spans multiple states).

By 1943, only Delaware and New Jersey did not regulate common carriers of motor freight and only Delaware, New Jersey, and Vermont did not regulate contract carriers of freight. Eleven states regulated private carriage.

By 1956, only New Jersey (which did not have a statute to regulate regular route motor common carriers of freight) and while Delaware (with a statute it chose not to implement) did not
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regulate intrastate carriers of freight.

State regulation basically stabilized from 1943 until the wave of deregulatory sentiment that occurred during the late 1970's and early 1980's. In addition, after the passage of the MCA-1980, some states brought their statutes in conformity with it.

Recent State Regulatory Activities:

The federal deregulatory policies of the 1980's led a number of states to rethink their policies toward intrastate regulation. States reacted very differently. Some states readjusted their regulations/statutes to reflect the changes in the MCA-1980; six

states totally or significantly deregulated, i.e., Florida
(1980), Arizona [34] (1982), Maine [35] (1982), Wisconsin [36] (1982),
Alaska [37] (1984), and Vermont [38] (1986); and many did not change
their statutes at all.

Florida's deregulation was caused suddenly by a lack of agreement by the legislature concerning the response to a pending sunset of the state Public Utility Commission's authority to regulate motor carriers. While debate was occurring, the authority was automatically sunset, leaving Florida with a completely deregulated industry in 1980.

Arizona, a state of regulated monopoly, [39] required a constitutional change by referendum of the state's voters. Under the governor's leadership, the legislature agreed unanimously to put the question to the voters. A strong referendum victory was won, and regulation was eliminated effective 1982.

The actions of Florida and Wisconsin are significant because both states have large amounts of intrastate traffic. The action in Arizona is significant because of the state's complete reversal. from regulated monopoly. Alaska's deregulation was apparently caused by a political quirk, i.e., Libertarians adopting an issue to achieve visibility. [40]

More recently, California has instituted more restrictive regulation [41] (but is now discussing a liberalization of that policy); Utah has passed a MCA-1980 type act; [42] Georgia has passed a bill to loosen entry; [43] Texas has allowed a zone of flexibility and some new entry; and Indiana voted in 1988 to deregulate effective 1990. However, in 1989 the Indiana legislature reversed the 1988 deregulatory action.

Many (but not all) motor carriers (except for private carriers) and their trade organizations generally favor the retention of regulation. At the current time, most shippers seem to favor deregulation.

The State Regulatory Committee of the Transportation Lawyer's Association (TLA) has studied the status of existing regulation by the states with respect to general commodities. Their study and the National Association of Regulatory Utility Commissioners' (NARUC) work below shows the following results of the overall status of state motor carrier regulation.

In the last several years, Idaho, Kansas, Michigan, New York, and North Dakota enacted what the TLA calls partial or limited deregulation laws. Indiana, Ohio, South Carolina, and Texas also have had some motor carrier legislative activity recently. A number of states considered partial or total deregulation laws several years' ago (five in 1984 and twelve in 1983) and defeated them. In

1986, five states considered deregulation. In Colorado, Georgia, and Utah, some regulatory reform was passed. In Indiana, an act was defeated and in Washington, the law was introduced but did not get out of committee. In 1987, seven states considered regulatory reform. In Alabama, Indiana, Mississippi, Nevada, and Texas, it was defeated. California approved partial changes. In Washington, a bill again failed to get out of committee. Daniel Baker, Chair of the TLA's regulatory committee, claims that "there has been no significant legislation enacted or policy changes adopted in 1988."[44] Baker describes Indiana, Kansas, and Oklahoma as those states where state officials are interested in deregulation. Significant deregulation campaigns have been initiated and financed by major shippers in California, Indiana, Ohio, Mississippi, Texas, and Washington in the last several years.

Baker noted that the requirements that public convenience and necessity (PCN) be shown to substantiate an application for entry have lessened: "It is evident that the degree of proof required has been markedly reduced. State commissions, to varying degrees, have become more liberal in granting authorities, probably in large part influenced by the actions and philosophy of the recent and current Interstate Commerce Commissions."[45] In a study done in 1984, Baker estimates that 50% of the states have maintained their policies while the other 50% have become more liberal in granting operating authorities and, at the same time, have become less likely to heed protests of existing carriers. The easier standard of public interest or demand has replaced PCN for entry justification.[46]

Baker classified states as to their strictness of their laws on the books and as to the strictness of their regulatory agency in enforcing those laws. Currently, eleven states (Alabama, Colorado, Illinois, Michigan, Missouri, Montana, Nebraska, Nevada, Ohio, Oklahoma, and Texas) are rated strict on both accounts. Another thirteen states (Kentucky, Louisiana, Massachusetts, Minnesota, Mississippi, New Hampshire, New Mexico, North Carolina, Oregon, Rhode Island, Washington, West Virginia, and Wyoming) only responded to the law question and rated themselves as strict. Eight states regard themselves as having strict laws but moderately liberal interpretation (California, Connecticut, Hawaii, Indiana, New York, Pennsylvania, South Dakota, and Tennessee). South Carolina states that they have a strict law but a liberal interpretation. In sum, 33 states believe that they have strict laws. Idaho and Utah claim partial regulation and moderately liberal interpretation while Maryland, Vermont, and Wisconsin claim partial regulation and did not respond to the enforcement question. Six states gave no response to the law question but described their interpretation. Kansas said that they were liberal. Arkansas, Iowa, North Dakota, and Virginia claimed that they were moderately liberal. Georgia maintained that they were strict.

While entry is perceived as being easier in 50% of the

states, rate controls are still strong. Twenty three states (down from thirty two states in 1984) strictly regulate rates. Twelve have limited rate controls (Arkansas, Colorado, Connecticut, Idaho, Iowa, Kansas, Kentucky, New York, South Dakota, Tennessee, Utah, and Virginia) in that some major segment is not regulated or that rates do not have to be filed, etc. Seven states exercise very little control (Indiana, Maryland, Massachusetts, Minnesota, New Hampshire, North Dakota, and Ohio) and eight have no controls because of deregulation (Alaska, Arizona, Delaware, Florida, Maine, New Jersey, Vermont, and Wisconsin).

The TLA data on rate regulation, existence of rate bureaus, and antitrust immunity are shown in Table 1-4. The data show that "the changes in the regulatory law have little effect upon the publication of bureau tariffs as they continue to function in forty seven states which includes those recently deregulated."[47] A year later, the TLA study shows bureaus in all states and, in 1987, the TLA shows bureaus in all states but Wisconsin.

According to the TLA, the rate bureaus did not have immunity from antitrust in 28 states in 1985 ranging from deregulated Florida to strictly regulated Washington. Changes could be forthcoming here given the resolution of the Southern Motor Carriers Ratemaking Conference (SMCRC) case in 1985 where the Supreme Court decided that intrastate collective ratemaking did not violate the U.S. antitrust statute[48] as long as it is sanctioned by the state (de facto or de jure) and it is actively supervised by the regulatory agency. By 1987, only 23 states did not grant antitrust immunity (and eight of those were the deregulated states cited above and hence could not actively supervise).

Recent regulatory activity, the status of current regulation, and formal (as opposed to de facto entry requirements) are shown in Table 1-5.

NARUC annually surveys the regulatory agency of each state with respect to their regulatory policies including motor carrier regulation. Since 1979, NARUC has asked the states whether their rates are above or below interstate rates and for a percentage deviation. The results for the eight years for which data are available are shown in Table 1-6. Interestingly, every reporting state claims that their rates are the same as or below interstate rates except California which states that interstate LTL rates are generally higher than intrastate LTL rates while interstate TL rates are both higher and lower than intrastate TL rates. The results reported by NARUC generally do not reflect a scientific study which controls for variables which could influence rates and do not reflect the discounting of rate bureau rates on the interstate and intrastate level.[49]

An unpublished study by the author of this report done for the year 1982 (reported on below) demonstrates that rates in many of these states were in fact higher than comparable interstate rates. The 1982 study controlled for non-regulatory variables which could

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TABLE 1-4

RATE REGULATION AND COLLECTIVE RATEMAKING

	Rate Regulation			Do Rate Bureaus Have Antitrust Immunity		
	12/1/87	1/1/85	1/1/84	12/1/87	1/1/85	1/1/84
Alabama	strict	strict	strict	exist/not immune	exist/ immune	exist/ immune
Alaska	none	none	strict	exist/not immune	exist/not immune	exist/ immune
Arizona	none	none	none	exist/not immune	exist/not immune	exist/not immune
Arkansas	limited	strict	limited strict	exist/not immune	exist/ immune	exist/ immune/not immune
California	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Colorado	limited	strict	strict	exist/not immune	exist/not immune	exist/not immune
Connecticut	limited	strict	strict	exist/not immune	exist/not immune	exist/not immune
Delaware	none	none	none	exist/not immune	exist/not immune	exist/not immune
Florida	none	none	none	exist/not immune	exist/not immune	exist/not immune
Georgia	strict	strict	strict	exist/ immune	exist/not immune	terminated due to SMCRC
Hawaii	strict	limited	limited	exist/ immune	exist/ immune	exist/ immune
Idaho	limited	strict	strict	exist/ immune	exist/not immune	exist/not immune
Illinois	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Indiana	very little control	limited	limited	exist/not immune	exist/ immune	exist/ immune
Iowa	limited	strict	strict	exist/not immune	exist/not immune	exist/not immune
Kansas	limited	strict	strict	exist/ immune	exist/ immune	exist/ immune
Kentucky	limited	limited	limited	exist/ immune	exist/not immune	exist/not immune
Louisiana	strict	strict	strict	exist/not immune	exist/ immune	exist/not immune
Maine	none	none	none	exist/not immune	exist/not immune	exist/not immune

TABLE 1-4 (Con't)

State						
Maryland	very little control	limited	limited	exist/not immune	exist/not immune	exist/ immune
Massachu-setts	very little control	strict	strict	exist/ immune	exist/not immune	exist/not immune
Michigan	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Minnesota	very little control	strict	strict	exist/ immune	exist/ immune	exist/ immune
Mississippi	strict	strict	strict	exist/not immune	exist/not immune	exist/not immune
Missouri	strict	strict	strict	exist/ immune	exist/not immune	exist/not immune
Montana	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Nebraska	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Nevada	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
New Hamp-shire	very little control	strict	strict	exist/not immune	exist/not immune	exist/not immune
New Jersey	none	none	none	exist/not immune	exist/not immune	exist/not immune
New Mexico	strict	strict	strict	exist/ immune	exist/ immune	exist/not immune
New York	limited	limited	limited	exist/ immune	exist/ immune	exist/ immune
North Carolina	strict	strict	strict	exist/ immune	exist/not immune	exist/not immune
North Dakota	very little control	strict	strict	exist/not immune	exist/not immune	exist/not immune
Ohio	very little control	limited	limited	exist/not immune	exist/not immune	exist/not immune
Oklahoma	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Oregon	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Pennsyl-vania	strict	limited	limited	exist/ immune	exist/not immune	exist/not immune
Rhode Island	strict	strict	strict	exist/ immune	exist/not immune	exist/not immune
South Carolina	strict	strict	limited	exist/ immune	exist/not immune	exist/not immune

TABLE 1-4 (Con't)

South Dakota	very little control	limited	strict	exist/not immune	exist/not immune	exist/not immune
Tennessee	very little control	limited	strict	exist/not immune	exist/not immune	exist/not immune
Texas	strict	strict	strict	exist/ immune	exist/ immune	exist/ immune
Utah	very little control	strict	strict	exist/not immune	exist/not immune	exist/not immune
Vermont	none	none	none	exist/not immune	exist/not immune	exist/not immune
Virginia	limited very little control	strict/ limited	limited	exist/ immune	exist/ immune	exist/ immune
Washington	strict	strict	strict	exist/not immune	exist/not immune	exist/not immune
West Virginia	strict	strict	strict	exist/ immune	exist/not immune/ suspended by regulatory agency	suspended by by regulatory agency
Wisconsin	none	none	none	no control exercised over rates	exist/not immune	terminated law enacted 1982
Wyoming	strict/ limited	strict	strict	exist/ immune	exist/ immune	exist/ immune

Source: Daniel Baker, "General Survey of the Status of State Regulation of Transportation", University of Denver and the Transportation Lawyers Association, 17th Annual Transportation Law Institute, Breckenridge, CO, July 25-27, 1984 and Daniel Baker, "1985 Update of General Survey of Status of Regulation of Motor Carriers by Individual States", Transportation Lawyers Association, State Regulatory Study Committee, 1985 and Daniel Baker "State Regulatory Activity and Federal Preemption," 21st Transportation Law Institute, pp. 83-95, 1988.

TABLE 1-5

DEGREE OF REGULATION OF MOTOR CARRIERS OF GENERAL FREIGHT,
REQUIREMENTS TO OBTAIN A CERTIFICATE OF ENTRY, AND LEGISLATIVE
ACTIVITY CONCERNING DEREGULATION/REGULATION AT THE LAST
LEGISLATIVE SESSION

	Degree of Regulation			Was Deregulation Considered at Last Legislative Session			Requirement for Obtaining a Certificate		
	12/87	1/85	1/84	12/87	1/85	1/84	12/87	1/85	1/84
Alabama	Law S Agency S	total	total	no	no	no	PCN	PCN	PCN
Alaska	DR	DR	total	no	yes/ pass	yes/ def	DR	DR	PCN
Arizona	DR	DR	DR	no	no	no	DR	DR	DR
Arkansas	Agency ML	total	total	no	no	no	PCN	Vary	Vary
California	Law S Agency ML	total	total	no	no	no	PCN/ DR	PCN	PCN
Colorado	Law S Agency S	total	total	yes/ part pass	yes/ def	yes/ def	PCN	PCN	PCN
Connect-icut	Law S Agency ML	total	total	no	no	no	PCN	PCN	PCN
Delaware	DR	DR	DR	no	no	no	DR	DR	DR
Florida	DR	DR	DR	no	no	no	DR	DR	DR
Georgia	Agency S	total	total	yes/ part pass	no	no	PCN/ PND	PCN	PCN/ PND
Hawaii	Law S Agency ML	total	total	no	no	yes/ def	PCN	PCN	PCN
Idaho	Law/ Part DR Agency L	total	total	no	no	no	PCN/ DR	PCN	PCN
Illinois	Law S Agency S	total	total	no	yes/ def	no	PCN	PCN	PCN
Indiana	Law S Agency ML	total	total	yes/ def	no	yes/ def	PCN	PCN	PCN
Iowa	Agency ML	total	total	no	no	no	PCN	PCN	PCN
Kansas	Agency L	part DR	part DR	no	no	part DR pass	Fit-ness	Ltd Proof	Ltd Proof
Kentucky	Law S	total	total	no	no	no	PCN	PCN	PCN

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TABLE 1-5 (Con't)

Louisiana	Law S	total	total	no	yes/ def	yes/ def	PCN	PCN	PCN
Maine	DR	DR	DR	no	no	no	DR	DR	DR
Maryland	Law/ Part DR	total	total	no	no	no	PCN	PCN	PCN
Massachu- setts	Law S	total	total	no	no	no	PCN	PCN	PCN
Michigan	Law S Agency S	part DR	total	no	part DR pass	part DR pass	PND	PND	PND
Minnesota	Law S	total	total	no	no	no	PCN	PCN	PCN
Mississ- ippi	Law S	total	total	no	no	yes/ def	PCN	PCN	PCN
Missouri	Law S Agency S	total	total	no	no	no	PCN/ Fit- ness	PCN	PCN/ PND
Montana	Law S Agency S	total	total	no	no	no	PCN	PCN/ PND	PCN/ PND
Nebraska	Law S Agency S	total	total	no	no	no	PCN	PCN	PCN
Nevada	Law S Agency S	total	total	no	no	more reg pass	PCN/ PND	PCN	PCN
New Hamp- Shire	Law S	total	total	no	no	no	PCN	PCN	PCN
New Jersey	DR	DR	DR	no	no	no	DR	DR	DR
New Mexico	Law S	total	total	no	no	yes/ def	PCN	PND	PND
New York	Law S Agency ML	part DR	total	no	part DR pass	part DR pass	PCN/ *	PCN	PCN
North Carolina	Law S	total	total	no	no	no	PCN	PCN	PCN
North Dakota	Agency ML	part DR	part DR	no	no	no	PCN	PCN	PCN
Ohio	Law S Agency S	total	total	no	no	part DR pass	PCN	PCN	PCN
Oklahoma	Law S Agency S	total	total	no	no	yes/ def	PCN	PCN	PCN
Oregon	Law S	total	total	no	no	more reg pass	PCN	PCN	PCN
Pennsyl- vania	Law S Agency ML	total	total	no	no	no	PCN/ Fit- ness	PND	PCN
Rhode Island	Law S	total	total	no	no	no	PCN	PCN	PCN

TABLE 1-5 (Con't)

State	Classification								
South Carolina	Law S Agency L	total	total	no	no	part DR pass	Ltd Proof	Ltd Proof	Ltd Proof
South Dakota	Law S Agency ML	total	total	no	more reg pass	more reg pass	PND	PCN/ PND	PCN
Tennessee	Law S Agency ML	total	total	no	no	no	PCN	PCN	PCN
Texas	Law S Agency S	total	total	no	no	part DR pass	PCN	PCN	PCN
Utah	Law/ Part DR Agency L	total	total	yes part DR pass	yes/ def	yes/ def	Ltd Proof	PCN	PCN
Vermont	Law/ Part DR	total	total	no	no	yes/ def	Ltd Proof	PCN	PCN
Virginia	Agency S/ML	total	total	no	no	no	PCN	PCN	PCN
Washington	Law S	total	total	yes/ **	no	yes/ def	PCN	PCN	PCN
West Virginia	Law S	total	total	no	yes/ def	yes/ def	PCN	PCN	PCN
Wisconsin	part DR	part DR	DR	no	no	yes/ pass	Fit- ness	DR	Ltd Proof
Wyoming	Law S	total	total	no	no	no	PCN	PCN	PCN

Note: S   - strict
    ML   - moderately liberal
    L   - liberal
  total - total regulation
  DR   - deregulation
  def   - defeated
  PCN   - public convenience and necessity
  PND   - public need or demand
  *   - less stringent proof required
  **   - no committee vote

Source: Daniel Baker, "General Survey of the Status of State Regulation of Transportation", University of Denver and the Transportation Lawyers Association, 17th Annual Transportation Law Institute, Breckenridge, CO, July 25-27, 1984 and Daniel Baker, "1985 Update of General Survey of Status of Regulation of Motor Carriers by Individual States", Transportation Lawyers Association, State Regulatory Study Committee, 1985 and Daniel Baker, "State Regulatory Activity and Federal Preemption", 21st Transportation Law Institute, pp. 83-95, 1988.

TABLE 1-6

STATE ASSESSMENT AS TO WHETHER INTRASTATE RATES ARE BELOW OR
ABOVE INTERSTATE RATES AND BY WHAT MAGNITUDE IF AVAILABLE

	1979	1980	1981	1982	1983	1984	1985	1986	1987
Alabama	B6	B6	B6	B6	B6	B6	B5	B5	B5
Alaska	0	0	0	0	0	DR	DR	DR	DR
Arizona	B	B	-	DR	DR	DR	DR	DR	DR
Arkansas	B10	B10	B10	B10	B10	B10	B10	B10	B10
California	B	B	B	B	B	B	B	A	A
Colorado	B5-10	B5-10	B0-10	B0-10	-	-	V	V	V
Connecticut	B24	B24	B24	B24	B23	B23	B23	B23	B23
Delaware	DR	DR	DR	DR	DR	DR	DR	DR	DR
Florida	-	-	DR	DR	DR	DR	DR	DR	DR
Georgia	B	B	B	B	B	B	B25	B25	B25
Hawaii	-	-	-	-	-	-	B10-20	B10-20	B10-20
Idaho	B12	B6	0	0	B10-20	B10-20	-	NA	NA
Illinois	-	-	-	0	0	0	-	-	-
Indiana	-	-	-	-	-	-	-	-	-
Iowa	-	-	. -	0	0	0	0	0	0
Kansas	B5.5	B	B	B	B	B	B	B10-25	B10-25
Kentucky	-	0	0	0	0	0	0	0	0
Louisiana	-	-	-	-	-	-	-	-	-
Maine	B22-26	B22-26	B22-26	DR	DR	DR	DR	DR	DR
Maryland	-	-	-	-	B10	B3	B3-10	B3-10	U
Massachusetts	-	-	-	-	-	-	-	-	-
Michigan	-	-	-	-	-	-	-	NA	NA
Minnesota	-	B10	B10	B10	B10	B10	B10	NA	0
Mississippi	B20	B20	B20	B20	B5	B5	B5	B5	B5
Missouri	-	-	-	B10-15	B10-15	B10-15	B10-15	B10-15	B10-15
Montana	_	-	B5-10	B5-10	B5-10	B5-10	B5-10	B5-10	B5-10
Nebraska	B20	B20	B20	B20	B20	B20	B20	B20	B20
Nevada	B	B	B8	B8	B8	B8	B8	B8	B8
New Hampshire	-	-	-	-	-	-	-	-	U
New Jersey	DR	DR	DR	DR	DR	DR	DR	DR	DR
New Mexico	B	B	B	B10	B10	B10	B10	B3	B3
New York	B15	B15	B15	B15	B15	B15	B15	B15	B15
North Carolina	B20	B20	B10	B8	B8	B8	B8-15	B8-15	B8-15
North Dakota	-	B	B	B	B	B	B	B	B
Ohio	-	-	B	B	B	B	B	B	B

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TABLE 1-6 (Con't)

State									
Oklahoma	-	-	-	B5-10	B5-10	B5-10	B5-10	B5-10	B5-10
Oregon	0	0	0	0	0	0	B	0	0
Pennsylvania	B7	B7	B7	0	0	0	0	0	0
Rhode Island	-	-	0	0	0	0	0	0	0
South Carolina	B55	B	B	B	B	B	B	B5-10	B5-10
South Dakota	B20	B20	B20	B30	B30	B30	B30	B30	B30
Tennessee	B6-8	B6-8	B6-8	B6-8	B	B	B20	B20	B20
Texas	B7-8	B7-8	B15	B15	B	B	B	B	B
Utah	-	-	-	-	-	-	-	-	-
Vermont	-	-	-	-	-	-	-	DR*	DR
Virginia	B35	B35	B35	B	B	B	B	B	B
Washington	0	0	0	0	0	0	0	0	0
West Virginia	B5	B5	0	0	0	0	0	0	0
Wisconsin	B10	B10	B10	B10	DR	DR	DR	DR	DR
Wyoming	B25	B25	B20	B20	B	B	B	B	B

Key: B   =below interstate rates
Bxx —below interstate rates by xx percent
0   =equal to interstate rates
DR =deregulated
-   =no response
V   = varies
U   = unknown
A   = above
NA = not available
*   = Economic regulation of motor carriers of general commodities ended 7/1/86

Source: Annual Report on Utility and Carrier Regulation, National Association of Regulatory Utility Commissioners, Washington, D.C., 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987.

influence rates, e.g., commodity type, shipment weight, distance, traffic balance potential of the move, etc. In addition to the above controls, the current study compares both actual and discounted rates versus intrastate rates. Thus the potential hearsay nature of the NARUC rate study is eliminated and the comparison with discounted rates more closely reflects the true comparison which should be made. In the current study, rates collected in Spring 1987 are used.

Some states did not respond to this question from NARUC, i.e., Indiana, Louisiana, Massachusetts, and Utah. Other states always respond qualitatively, i.e., California, North Dakota, and Ohio. No reports are given for the deregulated states. Iowa, Kentucky, Minnesota, Oregon, Pennsylvania, Rhode Island, Washington, and West Virginia currently report the same rates intrastate and interstate. Other states report intrastate rates below interstate and give magnitudes. These state reports will be compared and contrasted with the rate samples undertaken by the author of this report in 1982 and 1987.

Some states consistently report the same level of rates below interstate. This suggests either that the same individual makes off-hand estimates or that the state consciously "pegs" its rates to the interstate level, e.g., Arkansas 10% below, Nebraska 20% below, Nevada 8% below, and New York 15% below.

In general, most states reporting percentages below in 1984 report that the percentage difference between intra and interstate rates is declining or remaining the same. The only exception is South Dakota where the difference has gone from 20% to 30%. (South Dakota passed a MCA-1980 analogue bill effective July 1, 1981) and Tennessee which went from 6-8% below to 20% below.

Table 1-6 shows the results of the NARUC rate survey for all of the states from 1976 through 1987. A much different picture is generally portrayed in the rate analysis generated for this study.

NARUC also looks at the state's target operating ratio, which has a major impact on rate levels. The operating ratio is defined as operating costs divided by operating revenues. The higher the operating ratio, the lower the profit that the carrier is making. Carriers, therefore, prefer that states set rates with the goal of obtaining a low target operating ratio. The regulatory agency theoretically sets the target operating ratio so that a prudently operated carrier will be able to cover non-operating costs and make a normal profit with the difference between the operating revenues and operating costs.

Historically, the ICC target operating ratio was .93. Therefore, a prudently run carrier moving an average unit of traffic and incurring a cost of $93 for doing so should be allowed to charge $100 for the move in order to obtain the target operating ratio (and hence profit). To demonstrate the impact of different target operating ratios on interstate and intrastate rates, suppose that the ICC rates are predicated on an operating ratio of 93. If states have target operating ratios different than .93, then the comparison of inter and intrastate rate levels in the NARUC data is suspect.

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If, for instance, the state's target operating ratio is higher than .93, then the carriers can have lower rates intrastate
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than interstate given the same cost structure. On the other hand, if the operating ratio is lower than .93, then the carriers can have higher rates intrastate than interstate for the same cost structure. Interstate and intrastate rate comparisons must be adjusted for these differences in target operating ratios. This is explained in more detail in the analysis below.

Of the 31 states reporting target operating ratios in 1984, nine had a .93 operating ratio, eleven had operating ratios or
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an average of allowable operating ratios exceeding .93, while the remainder had operating ratios or an average of allowable operating ratios less than .93. By 1987, ten states had a .93 operating ratio, eleven had operating ratios or an average range of operating ratios exceeding .93 while ten were below .93.

Some extremes are an allowable operating ratio of .89 in Colorado and a target operating ratio of .89 in New Mexico, while North Carolina has an allowable operating ratio of .99. Until it stopped reporting in 1983, Mississippi had a target operating ratio of .985. The results for all of the states are shown in Table 1-7.

Many of the rates which are presented to the state regulatory agencies for approval are submitted not by the individual carrier that wishes to charge the rate, but rather by a rate bureau on behalf of many carriers that wish to charge the same rate. Rate bureaus are a collection of carriers which band together and propose rates collectively for submission to the regulatory agency. Other functions are also provided by the rate bureau, such as publishing tariffs and doing research, but a major function is the collective determination and proposing of rates. In most states, carriers do not have to be members of rate bureaus and hence can propose rates individually if they wish. In addition, carriers who are rate bureau members can opt not to participate in the collectively proposed rates but rather file an independent action proposing a different rate. However, most general freight carriers participate in the rate bureaus. The role of rate bureaus in the regulatory process is discussed in detail below.

State policy toward rate bureaus is presented in Table 1-8 from 1976 to the present time. In 1977 the SMCRC case was initiated, and its impact on state policies is evident in Table 1-8. Subsequent state policy changes reflect the potential resolution, through time, of the SMCRC case.

In 1977, most state regulatory agencies sanctioned collective ratemaking. Arizona never allowed it and subsequently deregulated; California allowed it in 1978 and reaffirmed it in 1986; Delaware was always deregulated; Michigan allowed it in 1978; Missouri allowed it in 1979; Nebraska has not changed its policy; New Jersey was always deregulated; South Dakota has not changed its policy; and Wyoming has not changed its policy.

Florida deregulated in 1980, Maine in 1982, Wisconsin in

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TABLE 1-7

TARGET OPERATING RATIO OF STATE

	1979	1980	1981	1982	1983	1984	1985	1986	1987
Alabama	92-93	92-93	92-93	92-93	92-93	92-93	90-91	90-91	90-91
Alaska	90	90	90	-	-	DR	DR	DR	DR
Arizona	93	93	93	DR	DR	DR	DR	DR	DR
Arkansas	90-93	90-93	90-93	90-93	90-93	90-93	90-93	90-93	90-93
California	93	93	93	93	93	93	93	93	93
Colorado	93	93	90-95	87-95	89-95	89-95	89-95	89-95	89-95
Connecticut	93	93	93	93	93	93	93	93	93
Delaware	DR	DR	DR	DR	DR	DR	DR	DR	DR
Florida	-	-	DR	DR	DR	DR	DR	DR	DR
Georgia	93	93	93	93	93	93	93	93	93
Hawaii	93	90	93	93	93	93	93	93	93
Idaho	90-93	90-93	90-93	90-93	V	V	90-95	90-95	90-95
Illinois	-	-	-	90-93	90-93	90-93	-	-	-
Indiana	-	-	-	-	-	-	-	-	-
Iowa	-	93.25	93.25	93.25	93.25	93.25	93.25	93.25	93.25
Kansas	-	-	-	-	-	-	-	93	93
Kentucky	-	93	93	93	93	V	V	V	V
Louisiana	-	-	-	-	-	-	-	-	-
Maine	93	93	93	DR	DR	DR	DR	DR	DR
Maryland	-	-	-	-	90	95	95	95	90
Massachusetts	-	-	-	-	-	-	-	-	-
Michigan	-	-	-	-	-	-	-	-	-
Minnesota	-	93-95	93-95	93-95	93-95	93-95	93-95	94-96	94-96
Mississippi	98.5	98.5	98.5	98.5	-	-	-	-	-
Missouri	-	-	-	93.96	93.96	93.96	93-95	93-95	93-95
Montana	-	-	93	93	93	93	93	93	93
Nebraska	93	93	93	93	93	93	93	93	93
Nevada	94	94	94	94	94	94	94	94	94
New Hampshire	-	-	-	-	-	-	-	-	U
New Jersey	DR	DR	DR	DR	DR	DR	DR	DR	DR
New Mexico	90	90	90	87	87	87	87	87-90	89-90
New York	94	94	94	94	94	94	94	94	94
North Carolina	99	99	95-99	95-99	95-99	95-99	90-99	90-99	90-99
North Dakota	-	90-93	90-93	90-93	90-93	90-93	90-93	90-93	90-93
Ohio	-	-	-	-	-	-	-	-	V

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TABLE 1-7 (Con't)

Oklahoma	-	-	-	90-93	90-93	90-93	95	95	95
Oregon	93-96	93-98	93-98	93-98	91-97	95.7	96	95.3	96.5
Pennsylvania	93	93	93	93	93	93	93	93	93
Rhode Island	-	-	93	93	93	93	93	93	93
South Carolina	92-93	92-93	92-93	92-93	92-93	92-93	92-93	92-93	92-93
South Dakota	95	95	95	95	95	95	95	95	95
Tennessee	-	-	-	-	90-92	90-92	90-92	90-92	90-92
Texas	92	92	90	90	90	90	90	90-95	90-95
Utah	95	95	95	95	95	95	95	95	95
Vermont	-	-	-	-	-	-	-	DR	DR
Virginia	-	-	-	-	-	-	-	-	-
Washington	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5
West Virginia	89-93	89-93	90-93	90-93	90-93	90-93	90-93	90-93	90-93
Wisconsin	95	95	95	95	DR	DR	DR	DR	DR
Wyoming	93	93	93	93	93	93	93	93	93

Notes: xx = operating ratio =
             (operating costs)/(operating revenues) X 100
          DR = deregulated
          - = not reported
          V = agency reported that their operating ratio varies
          U = unknown

Source: Annual Report on Utility and Carrier Regulation, National
        Association of Regulatory Utility Commissioners,
        Washington, D.C., 1980, 1981, 1982, 1983, 1984, 1985, 1986,
        1987.

TABLE 1-8

EXISTENCE OF COMMON CARRIER RATE BUREAUS IN A STATE (A) AND THE REGULATION OF THE BUREAUS BY THE STATE (B)

	1976		1977		1978		1979		1980		1981		1982		1983		1984		1985		1986		1987	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Alabama	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Alaska	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-
Arizona	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z
Arkansas	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
California	N	Z	N	Z	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Colorado	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Connecticut	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Delaware	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	-	-	N	-
Florida	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-
Georgia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hawaii	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Idaho	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Illinois	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y
Indiana	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	-	Y	-	Y	N
Iowa	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kansas	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kentucky	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Louisiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maine	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	N	-
Maryland	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Massachusetts	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Michigan	N	Z	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Minnesota	Y	-	Y	-	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y	Y
Mississippi	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Missouri	N	Z	N	Z	N	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	N	Y	N
Montana	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nebraska	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z	N	Z
Nevada	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
New Hampshire	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
New Jersey	D	D	D	D	D	D	D	D	D	D	D	D	N	-	N	-	N	-	N	-	N	-	N	-
New Mexico	Y	-	Y	-	Y	-	Y	-	Y	-	Y	-	Y	-	Y	N	Y	N	N	N	N	N	N	N
New York	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
North Carolina	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

TABLE 1-8 (Con't)

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North       Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y
Dakota
Ohio        Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N
Oklahoma    Y -   Y -   Y -   Y -   Y -   Y -   Y Y   Y Y   Y Y   Y Y   Y Y
Oregon      - -   - -   - -   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y
Pennsyl-    Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N
vania
Rhode       Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N
Island
South       Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N
Carolina
South       N Z   N Z   N Z   N Z   N Z   N Z   N Z   N Z   N Z   N Z   N Z
Dakota
Tennessee   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y
Texas       Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y
Utah        Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y
Vermont     Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N
Virginia    Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N   Y N
Washing-    Y Y   Y Y   Y Y   Y Y   N Y   N Y   N Y   N N   N N   N N   N N   N N
ton
West        Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y *
Virginia
Wisconsin   Y Y   Y Y   Y Y   Y Y   Y Y   Y Y   Y N   N N   N N   N N   N N
Wyoming     N -   N -   N -   N -   N -   N -   N -   N -   N -   N -   N -
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Notes: Y - yes
        N - no
        - - no response
        Z - not applicable (because deregulated, etc.)
        D - deregulated
        * - suspended collective ratemaking in 1982 until late 1986

Source: Annual Report on Utility and Carrier Regulation, National
        Association of Regulatory Utility Commissioners, Washington,
        D.C., 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985,
        1986, 1987.

1982, Alaska in 1984, and Vermont in 1986 joined the ranks of those states not allowing collectively set rates. Washington disallowed collective rates in 1980, while West Virginia suspended the allowance of collective rates in 1982, reaffirmed the suspension through 1986, and then returned to the allowance of collective ratemaking.

More states do not actively supervise the activities of the rate bureaus. In addition to the states not allowing collective rates in 1977, those states allowing such rates but not supervising the bureaus were: Alabama, Colorado, Illinois, Indiana, Iowa, Kentucky, Maryland, Minnesota, Mississippi, Montana, New Hampshire, New Mexico, New York, Ohio, Pennsylvania, Rhode Island, South Carolina, Vermont, and Virginia. By 1984, Alabama still did not supervise, nor did Colorado, Indiana, Maryland, Minnesota, Mississippi, New Hampshire, New Mexico, Ohio, Pennsylvania, Rhode Island, South Carolina, Vermont, and Virginia. By 1987, Minnesota and Vermont were removed from the list while Missouri and Washington were added.

When California allowed collective rates, they also regulated the rate bureaus. Illinois started regulating the bureaus in 1979, stopped in 1985 and reregulated in 1987; Iowa started regulating rate bureaus in 1983; Kentucky in 1984; Michigan in 1982; Minnesota in 1986; Montana in 1978, New York in 1984. Kansas, which had stopped regulating bureaus in 1980, reinstated regulation in 1983. Missouri's collective ratemaking supervision is special by the state as explained further in the text. In Texas, the regulatory agency prescribes the rates, as is the case in Washington and Wyoming.

Thus, a few states have responded to the threat of the SMCRC case by regulating rate bureaus and their activities. Given the 1985 Supreme Court decision in the SMCRC case, it would be expected that the states which allow collective ratemaking would also regulate the rate bureaus to comply with the active supervision test utilized by the Supreme Court in its decision. As shown above, five states began actively supervising rate bureaus since the resolution of the SMCRC case.

As can be seen from the tables, the states practice various policies with respect to economic motor carrier regulation. These diverse policies make for a lack of uniformity that could inhibit carriers in their pursuit of interstate business. This is a major topic of inquiry in this report, along with the question of the resource costs of regulation to the states.

Outline of the Rest of the Report:

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While the interstate market has been well studies, little has been written concerning the intrastate motor carrier
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market. This report will examine the intrastate market with the objective of determining whether state regulation exerts a

substantial burden on interstate commerce.

The report is organized as follows. This chapter is a brief introduction to intrastate motor carrier regulation and outlines the questions to be investigated herein. It also summarizes the de facto and de jure situations in the current intrastate motor carrier markets. Chapter 2 examines the theoretical rationale for regulation/deregulation and explores various competing theories of regulation. In addition, the initial public policy rationale of regulation will be discussed along with how and why the public policy perception has changed over time leading to significant deregulation on the federal level and in several states. Federal analogies are continually drawn upon because the state scenarios strongly parallel the federal scenario. Chapter 3 shows the limited data available on the magnitude of intrastate movements of commodities by motor carriage.

Chapter 4 investigates the social costs of intrastate motor carrier regulation by integrating the theory discussed in Chapter 2 with the US Multi-Regional Input-Output (MRIO) model. A small example of the methodology is presented. Ultimately, this methodology is tested by comparing rates in states with various degrees of regulation with the rates in the virtually deregulated federal market. Various experimental design and statistical controls are established so that the rates compared differ only because of differences in regulatory structure. These designs and controls, the data, as well as other practical questions concerning the operationalization of the methodology of Chapter 4 are developed in Chapter 5.

The interrelationship of state regulation and interstate commerce is the subject of Chapter 6. The hypothesis to be investigated therein is whether state policy with respect to the intrastate regulation of motor carriers can thwart the intent of interstate deregulation on the federal level. The magnitude of the impact is measured by the use of the US Multi-Regional Input-Output (MRIO) model. The impacts can be spread across 125 economic sectors and 50 states and DC. To conserve time and budget, however, the data was aggregated to form 73 economic sectors and 28 regions. These impacts are calculated by linking the MRIO model and the impact of regulation theory of Chapter 2 as demonstrated in Chapter 4.

Chapter 7 discusses the role of the federal government in what appears to be strictly state business. It investigates the pros and cons of federal intervention in state activities and of federal preemption of state actions.

The concluding chapter, Chapter 8, recommends policy for both the state governments and the federal government with respect to intrastate motor carrier regulation.

ENDNOTES TO CHAPTER 1

1. A ton-mile is one ton moved one mile and is a traditional output measure in the transportation field.

2. The ton-mile, tons, and revenue figures are from Transportation Policy Associates, Washington, DC., "Transportation in America, A Statistical Analysis of Transportation in the United States", 6th edition, March 1988.

3. 30,481 as reported in Nicholas A. Glaskowsky, Effects of Deregulation on Motor Carriers, Eno Foundation for Transportation, Inc., Westport, CT, 1986, p. 17. Lana Batts, a vice president of the American Trucking Associations, claims that nearly 40,000 firms exist (see "Truck Decontrol Placed On Hold", Handling and Shipping Management, November, 1986, p. 50.

4. A private carrier is a division of a firm which hauls its own products. The Motor Carrier Act of 1980, which codified Interstate Commerce Commission (ICC) case law, and subsequent (ICC) case laws have allowed private carriers to become common and contract carriers (defined in text below), to haul products of 100 % owned corporate affiliates, and to lease their vehicles to other types of carriers.

5. Charles A. Taff, Commercial Motor Transportation, 6 th edition, Cornell Maritime Press, Centreville, MD, 1980.

6. An owner-operator is an individual who owns a single truck (most likely) or a small fleet of trucks (less likely). The owner-operator tends to haul products that are exempt from regulation on an interstate basis, e.g., unprocessed agricultural products, or works for a regulated carrier, e.g., many household goods movers employ owner-operators.

7. See, Robert C. Lieb, Transportation: The Domestic System, Reston Publishing Co., Inc., Reston, VA, 1978, p. 61. The current conventional wisdom is that their numbers have shrunk because some of them have moved into the ICC regulated category and others have left the business because of high fuel costs, high insurance costs, high tractor prices, and low returns to their endeavors.

8. John J. Coyle, Edward J. Bardi, and Joseph L. Cavinato, Transportation, West Publishing Company, St. Paul, MN, 1982.

9. Prior to the Motor Carrier Act of 1980, contract carriers were restricted to no more than eight contracts. This limit is no longer in effect.

10. The initial regulation of motor carriers by the federal government exempted certain commodities and geographic areas from federal regulation. For instance, unprocessed agricultural products, e.g., lettuce, can be shipped across state lines without any federal (or state) motor carrier regulation. Commercial zones are defined as areas around cities (usually a certain number of miles from the city's corporate limits). Any shipments within those geographical confines are exempt from ICC regulation. Since some cities' commercial zones extend into adjacent states, e.g., Washington, DC's commercial zone extends into Maryland and Virginia, interstate transport within these zones is not regulated. Some motor carriers only haul in exempt markets, but all motor carriers are allowed to make exempt moves.

11. Many of the above distinctions have blurred since the passage of the Motor Carrier Act of 1980 and its interpretation which significantly deregulated the interstate motor carrier industry. As mentioned in endnote 4, private carriers can now become common and/or contract carriers. In addition, common carriers can become contract carriers and vice versa. Regional carriers have expanded their operations to become trunkline carriers, etc. Nevertheless, the distinctions made in the text still remain in practice, and many familiar with the industry still utilize the terms.

12. Dwight Dewey, "Applications of Regulatory Theory to the Trucking Industry", Research in Law and Economics, Vol. 6, 1984,
p. 215.

13. Economic regulation refers to the control of entry to the industry or parts of the industry, of exit from the industry, over rates charged, over mergers, etc., -- essentially economic variables. It does not refer to controls over physical safety standards or regulations, insurance, etc., which have, if anything, been nominally increased over recent years. This is not to imply, however, that these latter controls do not have economic effects on motor carriers.

14. Dorothy Robyn, Braking the Special Interest: Trucking Regulation and the Politics of Regulatory Reform, Chicago, University of Chicago Press, 1987.

15. Letter from Secretary of Transportation Elizabeth Dole to the Honorable George Bush, President of the Senate, Washington, D.C., September 12, 1985.

16. Ibid.

17. Letter to US Senator Robert Packwood from James E. Bartley, Executive Vice President, National Industrial Transportation League, (NITL) Washington, DC, January 27, 1986. The NITL endorsed ending economic regulation of the motor carrier industry. Its membership ships 80% of the country's commercial freight. See also, "Wholesale Grocers See Benefits In More Truck Deregulation", Traffic World, March 31, 1986, PP. 15-17 and "New Coalition Formed
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To Advocate Complete Motor Carrier Deregulation", Traffic World,
                                                  ----
March 3, 1986, PP. 15-16. This latter group contains many of the members that banded together to advocate the MCA-1980.

18. "Collective Ratemaking in the Trucking Industry", A Report to The President and The Congress of the United States, Submitted by the Motor Carrier Ratemaking Study Commission, Washington, DC, June 1, 1983, p. xiii.

19. Ibid. p. xiii.

20. Op. Cit. Endnote 5.

21. Op. Cit. Endnote 5.

22. Testimony of Herman Granberry, President, Private Carriers Conference, Inc., of the American Trucking Associations, Inc., before the Subcommittee on Surface Transportation, Senate Committee on Commerce, Science, and Transportation, Washington, DC, September 9, 1985.

23. "New Coalition Is Formed To Advocate Complete Motor Carrier Deregulation", Traffic World, March 3, 1986, PP. 15-16.
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24. Regular Common Carriers Conference, Convention Newsletter, Alexandria, VA, June 28, 1986 and "Rationale For Trucking Regulation Espoused By New Informal Coalition", Traffic World,
                                                   ----
March 24, 1986, PP. 35-37.

25. Statements by Robert Delaney, Senior Vice President, Leaseway Transportation, owner of the nation's 11th largest (by revenues) trucking firm (Anchor Motor Freight) and 22nd largest trucking firm (Signal Delivery Service) among others, in "Brokers Celebrate Budding Success, But Still Fret Over Image Problem", Traffic
                                                       ----
World, April 28, 1986, PP. 21-23.
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26. See testimony of James C. Harkins, Executive Director of the

Regular Common Carrier Conference of the American Trucking
Associations before the Surface Transportation Subcommittee of
the House Public Works and Transportation Committee as reported
in the Highway Common Carrier Newsletter, No. 911, November 11,
1985, Alexandria, VA, pp. 2-3.

27. Transportation costs have a fixed component that is independent
of distance shipped. These costs reflect billing, terminal costs,
etc., which are incurred regardless of the distance shipped. Other
costs vary with distance but tend to increase at a decreasing rate.
The sum of these costs, which are either fixed or variable with
respect to distance, also increases at a decreasing rate.
Therefore, the cost per mile for the carrier will decrease as the
number of miles increases, as the fixed costs are spread over more
miles and because the variable costs increase less rapidly as the
mileage increases. Rates charged tend to be related to the above
cost pattern. The results, of higher rates per mile for short
distances and lower rates per mile for long distances, is called
the "distance taper".

28. See the statement by Frank Jones, Vice President and Director
of Transportation of the Southwire Co., in "Georgia Intrastate
Rates Held Higher Than Interstate, Shippers Tell GPSC", Traffic
World, February 10, 1986, P. 69.

29. "Texas Challenges Ruling By ICC On Carpet Moves", Traffic
World, July 14, 1986, p. 65 and "Conrail Drug Test Appeal Taken;
Pinney Dock, ICC Pleas Denied", Traffic World, October 10, 1988,
p. 29.

30. "Texas Delivery Of Carpet From Warehouses Ruled Interstate By
ICC", Traffic World, April 28, 1986, p. 7.

31. "DOT Requests ICC Rule That Certain Single State Movements Are
Interstate Commerce", Highway Common Carrier Newsletter, No. 930,
September 22, 1986, Alexandria, VA, p. 1.

32. New Jersey did regulate household goods movers, solid waste
disposal movers, and tank truck operators. Each case was a
special one. The household goods movers were regulated because
this is the only motor carrier market where the general public
has contact with the carrier. The presumption was that an
unsophisticated buyer would require protection from a group of
business-wise sellers. The regulatory agency would provide that
protection. Solid waste disposal has always been a major issue in
New Jersey. The state environmental agency has a role in this

regulation. Tank trucks are a recent issue because of hazardous materials. Only entry is controlled here and it is really a registration of haulers as opposed to an entry restriction. The Division of Motor Vehicles handles this function rather than the Public Utilities Commission. For a discussion of New Jersey intrastate motor carrier regulation see, W. Bruce Allen, Steven Lonergan, and David Plane, Examination of the Unregulated Trucking Experience in New Jersey, United States Department of Transportation, Washington, DC, December, 1979, DOT/RSPA/DPB-50/79/13.

33. Richard Beilock and James Freeman, "Motor Carrier Deregulation in Florida", Growth and Change, April, 1983, pp. 30-41.

34. Proposition 101 which deregulated Arizona's intrastate motor carrier market in November, 1980. The deregulation was effective July 1, 1982.

35. Maine, H.R. 1576 (Regular Session 1981), which became effective on January 1, 1982.

36. Wisconsin, S.B. 150, Sub. 2, which passed in the Spring of 1982 and became effective on October 1, 1982.

37. Daniel W. Baker, "State Regulatory Activity and Federal Preemption", Transportation Law Institute, Washington, DC, October 1988, P. 88.

38. "Economic regulation of motor carriers of general commodities ended July 1, 1986." Annual Report on Utility and Carrier Regulation, National Association of Regulatory Utility Commissioners, Washington, DC., 1987, footnote 8, Table 142, p. 763.

39. That is, only a single carrier was allowed on a given route.

40. Daniel Baker, "1985 Update of General Survey of Status of Regulation of Motor Carriers by Individual States", Transportation Lawyers Association, State Regulatory Study Committee, 1985, p. 22.

41. "New California Program Preserves Collective Rates", Transport Topics, Alexandria, VA, No. 2647, May 5, 1986, p. 1 and p. 31 and "California Truckers Can Adjust Rates Under New Regulation Guidelines", Traffic World, April 28, 1986, p. 60.

42. "Utah Legislature Debates Trucking Deregulation", Traffic

World, February 17, 1986, p. 68. The bill passed in the spring of
1986 and became effective October 1, 1986.

43. "Georgia Senate Approves Bill To Relax Regulation Of State's
Truck Industry", Traffic World, March 17, 1986, p. 130.

44. Baker, op. cit., endnote 43, p.87.

45. Baker, op. cit, endnote 46.

46. Daniel Baker, "General Survey of the Status of State Regulation
of Transportation", University of Denver and the Transportation
Lawyers Association, 17th Annual Transportation Law Institute,
Breckenridge, CO, July 25-27, 1984, pp. 4-5.

47. Ibid. p. 5.

48. In 1977, the U.S. Department of Justice filed what became known
as the Southern Motor Carriers Ratemaking Conference (SMCRC) case.
The main contention of the case was that the rate bureaus, although
immune from federal antitrust statutes on the interstate level
because of the Reed Bulwinkle Act (1948), were in violation of the
Sherman Act on their intrastate collective ratemaking activities.
The case worked its way through the district and circuit courts,
each time resolving that an antitrust violation had occurred.
However, in 1985, the U.S. Supreme Court ruled in favor of the rate
bureaus. Details of the SMCRC case will be given in Chapter 2.

49. Discounting refers to the practice where a carrier will take
the tariff rate and tell the shipper/receiver that the rate to be
charged him/her will be x% less than the published rate. These
discounted rates must be filed with the regulatory agency.
Discounts of up to 80% are not unheard of, but the more common
range appears to be between thirty to fifty percent.

50. Consider a state with a target operating ratio of .95. Suppose
that the carrier had one move with costs of $93. A rate of $97.89
would allow the carrier to obtain the target operating ratio of
.95. A carrier facing the same costs in the interstate market would
require a rate of $100 to obtain the federal target operating ratio
of .93. Although both carriers have the same cost structure, the
intrastate carrier would report rates 2.11% below interstate rates.
The reverse situation would occur for states with target operating
ratios below .93.

51. Some states have more than one target operating ratio. In some
cases, the ratio is different for different types of carriers. In
other cases, the state has an acceptable range for the ratio. In
these cases, since no other information is given, the simple
average is taken and compared to .93.

52. See, for example, Taff, op. cit., and Garland Chow, The Economics of the Motor Freight Industries, Indiana University Press, Bloomington, IN, 1978.

53. See, Donald V. Harper, Economic Regulation of the Motor Trucking Industry by the States, The University of Illinois Press, Urbana, IL, 1959.

54. Federal preemption would entail the federal government controlling the state government's right to regulate intrastate motor carriage because such regulation has a negative impact on interstate commerce. Such preemption could take the form of complete disallowance of state motor carrier regulation or approval of a state regulatory plan that was in conformance with the federal perception of the degree of allowable interference with interstate commerce (where the implementation of the state regulatory plan would be subject to federal override).

CHAPTER 2

THE WELFARE COSTS OF STATE REGULATION OF MOTOR CARRIERS

Introduction:

This chapter discusses the theory of regulation in general and the theory applied to inter and intrastate motor carriage in particular. The impacts that strict entry controls and collective ratemaking are likely to have are discussed. These include: restricted output and higher rates, improper modal splits, excessive costs caused by regulation induced inefficiencies, and excessive costs caused by payments to input suppliers that could be passed on to the shippers due to a lack of carrier competition.Various measures of these costs are developed and discussed.

As developed in Chapter 1, virtually all states had adopted some form of motor carrier regulation by the late 1930's. Most of these regulations were patterned after the MCA-1935. The regulatory policy in most states was thus aimed at the control of entry and rates. Frequently, the stated objectives of the legislation were to prevent excess competition and to ensure the provision of adequate services at reasonable rates. The implication for the regulator was clear: rates must be maintained at some level which will insure carrier stability through an adequate rate of return which, however, will not permit excessive profits at shipper expense. What is not stated in the statute is how this task is to be accomplished.

Most statutes are written ambiguously with the intent that the appointees to the regulatory agency will make de facto law depending on their judgment as the environment and economy change and as specific conditions warrant. The statutes give parameters to guide decisions but the decisions are to be made by intelligent individuals who will make an educated analysis of
1
each idiosyncratic situation. Thus, how to accomplish the regulatory task is at the discretion of the regulators. The first regulators evolved procedures for handling situations, and their successors tended to follow the methods of their predecessors, with new procedures evolving slowly.

However, even where economic regulation can be justified (which is in question for the motor carrier industry), its intelligent implementation by the regulators requires a great deal of information. In the real world, perfect information is not available; moreover, all information entails cost to obtain, process, and digest. Regulation without information is likely to be imperfect. Thus, the lofty goals of regulation, simply stated as emulating competition or equitably distributing income, are very difficult to attain or to measure.

Numerous studies of federal motor carrier regulation prior to 1980 (as cited in the endnotes to this chapter) found that such regulation caused economic distortions. Much evidence was

found that suggested that market forces will yield a better economic solution, i.e. fewer resources would be necessary to produce a given output or that more output could be produced with the given amount of resources. Prices would be lower in a deregulated environment reflecting these efficiencies and reflecting a competitive market structure (as opposed to an imposed, but regulated, monopoly or oligopoly structure.) Comparing the regulated situation with a purely competitive model would yield an estimate of the costs of regulation.

Measurement of the economic costs imposed by regulation should begin with an understanding of the behavior that regulation is likely to generate. Therefore, a treatment is given below which demonstrates how various regulatory schemes are likely to impact on economic efficiency. In this analysis, the regulated outcome is compared to the competitive outcome and the measured difference between the two would be the economic costs of regulation.

However, the role of equity should also be considered. Thus the impact of equity versus efficiency will be examined in a regulatory context in evaluating the benefits of deregulation.

Types of State Regulation:

The regulations adopted by the various states to ensure rate reasonableness fall into several categories. In the extreme case, the state prescribes and publishes its own set of tariffs. Carriers may not deviate from the relevant tariff without the regulatory agency's approval. Since the petitioner for change usually bears the burden of proof, must endure hearings, and must overcome protests, deviations from said rates in the tariff can be costly.

Other states established a system of guidelines for rates. A tariff of minimum rates may be published to provide a threshold of the lowest rates believed to be profitable. A specific ratio of operating costs to operating revenue, called the operating ratio, may be designated as a target. For instance, a state might convey implicitly (e.g., via approval of rates proposed by carriers with the objective of obtaining a particular operating ratio) or explicitly (e.g., by setting the range) that rates resulting in an operating ratio above X (usually 1.00 or 100) or below Y (usually .9 or 90) are unacceptable.

The Operating Ratio Problem:

The use of the target operating ratio has potential difficulties. For instance, for many years, the ICC's target operating ratio was 93. If the rates were adjusted to reflect cost changes so that the target operating ratio was maintained, then it could be argued that carriers would have a disincentive to control costs that would be common to the group, e.g., Teamster labor costs.

Consider a hypothetical example. Carrier 1 (one of n

identical carriers) currently has an operating cost of 93 and an operating revenue of 100. Thus carrier 1's operating ratio is the target operating ratio and the carrier should be able to cover capital expenses and make a normal profit. Suppose that organized labor requests a $93 per company increase in wages. Assuming that all carriers will be faced with the same increase and that the regulatory agency adjusts rates to maintain the target operating ratio of 93, then the carrier has no incentive to bargain hard against the proposed wage increase since its competitors will have to pay it too, leaving all competitors in the same relative position as before the increase. Indeed, the carrier has an incentive not to bargain hard since the new allowed revenue will be 200 to maintain the operating ratio. If the 100 - 93 = 7 of the pre-wage increase covered capital cost and a normal profit, then the new 200 - 186 = 14 will be more than sufficient to cover the same capital cost and the normal profit requirement of the non-expanded but more costly carrier-- leading to an excess profit of seven.

This situation works as long as the demand is inelastic enough and/or growing enough so that these higher rates can be passed along to shippers. The rapid growth in private carriage would tend to suggest that this was not totally the case.

Others would argue that while some carriers might be lazy and not bargain hard and hence find the above behavior profitable, still other carriers would find it even more profitable to become more efficient. If carrier 2 can hold its cost increase to $87 but still gets to charge $200 (since the regulatory agency sets the target operating ratio to yield the rate to be allowed for the whole industry to charge), carrier 2 will obtain 200 - 180 = 20 or an even greater excess profit.

The operating ratio regulation thus allows both lazy and ambitious carriers to prosper, whereas a competitive market would allow only ambitious carriers to prosper and would ensure that consumers receive the benefits of carriers' efficiency.

Some would go so far as to argue that motor carriers have advocated that the rates be predicated on the basis of the costs of the least efficient carriers. "One of the criteria that rate bureaus use for establishing the levels of rates is their consideration of the least profitable and (the most) inefficient member of their bureau."[2] If the least efficient carriers are, therefore, guaranteed to make a normal profit, then the more efficient carriers make supra-normal profits--all sanctioned by the regulatory agency. In order to prevent such abuse, the regulatory agency would have to be extremely vigilant and would have to acquire much data.

The carriers have argued that the operating ratio method is an efficient way of regulating since it is predicated on the operating experience of the average carrier--not the least efficient carrier. Thus, all carriers below average efficiency in time period t would find the rates predicated on the average carrier to be less than sufficient to return a normal profit.

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Unless they had deep pockets, they would disappear from the industry. Thus, the carriers remaining in the industry in time period t+1 would be from the average carrier from time period t up to the most efficient carrier in that same time period. However, the new target operating ratio would be predicated on the new average carrier in time period t+1 which would lie between the average carrier from time t and the most efficient carrier from the same time period. The rates predicated on this new average carrier will drive out those carriers between the average from time period t+1 and the average from time period t. This, in turn, would make the new average carrier in time period t+2 even more efficient than its predecessor average carrier in time period t+1, and so on as time goes on. Therefore, according to the carriers' argument, the target operating method should ultimately converge to a situation where the average carrier is the most efficient carrier. Hence, the carriers argue, such a method of regulating is optimal.

Clearly, such convergence has not been the case, as this method of regulation has been in play for many years and recent operating ratios range from well over 100 to down in the low 70's. Any convergent process would have worked by this time. It is clear that such a regulatory scheme has propped up inefficient carriers and excessively rewarded efficient carriers.

On the federal level, as rate freedom has become a reality, the rash of bankruptcies in the 1980's is indicative of the
3
artificial propping-up of firms in the regulatory days.

Still other states assess the reasonableness of the operating ratio implied by the rates proposed by the carriers on a case by case basis with no clear decision rule. Finally, some states use a series of rate of return or profit ratios.

Role of Costs and Regulatory Oversight:

In any of the methods described above, an accurate estimate of the costs of providing the service is essential information for socially optimal regulation. The task of obtaining information and using it correctly is immense. Service characteristics, geography, labor costs, and commodity characteristics can vary widely. Theoretically, a cost would have to be compiled for each service and with inflation, changes in technology, and changes in business practices, revisions would be necessary often. Even where states rely on cost information submitted by the applicant, a cost methodology is needed to evaluate the data.

A most difficult undertaking is the establishment of minimum tariffs. Cost estimates are required for a hypothetical "most efficient" operation. Since the minimums are put into place to eliminate non-compensatory rates, the rates should reflect the lowest costs attainable by any existing carrier operating at maximum efficiency. If a more efficient entrant began to provide service or an existing carrier made improvements, the minimum would require adjustment.

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But how would a regulator know if newly proposed rates would cover costs and not undercut them for the purpose of obtaining market share, for the predatory purpose of driving competitors out of business, or because of ignorance of a carrier of its own costs? The regulator faces the dilemma posed by the four celled matrix below. She/he wishes to judge rates which are indeed compensatory as compensatory and to judge rates which are indeed non-compensatory as non-compensatory and hence to allow the former and disallow the latter. When a rate which is indeed compensatory is adjudged to be non-compensatory, an error has been made; a deserving carrier has been denied business which the carrier should rightfully receive; and efficiency and innovation are denied. When a rate which is indeed non-compensatory has been judged compensatory, then an error of a different type has been committed: a carrier is allowed to obtain traffic which it should not carry, inefficiency is enhanced, and legitimate carriers lose business.

TRUE SITUATION

		COMPENSATORY	NON-COMPENSATORY
REGULATORY	COMPENSATORY	CORRECT	ERROR
AGENCY JUDGEMENT	NON-COMPENSATORY	ERROR	CORRECT

A second problem exists. Even if the regulatory agency always makes the correct decisions (i.e., in the northwest and southeast cells of the decision matrix), it may take an inordinate amount of time to make such decisions. The 12 year decision by the ICC in the Rock Island rail merger case is often cited as the premier example of severe regulatory lag. Thus an error may exist for a long period of time if a carrier is denied implementation of a correct policy while the regulatory agency is debating its "correctness". Such delays may render the initiator's advantage moot by allowing the competitors the time to catch up to the initiator. Not only would the gain in this innovation be mitigated but a chilling signal would also be sent out that the gains from future initiatives might also be dampened or crushed. The Southern Railway's "Big John" hopper decision by the ICC is often cited as the premier example of such innovation dampening.

Thus, a question arises as to whether societal welfare would be better served by having a regulatory agency make such decisions or whether the market should make such decisions. Correct decisions will be rewarded by the market. Incorrect decisions will also be corrected by the market. However, because of frictions in the

marketplace, shippers and other carriers may be hurt as the result of the errors.

For instance, assume that a carrier prices below cost. This is an error. If it is an unconscious error, the carrier will discover the mistake over time when the rate does not cover costs and the carrier in the short run can not pay its variable cost or in the long run, the carrier cannot replace capital. However, in the meantime, carriers which know their costs may exit from the business due to the low rates. A knowing regulatory agency could have disallowed non-compensatory rates and saved the legitimate carriers from such a fate. New carriers may, however, enter the market to replace the fallen carriers; if the lesson of non-compensatory rates has been learned, the industry will return to an equilibrium. However, if information is poor, a new entrant may pursue the same type of policy as the non-compensatory carrier, and the unstable nature of the industry may continue.

In a second case, an existing carrier consciously prices in a non-compensatory fashion with the objective of driving out competitors. Some sort of a deep pocket is necessary to undertake such behavior. When competitors are driven from the market, the initiating carrier would raise prices to recoup the losses incurred in driving out the competitors and to take advantage of its monopoly power in the newly competition-less market.

If barriers to entry were formidable, the new higher prices would not encourage entry, especially if potential entrants perceived the likelihood of another cycle of price wars. Thus, such an error would be counter to desired social policy.

If, however, barriers to entry were trivial, the new higher prices would encourage entry. It is argued that because a potential predatory pricer would play out the scenario ahead of time, the potential predatory pricer would not engage in such acts (recognizing the inability to recoup the losses incurred during the period of predatory pricing.) A general lack of barriers to entry tends to describe the motor carrier market.

In both cases above, such acts are illegal under the antitrust or Robinson Patman Acts for industries in general. Consequently, one could ask why transportation should have separate agencies to watch over events while the non-regulated industries are subject to the general laws of the land.

However, an argument goes, the antitrust solution is a "the damage is done" type of solution, i.e., reactive to a wrong which has already occurred. Those who have already been wronged may be out of business by the time that the case is decided. The regulatory solution, it is argued, can be proactive, i.e., it can "solve" the potential problem before it can develop into a real problem. As above, an antitrust message can be sent out which will likely deter predatory behavior. This can occur via decisions in cases or via strong statements by highly visible Department of Justice officials. However, antitrust paranoia may dampen the innovative spirit of all but the risk preferrers. In essence, a misclassification matrix analogous to that

presented above can be constructed to analyze the impacts of antitrust.

Thus both the market and the regulated situations have a classification/misclassification matrix. It is likely that what ends up in the error cells will differ under each form of market organization. The social policy question is: which type of organization is best for society to utilize to allocate resources? While it is possible for the regulatory agency to catch unintentional or intentional errors such as those discussed above, it is also possible for the market to be self-correcting and for errors such as those above to be corrected by other non-transportation specific regulations. The costs of these misclassifications include legitimate carriers driven from business, high rates to shippers, a chilling of innovation and initiatives, and the cost of operating the regulatory apparatus. the market mechanism can also involve misclassifications. Which method is better will be addressed herein.

Problems in Cost Estimation:

Another problem arises with the regulatory agency in estimating cost parameters to be used in making regulatory decisions. In some cases, agencies have attempted to estimate cost functions statistically from existing data. A major difficulty with such a procedure is that firms can be no better than efficient but they can be all degrees of inefficient. Thus data used to estimate cost functions will average together information from firms, none of which may be perfectly efficient. The resulting estimate of costs must, at best, be the efficient cost (if all firms are efficient and the functional form estimated is correct) and most likely results in a higher cost than it is theoretically possible to attain. The situation would appear as in Figure 2-1 for an estimate of average cost.

In order to answer this problem, some researchers have proposed the estimation of the best practice cost function. This procedure linearly combines the best cost positions observed in practice such as in Figure 2-2.

However, if none or only some of the firms are truly efficient, the best practice frontier will also tend to overestimate the most efficient costs.

Thus, regulatory agencies are bound (most likely) to be too conservative in their cost estimates. Consequently, they will tend to inhibit the introduction of new innovative carriers and techniques by judging them as pricing below their costs.

Despite the complexity of their task, most state regulatory agencies handling motor carrier rates have very limited staffing. Few have attempted to develop elaborate cost evaluation systems. State regulators tend to rely heavily on the carriers' estimates of costs (which, as shown above in the operating ratio example, carriers may have an incentive to overstate). ICC evaluation of carrier costs for general rate increases is also used as a gauge of reasonableness (the assumption being that what has

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X = Observation

X Fitted Average Cost

Actual Average Cost

Quantity
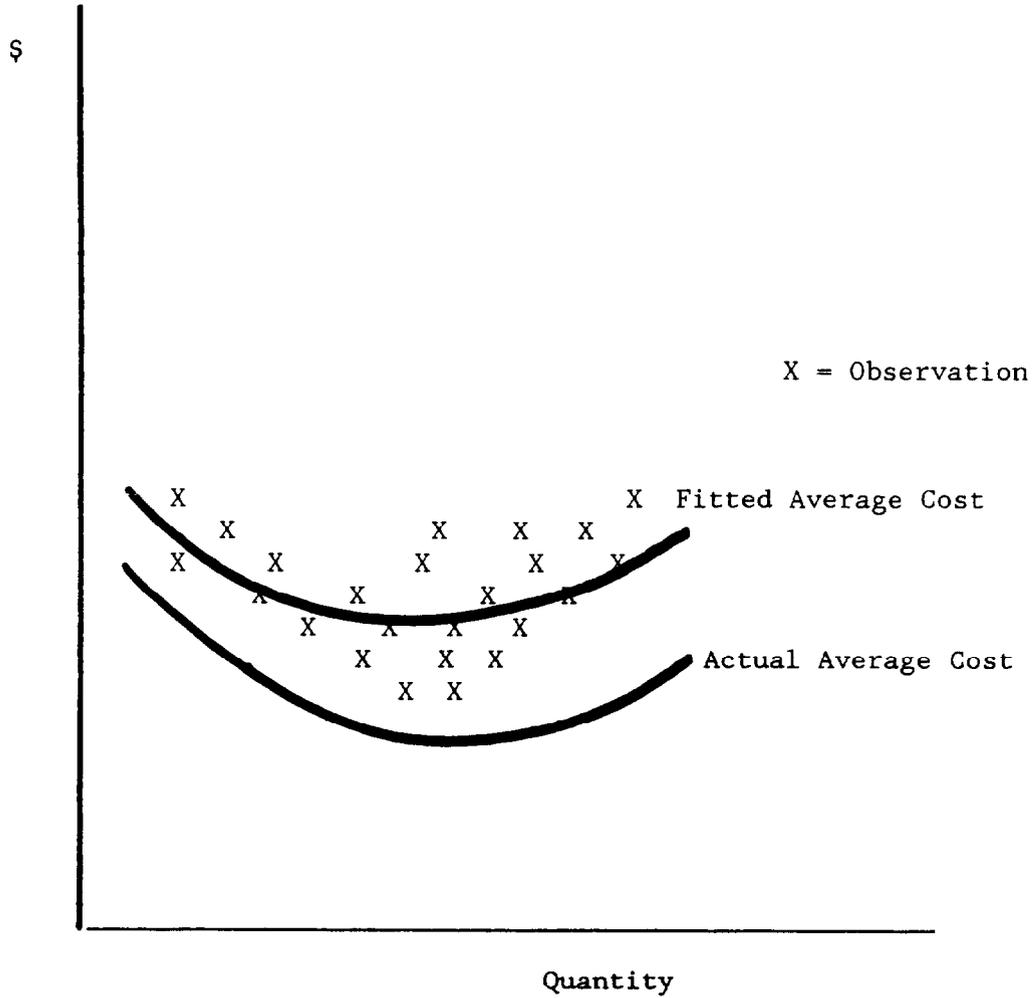
FIGURE 2-1

Fitted Average Cost Versus Actual Average Cost Curves for a
Firm

48
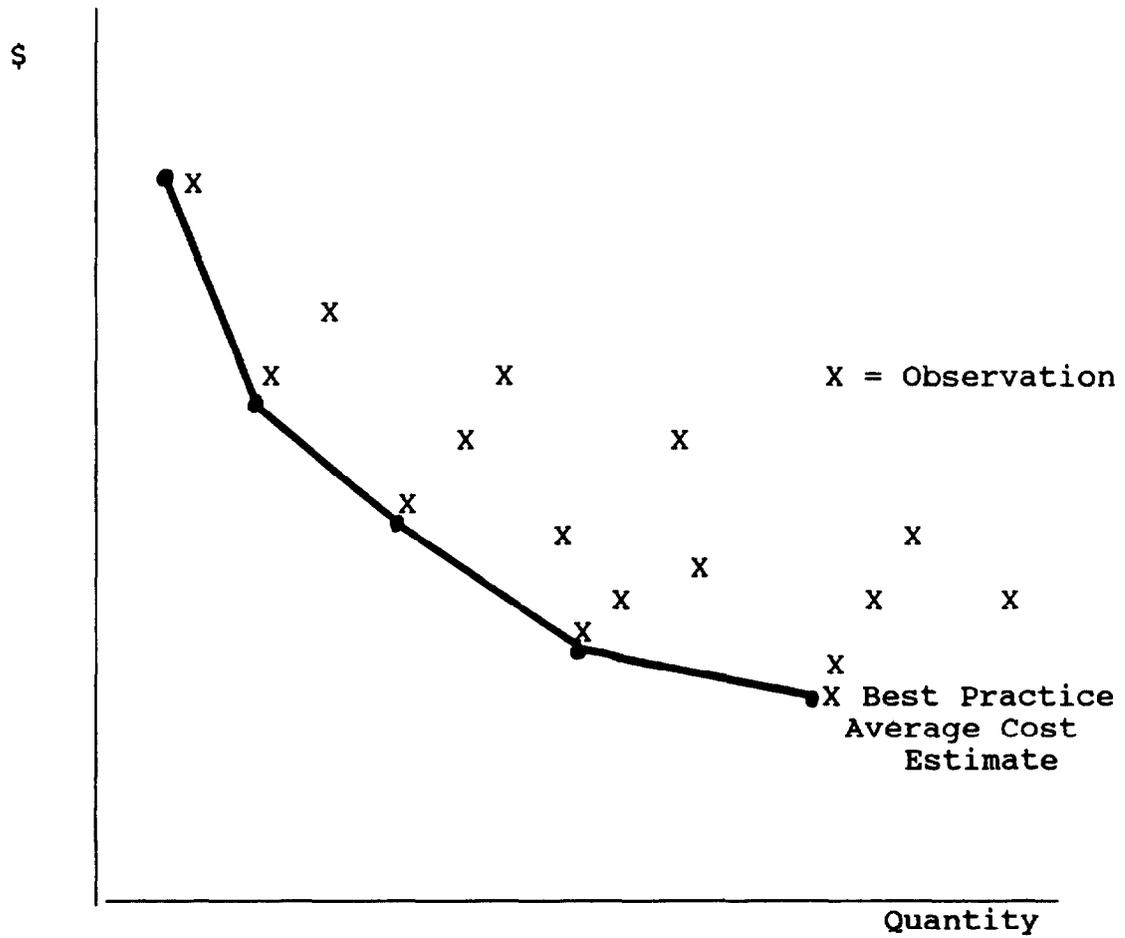
FIGURE 2-2

Best Practice Estimate of Average Cost

happened on the federal level is likely to have happened on the state level.) In some jurisdictions, old base cost estimates are indexed using published cost indices which are often unrelated to trucking (e.g., the consumer price index), or to simple estimates of carrier cost inflation. Other states study a sample of carriers chosen to represent the size distribution of carriers in the state or the largest several carriers in the state.

Clearly, such estimates of costs cannot account for efficiency differences, nor do they measure the individual costs of a particular service very accurately. If anything, over time, the regulatory agency's estimate of costs will approach average carrier costs (which, in turn, may be inflated due to the deterrence to innovation and because of restricted entry and collective ratemaking), rather than the costs associated with the optimally efficient operation.

The impacts of such regulatory cost based rates can be predicted. Carriers will have little incentive to resist cost increases which will influence all of their competitors. Oligopolistic and monopolistic input suppliers (e.g., labor unions) an obtain higher input prices than those that would prevail if competition existed in the setting of rates. Knowledge of the ability to cover cost increases reduces the gain anticipated from conscientious bargaining with input suppliers.

Collective Ratemaking:

Many of the problems of rate and cost analysis faced by regulators would be lessened if an actively competitive market kept pressure on rates and efficiency. Unfortunately, other aspects of regulation preclude this check. Of particular concern is the extreme control over entry into the motor carrier industry practiced in some states and the use of collective ratemaking in some states. The roles of collective ratemaking and entry will be explored below.

A tariff is "the publication by which a carrier or his agent publishes the rules, regulations, and rates of his
4
operation". Such tariffs enable motor carriers to quote a rate to a shipper/receiver or enable a shipper/receiver or his/her agent to determine what the rate would be for shipping a given product, a given weight, and from a given origin to a given destination. In addition, any accessorial or ancillary charges are listed and explained in the tariff. With the use of the tariff, a shipper/receiver can calculate the total dollar cost of moving the shipment from the origin to the destination.

Tariffs may be simple in nature, or they may be very complex--so complex that specialists exist that firms can hire to audit their freight charges so as to determine that the motor carriers have not overcharged them. In larger firms, specialists can exist to handle the function internally.

As explained herein, pre-1980 on the federal level and currently on most state levels, most tariffs are made collectively by rate bureaus. These bureaus perform five major functions for the motor carrier industry:

(1) They allow carriers/shippers a formal organization under which rates are presented and discussed. Only member carriers are allowed to vote on rate proposals.

(2) For a rate increase designed to generate significant revenue, relevant cost and revenue data may be required by the regulatory agency. Rate bureaus compile, organize, and present such data to the regulatory agency.

(3) Bureaus initiate research at the request of member carriers.

(4) The bureaus publish and distribute the tariffs.

(5) The bureaus establish joint and through rates.

The determination of the rates is the most critical item. The other functions are not necessarily anticompetitive, and one could envision rate bureaus as consulting firms that gather and process information on motor carrier costs, that keep track of events and report on them for the carriers, that act as publishing agents for the carriers and also publish individually set tariffs, and that provide a forum where carriers can individually negotiate joint and through rates. See Gardiner for a discussion on the role of rate bureaus without antitrust
5
authority.

Rate determination by rate bureaus is shown by the decision tree in Figure 2-3. A regular procedure exists where a member carrier on its own behalf, a member carrier on the behalf of a shipper, or a shipper on its own behalf can submit a proposal to the rate bureau. The proposal is then docketed for joint consideration. All interested parties can learn of the proposal by reading a synopsis of the docketed proposal in a publication available at a subscription fee. A public hearing is scheduled and held by the Standing Rate Committee of the bureau. Any interested party can attend and participate. The Standing Rate Committee then issues a report recommending acceptance or rejectance of the proposal. Non-member carriers or shipper/receivers have no vote in this procedure. On the federal level, this procedure has now been eliminated. Prior to the reform in the MCA-1980, carriers who did not even participate in the moves in the proposal had a say in whether the rate should be approved or not. However, since the MCA-1980 did not affect intrastate rate bureaus, the above procedures generally hold.

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                    +-------------------------------+
                    |                               |
                    |  RATE PROPOSALS:              |
                    |                               |
                    |  May be filed by Shippers,    |
                    |  Consignees, Standing Rate    |
                    |  Committee, Association        |
                    |  Members, or any Common        |
                    |  Carrier by Motor Vehicle     |
                    |                               |
                    +---------------+---------------+
                                    |
   Emergency Procedure--------------------------+------------------------+
            |                                   |                        |
   +--------+----------+                        |          Independent Action
   |  Disposition:     |          +-- Regular Procedure              |
   |                   |          |    |                    Notice given to
   |  Issued without   |          |    Notice of Public Hearing   all participating
   |  Public Hearing   |          |    By Standing Rate Committee  carriers in
   |  within 5 working |          |    |                           Tariff(s)
   |  days from date   |        Recommend   Disposition            Involved
   |  of docket        |        Regular      |                       |
   +--+-------+------+--+        Procedure    |               Participation:
      |       |      |          |             |               10 days allowed
      +-------+------+---------+             |               to give carriers
      |       |      |                        |               opportunity to
   Adopt   Adopt   Fail        +-------+--------+            join or flagout
   As      As      Of          |       |        |                   |
   Proposed Amended Adoption  Adopt   Adopt    Fail            Publication
      |       |      |         As      As       Of
   Publication     Appeal to  Proposed Amended Adoption
                   General      |       |        |
                   Committee  Publication Appeal to
                     |                   General
            +---------------------Committee
                                     |
                                Consideration
                                by General
                                Committee
                                     |
                     +-------------+-------------+
                     |             |             |
                   Adopt         Adopt         Fail
                   As            As            Of
                   Proposed      Amended       Adoption
                     |             |             |
                   +-Publication-+   Option of Independent Action:
                                     May also be taken during
   Source: Eastern-Central           Emergency and Regular
   Motor Carriers Association         Procedures
```

Figure 2-3: Collective Ratemaking Procedure by Rate Bureaus

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If the decision by the Standing Rate Committee is not acceptable to a party, an appeal can be made to the General Rate Committee and ultimately to the Executive Committee. In addition, if the decision anywhere along the way is unsatisfactory to a carrier, the carrier has the right of independent action, i.e., to have the rate bureau publish the carrier's own rate separate from the collectively decided rate. While the situation described seems to contain numerous checks and balances, the actuality of the situation is quite different; as is described below.

It is often alleged by the advocates of collective ratemaking that because carriers are not forced to join rate bureaus and because those that are members have the right of independent action (i.e., the right not to go along with the collective behavior of the rate bureau) that the public is protected.

But the FTC concluded in its testimony in the ICC investigation in Ex Parte No. 297 (Sub No 3) that current "rate bureau procedures infringe on the rights of independent action."[6] The USDOT also notes that carriers have little incentive to utilize independent action, given the existence of a rate bureau (especially in concert with strict entry regulation). "A carrier participating and earning profits in this collective environment will quickly learn that mutual adherence to the established rate structure is more beneficial than engaging other carriers in direct price competition."[7]

Senator Edward Kennedy is also skeptical of the significance of the right of independent action. "The trucking industry makes much of the fact that any trucker may take 'independent action', that is, may file any rate he chooses--at any time. They cite statistics showing that most independent actions are for lower rates. The factors behind the statistics, however, contain the real story. Most independent actions are for decreases for the simple reason that virtually all rates are increased across the board several times each year at a single stoke, by a mechanism known as a general rate increase (still allowed collectively under the MCA-1980). Independent actions are taken by carriers who must charge lower rates or they will lose business. I think that a mechanism which places the burden on the rate cutters... is indefensible."[8] After the MCA-1980, the number of independent actions on the interstate level grew dramatically (from 27,100 in calendar 1979 to 230,200 in fiscal 1983)[9] as entry has increased, the rate bureaus have been denied the right to protest independent actions, the general rate increases have continued despite the increased interstate competition, and the overall power of rate bureaus has been significantly reduced. While the number of

independent actions has declined rapidly in recent years (to 42,440 in fiscal 1985), such a decline does not signal an end to rate competition and discounting but rather that carriers are now publishing their discount provisions and negotiated rates directly
                                                              10
in their own tariffs, rather than as independent actions.

The US Department of Justice believes that the use of independent actions is inhibited by the very nature of rate bureaus. "Because of this loaded regulatory scheme, trying to lower rates in the trucking industry is not merely a business decision; it is a decision to go to war--to litigate--for those who would lower rates will inevitably face vigorous protests from rate bureau members. The process guarantees great delay, cost, and uncertainty as to outcome, and serves to depress--indeed to strangle--the entrepreneurial initiative which has been the great strength of American business. For any intelligent trucker, this system carries with it a simple
                                                              11
message: don't lower prices."

Thus, although carriers can follow their own ways with respect to pricing, in reality, the large carriers tend to be members of rate bureaus rather than independently setting rates; and the right of independent action is not often used on a relative basis. While this statement does not now hold on the federal level, it holds for those states where collective ratemaking is business as usual.

When independent actions are used, they most often are in a form to lower rates for a particular customer, rather than to lower rates across the board. Since it is in the mutual interests of the carriers to set rates collectively, independent actions are the exception and not the rule.

Tariffs are useful for shipper/receivers, just as prices in stores and in newspaper advertisements are useful for everyday consumers. Prices and tariffs do exist in the non-regulated motor carrier industry. Carriers publish their own tariffs, and tariff publishing agents exist. In many cases, unregulated tariffs and rate structures are much less complex than those of the regulated motor carrier sector. Many of the tariff forms from the unregulated sector are also utilized by the less regulated interstate motor carriers (e.g., freight all kinds rates, geographical zoning, etc.)

Rate bureau procedures are restrictive by their very nature. Participant carriers soon learn that conformity is for the collective good. The right of independent action is illusory. All rates could be made by independent action in its purest form, i.e., without rate regulation and without rate bureaus.

Rate bureaus received antitrust immunity under the Reed-Bulwinkle Act in 1948. President Truman's veto of the act was overruled by Congress. In his veto message, the President warned that "the exercise by private groups of this substantial control over the transportation industry involves serious potential harm to the public...Power to control transportation

rates is power to influence the competitive success or failure of other business. Legislation furthering the exercise of this power by private groups would clearly be contrary to the public interest."[12]

When antitrust immunity was granted over the President's veto, the ICC was to act as a proxy for protecting the public interest. According to Senator Edward M. Kennedy, the ICC has failed in this regard. "Although rate agreements are theoretically subject to ICC review, the ICC has been more inclined to rubber stamp such agreements rather than subject them to an independent and thorough review. It is also the mechanism which contributes most significantly to inflated truck rates."[13] This same rubber stamping has been claimed by the critics of collective ratemaking and rate bureaus on the intrastate level.

Senator Kennedy referred to collective ratemaking as price fixing and the most anticompetitive feature of trucking regulation.[14] Former Secretaries of Transportation Adams and Goldschmidt have both criticized collective ratemaking as price fixing cartels in the case of the former[15] and as price fixing in the case of the latter.[16] In 1985 and 1987, USDOT proposed the complete deregulation of motor carrier transportation including the removal of antitrust immunity for the remaining collective ratemaking.[17] Numerous other testimonies against collective ratemaking, especially when combined with strict entry, have been given by the United States Department of Transportation,[18] the United States Department of Justice,[19] the Federal Trade Commission,[20] the Interagency Task Force on Truck Regulatory Reform Options,[21] and the Office of Management and Budget.[22] Statements of the following type are common from the above.

"Collective pricemaking by rate bureaus is inherently anti-competitive. These carrier associations set rates, fares or charges collectively, at higher levels than would be supported in a competitive market."[23]

"...rates are also higher than they should be because competition has been suppressed...price fixing leads inherently to higher than competitive rates. Firms will use the power to set rates collusively to their own advantage."[24]

"...the rate bureaus contribute to inflationary rate

levels by establishing and encouraging the motor carrier
industry to engage collectively in profit maximization
where competitive pressures from other modes are weak.
Additionally, the procedures of the rate bureaus serve to
discourage independent action."[25]
     "It is, of course, in the interest of any industry
organization which fixes prices to raise them above freely
determined competitive levels."[26]
     "In reaching such agreements, members of a rate
setting organization will set rates at levels that protect
inefficient members."[27]
     "Today's truck regulation stifles competition by
limiting entry and allowing collective rate setting. Without
competition or the threat of competition, rates are inflated
since carriers have little incentive to hold down cost
increases, let alone reduce their rates."[28]
     "Rate bureaus act collectively to determine class rates
without fear of antitrust prosecution. These rates are
inflated to protect the inefficient."[29]
     The motor carriers have argued that "the result of these
rate bureaus and their activities is to keep rates low, not
high..."[30]   The ten major general freight motor carrier rate
bureaus also sponsored a study of collective ratemaking in
motor carriage by Jesse Friedman,[31] and Friedman has continued
his work in the field.[32]   Friedman states that collective
ratemaking "...involves, by definition, a restraint upon rate
competition..."[33]   However, the ICC's supervision protects the
public against any abuse. Friedman states the argument for
active supervision of collective ratemaking by stating that
"Good public policy requires that whenever an area of economic
activity is freed from the operation of the antitrust laws, the
procedures under which prices are established and the prices
themselves should be subject to stringent public control to make
sure that the interests of affected groups in the economy are
properly protected."[34]   Until implied by the decision in the
SMCRC case (to be discussed in more detail below), the
definition of stringent control was lacking on the state level.
The question of the adequacy of state control is still
considered to be of issue with respect to the legality of
intrastate collective ratemaking, e.g., by the US Department
of Justice. State control, in most instances, was certainly
less than ICC control on the federal level.

Another argument for the utilization of rate bureaus is
that they bring stability to rates. Friedman argues that
"there is no other practical way to assure the degree of rate
stability and certainty producers and distributors must have
in order to plan current and projected production and marketing
operations efficiently."[35] However, as is pointed out with
reference to the local drayage rates below, it is information
about rates that is important in enabling markets to perform
their function. If stability is desired, it can be contracted
for in a deregulated market. The Federal Trade Commission
also refutes Friedman's statement.[36] They show the stability of
the agricultural exempt rates. The FTC concludes that this
"uniformity of rates is not essential to the maintenance of a
stable and coordinated transportation system."[37] Below an
analysis is given which shows the stability of the unregulated
non-rate bureau members in the New Jersey tank truck industry.

    USDOJ also strongly questions the roles of rate bureaus in
uniformity and stability. In fact, DOJ suggests that non-market
determined uniformity and stability are disbenefits of rate
bureaus. "It is not clear that rate bureaus lead to greater
uniformity than would exist under competitive ratemaking.
Imposing a presumption in favor of uniform rates discourages
price innovation by carriers."[38] Concerning uniformity, DOJ
concludes that: "(1) there are social costs attending uniform
rates, which must be weighed against their benefits, (2)
uniformity is not necessarily achieved under rate bureaus,
e.g., independent actions, (3) competition is likely to
achieve a socially optimal degree of uniformity at a lower
rate level than under collective price setting via rate
bureaus, and (4) competition permits various price/service
combinations which enhances the public interest. In summary,
the alleged benefits to rate bureaus (uniformity, equitableness,
and stability) do not withstand economic analysis as
justification for the existence of collective ratemaking. Rather
such behavior leads to a loss in consumer welfare and/or a waste
of resources. Independent pricing, on the other hand, leads to
the following benefits: (a) innovation, (b) saving resources,
and (c) lower rates."[39]

    The Motor Carrier Ratemaking Study Commission, which was
established by the MCA-1980, had a mandate to study the impact
of collective ratemaking and to make a recommendation to
Congress with respect to the desirability of maintaining
collective ratemaking in the interstate motor carrier industry. The
Commission concluded (on a non-unanimous basis) that collective
ratemaking inhibited the functioning of the market and that all
collective ratemaking should be eliminated.[40]

At both the state and the federal levels, carriers have historically come together in rate conferences to discuss and propose rates. Regulators and carriers have defended the collective ratemaking process as necessary to ensure stable, uniform, and nondiscriminating rates. Ironically, the practice, which might be less damaging under tight review, is declared necessary because regulators can not handle the review of many individual rates, i.e., the regulatory burden would be too high. The bureaus help the regulators by providing information necessary for rate evaluation. Although most states argue that they "set" the rates that are "filed" by the bureau, i.e., the bureaus do not set rates, many would argue that few agencies have the time or analytical tools to do more than merely 41 "rubberstamp" the filings.

Proponents of collective ratemaking argue that such conferences act as a forum between shippers and carriers, since rate proposals are "run by" the shippers before the bureaus finally decide on them. The carriers and shippers, therefore, resolve many of their differences before the rates appear before the agency, thus minimizing the likelihood of a shipper protest of a rate before the regulatory agency. This minimizes the regulatory burden on the government.

However, the process tends to stifle competition among non-transportation firms, because a major input price to their productive process is the same for all producers or becomes known to one's competitors.

In a like manner, the proponents claim, the potential conflicts among carriers are resolved at the bureau level, thus minimizing the likelihood of a protest of the rates by a carrier before the regulatory agency. This, too, eliminates a regulatory burden on the government.

The argument is basically that the bureaus present a "clean" rate proposal before the regulatory agency for approval--one which the general constituents of the regulatory agency (the shippers and the carriers) have already agreed to. However, another element of the regulatory agency's constituency is the consumers. If such collective behavior holds shipping rates artificially high, then consumers receive a disbenefit in that fewer goods are produced and are sold at a higher price. Finally, the regulatory agency must have a constituency that exceeds the individual components. This is a concept of societal welfare.

Should a bureau member carrier not wish to conform to a collectively proposed rate, such a carrier may file an independent action which allows said carrier to establish and publish its own independent rate (subject to the regulatory agency's approval). In addition, carriers are not required to join rate bureaus and may file their rates independently with the regulatory agency.

Advocates of collective ratemaking argue that it does not artificially inflate rates, since no carrier is forced to go along

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with the findings of the bureau, nor is any shipper; moreover, both shippers and carriers have the recourse to appeal to the regulatory agency. In addition, the administrative savings of alleviating the regulatory burden provide a benefit to society.

Opponents to collective ratemaking argue that rate bureaus are government sanctioned rate cartels. When carriers join to discuss rates, the discussions lead to how rates can be raised to monopolistic levels so as to maximize the cartel's profit. Such high rates will restrict output and harm consumers, while carriers will earn excess profits. The right of independent action has been called a sham, since the bureaus have protested their own carriers' independent actions and since carriers have threatened other carriers who use independent actions with sanctions (i.e., not voting with them on future issues, not interlining traffic with them, etc.) Thus, it is alleged that the volume of independent actions vastly understates the true desire to engage in independent pricing.

It should be noted that the above discussion assumes that entry is restricted in the motor carrier industry and that most carriers participate in collective ratemaking. If these assumptions are not true, then different results may occur (as will be explained below.)

The MCA-1980 restricted rate bureau activities in and of itself and based on the report of the Motor Carrier Ratemaking Study Commission. Immediately after the passage of the MCA-1980, carriers not participating in a route could not vote on rates for that route nor could rate bureaus protest independent actions. On July 1, 1984, rates for individual routes had to be independently set. Only joint line rates, AC, (where carrier 1 hauls the product from A to B and carrier 2 hauls the product from B to C) can still be set by the rate bureaus. The Administration has sent forth a deregulation proposal which would
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eliminate all collective ratemaking.

The regulated motor carriers that desire regulation have made it clear that collective ratemaking is an extremely important part of regulation in their minds and that they do not wish to give it
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up (or alternatively, that the inducements offered by some of the deregulators, e.g., a motor carrier administration in the USDOT, etc., are not sufficient to cause them to abandon collective ratemaking).

The Southern Motor Carrier Ratemaking Conference Case:

Although interstate collective ratemaking has been curtailed, the states are still able to allow collective ratemaking. The U.S. Department of Justice's (DOJ) challenge to state collective ratemaking introduced in 1977 was finally resolved by the U.S. Supreme Court in 1985, overturning district and circuit court decisions, both of which had favored DOJ. If states compel collective ratemaking (i.e., in their state laws or via

administrative law in their regulatory agencies) and they actively supervise it (i.e., they merely do not rubberstamp it), then intrastate collective ratemaking does not violate the U.S. Constitution or other federal law. Requirements of compulsion and active supervision do not seem to be very strong: compulsion can be merely implied, and active supervision does not necessarily mean that the states must maintain vigilance over the rate bureaus.

The SMCRC case (decided by the US Supreme Court on March 27, 1985 by a 7-2 majority) does not require that states explicitly require or compel carriers to participate in rate bureaus. While North Carolina, Georgia, and Tennessee (three of the five states involved in the case--Mississippi and Alabama are the other two states) had statutes which clearly articulated their desire to ALLOW (not compel) collective ratemaking in their states, Mississippi had no such express approval of collective ratemaking in its laws. Nevertheless, the majority ruled that the state had sufficiently signaled its blessing for collective ratemaking by its regulatory agency the authority to regulate motor carriers and their rates. This action and subsequent administrative law and lack of legislative expression to the contrary has ARTICULATED CLEARLY (in the Court's view) Mississippi's intent to displace price competition among common carriers with a regulatory structure. "Requiring express authorization for every action that an agency might find necessary to effectuate state policy would diminish, if not destroy, its (a state regulatory agency's) usefulness" stated Justice Powell, writing for the majority.[44]

The minority opinion (which is not likely to carry much weight because of the strength of the vote) by Justices Stevens and White sided with the Department of Justice's position that the states do not require collective ratemaking but merely tolerate it. The minority Justices contend that only Congress, not state legislatures, may issue exemptions from the Sherman Antitrust Act. These Justices strongly felt that the private parties should not be entitled to state action immunity unless the states compelled the private party (the rate bureau) to act in violation of the federal law.

The Federal Trade Commission had charged the Tri State Household Goods Tariff Conference, the Middle Atlantic Conference (one of the ten major general commodity rate bureaus), the Motor Transport Association of Connecticut, the New England Motor Rate Bureau (one of the ten major general commodity rate bureaus), and the Massachusetts Furniture and Piano Movers Association (Mass Movers) with illegally restricting competition among trucking companies within states in violation of section 5 of the Federal Trade Commission Act.[45] The SMCRC decision was felt to have undermined the FTC's case in each of the above situations. Since the FTC, like DOJ in the SMCRC case, had charged that intrastate collective ratemaking was an illegal restraint of trade, the DOJ loss in the SMCRC

case would seem to indicate very little chance for success in the FTC cases. In fact, the US Court of Appeals for the First Circuit in Boston had stayed an appeal of an FTC action against the Mass Movers pending resolution of the SMCRC case. Although the SMCRC case renders a decision against a challenge using the Sherman Act, the Supreme Court's decision seems broad enough to hold for challenges on the Federal Trade Commission Act.

The FTC subsequently dropped its cases versus the Middle Atlantic Conference and the Tri State Household Goods Tariff Conference, because it decided that the State of Pennsylvania, the state where the cases were brought, had exercised regulatory control over collective rates at a level sufficiently rigorous to satisfy the Supreme Court's test of oversight in the SMCRC decision.

In the Mass Movers case, however, the FTC announced that it did not feel that the SMCRC decision upset the FTC's position that the Mass Movers should end all collective ratemaking. In addition, the State of Massachusetts has agreed with the FTC conclusion and told the court that it does not favor such
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collective rate actions. The state sided with the FTC's interpretation that the test of state compulsion established by the SMCRC court decision does not exempt Mass Movers from federal antitrust laws for its collective ratemaking initiatives. However, after the First Circuit Court of Appeals ruled in September 1985 that Massachusetts had a clearly articulated policy for collective ratemaking, the FTC turned to the active supervision portion of the Supreme Court's test. In November 1985, the Appeals Court turned down an FTC request to rehear the entire case. Given this decision,
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the FTC dropped the Mass Movers case on April 24, 1986.

The United States of America versus Southern Motor Carrier

Rate Conference et al. (SMCRC) was brought by the United States
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Government (via the US Department of Justice-USDOJ) pursuant to section 4 of the Sherman Act (the basic antitrust statute-15 USC, Sec 4), seeking to enjoin and restrain alleged continuing violations by the defendants of section 1 of the Sherman Act (15 USC, Sec 1).

DOJ claimed that three rate bureaus (SMCRC and two smaller bureaus-Motor Carrier Traffic Association Inc. and the North Carolina Motor Carriers Association Inc.) had engaged in a continuing conspiracy to fix rates charged for intrastate for-hire transportation of commodities within the states of Alabama, Georgia, Mississippi, North Carolina, and Tennessee. While these rate bureaus had been established under the by-laws and rules of procedure approved by the ICC pursuant to section 5a of the Interstate Commerce Act, 49 USC Sect 56, DOJ argued that such a procedure was appropriate for interstate ratemaking where collective ratemaking was legal under the Reed-Bulwinkle Act of 1948 but was irrelevant for intrastate collective ratemaking which

was not exempt from antitrust under Reed-Bulwinkle.

On March 29, 1979, the District Court granted the motion of DOJ for summary judgment, finding that the interstate collective ratemaking activities of the three rate bureaus constituted a per se violation of the Sherman Act, 467 F. Supp 471 (N.D. Ga 1979). The defendants had argued that their activities were protected from antitrust under the State Action defense and the Noerr-Pennington defense. The court allowed the bureaus' activities to continue pending the resolution of an appeal of its verdict.

On April 5, 1982, a divided panel of the US Court of Appeals for the Fifth Circuit affirmed the District Court ruling (672 F 2d 469-5th Cir. Unit "B" 1982). The panel majority rejected the State Action and Noerr-Pennington defenses. On April 11, 1983, Unit "B" of the Fifth Circuit, en banc, affirmed the panel decision (702 F. 2d 532-5th Cir. Unit "B" 1983). Again the court allowed the bureaus' behavior to continue pending appeal of their decision.

On May 27, 1983, the defendants filed a petition for writ of certiorari with the US Supreme Court (Docket No. 82-1922) seeking review of the Fifth Circuit's decision. In the interim, DOJ began a nationwide antitrust investigation into the ratemaking practices. of many state regulatory agencies seemingly predicated on the "victories" in the District and Circuit Courts.

On June 11, 1984, the Supreme Court granted the petition for certiorari. On November 25, 1984, the Supreme Court heard oral argument in the case. On March 25, 1985, the Supreme Court issued its decision reversing the Court of Appeals, thereby ruling that the intrastate collective ratemaking systems under review in the case did not violate the Sherman Act (53 U.S.L.W. 4422).

In its decision, by a 7-2 majority, the court stated that collective intrastate ratemaking was not exempt from federal antitrust liability only if it was compelled through the abolition of the right of independent rate action. Justice Powell stated that under the state action doctrine from Parker v. Brown (317 US 341-1943), such compulsion is not necessary for immunity from attack. Rather, in order to be exempt, collective activities must occur pursuant to a clearly articulated and affirmatively expressed state policy and must be actively supervised by a state agency-- California Liquor Dealers v. Midcal Aluminum, 445 US 97 (1980).

The defendants argued that the state regulatory agencies from the five states involved need not compel regulated intrastate motor carriers to file only collective rate proposals in order for the collective ratemaking activities of these carriers to be immune from federal antitrust liability under the State Action doctrine. Rather such actions were exempt because they were undertaken pursuant to clearly articulated and affirmatively expressed state policies and because they were actively supervised by the regulatory commissions of each state. DOJ countered that such

activities must be compelled in order for the antitrust immunity to be in effect.

Interestingly, before the resolution of the case, the state attorney generals of Iowa, Wisconsin, Delaware, Rhode Island, and Indiana filed an amici curiae brief in favor of the DOJ. These states asked the court to review state regulatory policies to determine if such policies were wise or whether they had been adopted for legitimate purposes, i.e., these states wanted the federal courts to tell them if policies deemed wise by the states (or some portion of the state) were indeed wise. DOJ would point out that such a question was precisely the issue--especially where the state policy was articulated by an appointed or hired official acting on his/her own discretion, rather than being directed by the state legislature or court.

The attorney generals argued that the state collective ratemaking policies were pre-empted by federal antitrust laws, even if these state policies compelled collective rate submissions. They argued that the reasons why the states adopt such collective rate policies should be assessed by the court. If the reasons were not good enough, then the state regulation should be pre-empted by the federal antitrust policy (i.e., DOJ's case.) These same attorney generals argued that the State Action doctrine should not apply, because the state regulatory agencies, in conjunction with intrastate motor carrier rate bureaus, had lost sight of the public interest.

The National Association of Regulatory Utility Commissioners (NARUC) challenged these statements by the attorney generals. Their argument cited Community Communication Co. v. City of Boulder 455

US 40, 61 (1982), where the court stated "Plaintiffs challenging state or local action on the ground that such governmental actions are pre-empted by federal antitrust law bear the heavy burden of overcoming the presumption that pre-emption is not to be found absent the clear and manifest intention of Congress that the
[48]
federal Act should supersede the police powers of the states."

With respect to State Action, NARUC claimed that there exists no reason to suggest that the states have abandoned the public interest. In fact, they claim close scrutiny by the states and claim that DOJ has not contested the fact that states closely and actively supervise ratemaking activities.

In addition, the Midcal case cited above states that the reason why the state has adopted collective ratemaking is not relevant and that what matters is only that the state policy is "clearly articulated, affirmatively expressed, and actively
[49]
supervised." The wisdom of the state ratemaking policies or the reasons for their adoption are not the issue. NARUC argues that state compulsion of anticompetitive activities is one way, but not the only way, of proving that its regulatory policies are articulated and affirmatively expressed.

NARUC concludes that the attorney generals' "object to

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intrastate collective ratemaking because, in their opinion, it is unwise public policy. The court, however, is not the forum in which to argue the merits of collective ratemaking. The attorney generals have ample remedies if they wish to eliminate collective ratemaking in their respective jurisdictions, i.e., they may petition their legislatures to abolish the practice, or they may bring suits in State Court under state antitrust laws. They must not, however, be permitted to litigate the wisdom of state policies in light
                                              50
of federal antitrust law in Federal Court."

     This position of the several states is indicative of most judicial branches, i.e., to be against price fixing.

     Clearly, the results of the SMCRC case show that states do not need a direct statute to compel collective ratemaking. For a while after the SMCRC decision, DOJ's initiatives in this area seem to concentrate on the concept of active supervision. Given the states' limited budgets and expertise, the actual level of supervision is small. However, the definition of "active" is a difficult one. The states' actions today seems to be nil.

     DOJ had argued that states did not compel collective ratemaking but merely allowed it and did not actively supervise it. States could, if they wish, disallow collective ratemaking. DOJ rationalized intervening in what, on the surface, appears to be a state level problem by arguing that some interstate traffic might be impacted by intrastate collective ratemaking, e.g., a product is brought into a state from another state by private carrier and then distributed within the state by for-hire carriers collectively making rates.

     The US Solicitor General's Office argued that Congress never delegated to states the authority to grant antitrust exemptions as the legislature did with the ICC. It is the government's "position that Congress only exempted state action and not policy from
                                              51
antitrust protection."   The rate bureaus argue that any anticompetitive effects ultimately resulting from state supported and fostered collective ratemaking are "irrelevant" as long as their actions are taken under the state's umbrella. The carriers can do nothing about their collectively proposed rates without subsequent approvals by the state regulatory agencies. In essence, the rate bureaus have collectively decided to agree to make a proposal to the states. "It is not carriers setting rates, it is
                                              52
the public service commissions."

     The main problem of collective ratemaking is the cartel behavior associated with the rate bureaus, i.e., competitors come together to set rates with impunity. Given the Supreme Court decision in the Southern Motor Carriers Ratemaking Conference case, it would appear that states wishing to continue the practice of collective ratemaking do not have to change their existing way of sanctioning the practice; however, they may have to engage in more active supervision of the bureau's practices. If

this is not done by the state, then it is possible that the courts
would rule that collective ratemaking is not legal. The state
reactions to date were shown in Chapter 1. However, no recent cases
attacking collective ratemaking in the states has surfaced.

Even if the fixed rates of the rate bureaus are not charged
by all of the carriers, the establishment of collective rates
likely elevates the entire rate structure if entry is also
restricted. Lower cost carriers can charge more, because price
competition is mitigated if most significant carriers are
loyal bureau members. Higher cost, less efficient carriers are
sustained in the market. For analogous reasons given above in
the operating ratio argument, if a high cost producer's position
dictates the rate chosen by the cartel, lazy carriers will have
little incentive to become more efficient, while the efficient
carriers will earn supra-normal profits and have incentives to
maintain the inefficient carriers in the market.

Cartel Behavior and Social Costs:

Cartel behavior parallels that of a monopolist. The
monopolist maximizes profit at the output where marginal revenue
(the additional revenue attributable to making the sale of an
additional unit of output) equals marginal cost (the additional
cost attributable to producing an additional unit of output).
This point is shown at A in Figure 2-4. In contrast, the
perfectly competitive market (a theoretical ideal) is at
equilibrium where price, P_c, equals marginal cost, at C in

Figure 2-4. Relative to the competitive market, the monopolized
market has restricted output, Q_m versus Q_c, and a higher

price P_m. Pricing in the cartel reflects the value of service

to the customer, whereas competitive pricing reflects the cost of
producing the product.

At C, society attaches a value to the finished product (price)
equal to the resource costs of the inputs (marginal cost). The
price P_m, however, is well above the value of the inputs in other

uses (marginal cost). Society would prefer another unit of motor
carrier service over a different use of the resources, but the
service would not be produced by the monopolist (cartel).
Restricted output is the key to their inflated price. Resources
are, therefore, misallocated.

In order to measure the losses (if any) caused by the state
regulation of motor carriers, the traditional welfare triangle
analysis is useful. In Figure 2-4, the area $P_o C P_c$ represents the
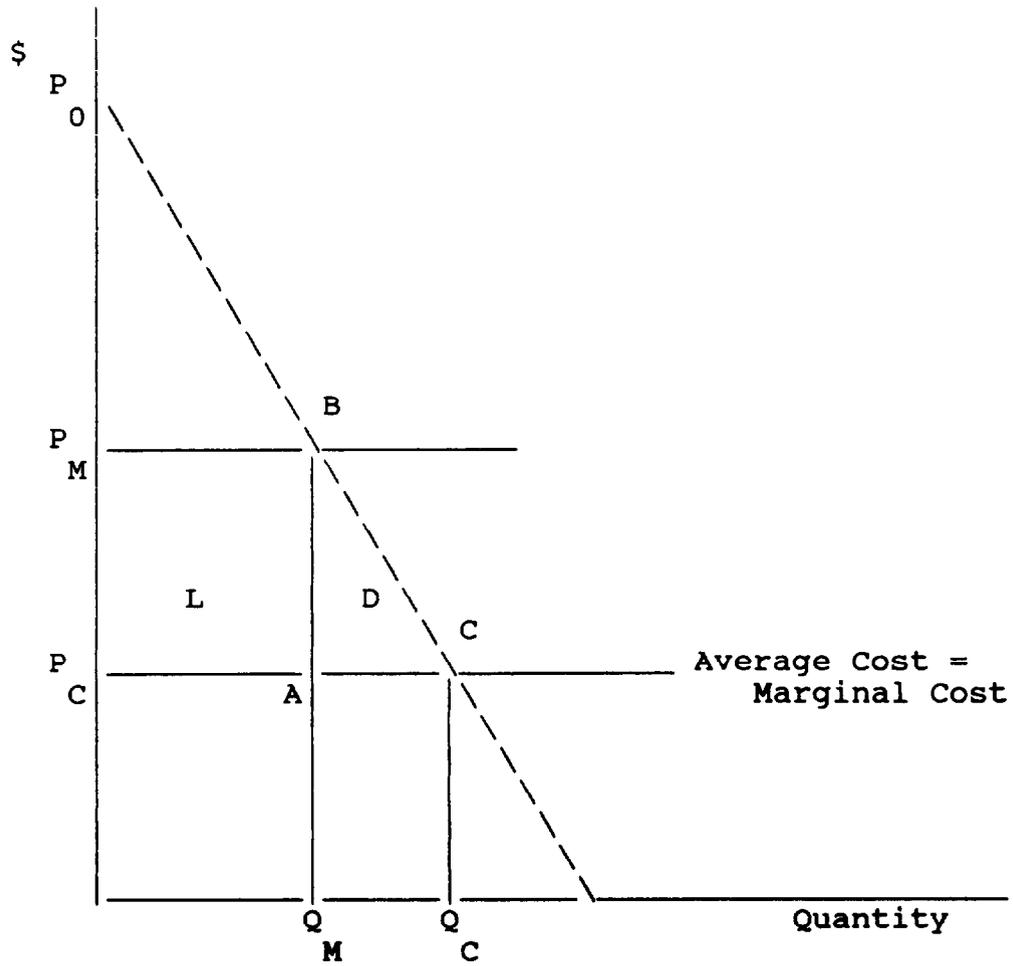
FIGURE 2-4

Posner Welfare Trapezoid (L + D) and Standard Welfare
Triangle (D)

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"consumer surplus" at price P_c, i.e., the extra amount that

consumers would be willing to pay (as measured from prices on the demand curve) but do not have to pay, given that the price is P_c.

Thus, consumer surplus is the difference between the maximum price consumers will pay for each unit of output along the demand curve and the going market price. As the monopolist (cartel) raises the price to P_m, the consumer surplus shrinks to $P_o BP_m$.

The shaded area, L, in Figure 2-4 can be viewed as a transfer payment from consumers who continue to use the motor carrier service to the cartelized motor carriers. Area D is an efficiency loss called the deadweight loss triangle. The output Q_c is not produced because the market price P_m exceeds the

maximum that consumers will pay for Q_c, i.e., P_c. These

consumers may not ship their products at all, or they may use an alternative mode such as private trucking.

The economic inefficiency depicted by area D is the loss to society because of the misallocation of resources. In the output range from Q_m to Q_c, the opportunity cost of the inputs is shown

as MC. This represents the resources' highest value in alternative uses. If such resources were used in regulated motor carrier service, consumers would attach a value to them as high as the price on the demand curve. The difference between the demand curve and the marginal cost in this output range is the extra value which is lost to society because the service between Q_m and Q_c is not

produced and the resources are diverted to uses of less value. The area D is measured by $(1/2)(P_m - P_c)(Q_c - Q_m) = (1/2) \triangle P \triangle Q$.

Cost of Distortions Caused by Regulation:

An extension of the welfare triangle analysis is shown in Figure 2-5. It is charged that other aspects of regulation such as route and commodity restrictions (i.e., restrictions that limit what geographic points can be served, specify the routes that must be travelled among them, and list what specific commodities can be carried) or inflated input prices also increase the cost of providing motor carrier service. This is because circuitous trips must be made and because vehicles do not operate efficiently
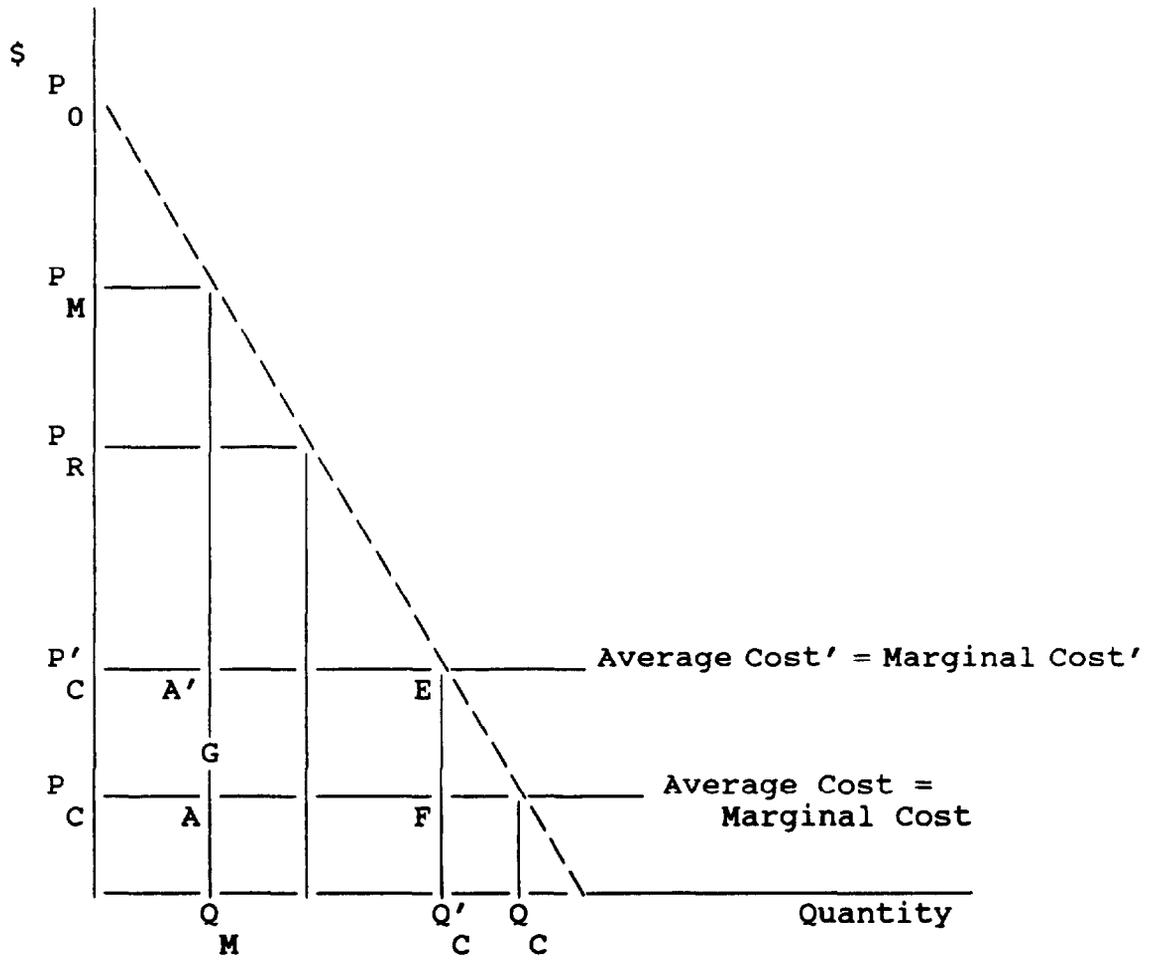
FIGURE 2-5

Modified Welfare Triangle Analysis

because they are only partially loaded.

The line MC depicts the cost of motor carrier service production without regulation, i.e., without such cost increasing restrictions. The line MC' shows the effect of costly operating restrictions. Thus, even without cartel pricing, the prices would be inflated from P_c to P'_c and output would fall from Q_c to Q'_c.

The area P'_cECP_c is the reduction in the consumer surplus which would stem from regulation induced cost increases. As above, a rectangle of revenue, P'_cEFP_c, would be extracted from consumers who continue to use the service. The area CEF is the deadweight loss which would be incurred because $Q_c - Q'_c$ output is not produced. A significant difference from the analysis of Figure 2-4 is that in the case of Figure 2-5, the rectangular area (G) would not be transferred to the trucking companies. It would be paid out to resources which must be consumed to comply with regulatory restrictions.

Figure 2-5 is useful in separating the costs stemming from regulation. The area P'_cEFP_c is a reduction in consumer surplus caused by restrictions which increase the cost of motor carriage. CEF is the deadweight loss from reduced production because of regulatory costs and associated price increases. The collusive behavior results in the loss of $P_mBEP'_c$. $P_mBA'P'_c$ is a transfer payment between consumers and suppliers of motor carriage. BA'E is the deadweight loss associated with non-consumption at the monopoly price. When both the operating restrictions and cartelized pricing are in place, equilibrium output is Q_m. The deadweight loss is the area BAC. Consumers pay P_mBAP_c too much for trucking service still consumed. $P_mBA'P'_c$ of this is transferred to the motor carriers while $P'_cA'AP_c$ is paid out for the increased operating costs made

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necessary by regulatory restrictions. Note that higher input prices extracted by monopolistic or oligopolistic input suppliers are attempts to capture some of the motor carriers' monopoly profit and do not constitute the cost increases in $P'A'AP_c$.

Thus, a regulatory jurisdiction which did not impose operating restrictions or any regulations which elevated the carriers' operating costs, but which allowed collective ratemaking, would have rates at P_r . If regulatory requirements and fees caused cost increases, but rates were effectively held at competitive levels, the rates would be at P'_c . The market with both elevated rates and costly regulatory requirements would have an equilibrium price P_m . All of these alternative regulatory scenarios should be compared with the competitive equilibrium price of P_c . While the competitive price of P_c may not actually be attained in a deregulated market, it is a convenient reference point and sets an upper bound on the gains to be obtained. In addition, in some deregulated markets, evidence exists that prices approach long run marginal costs.

Many theories attempt to explain the behavior which develops in response to the availability of monopoly profits. Any regulatory mechanism which elevates the market price above marginal cost and has a viable enforcement procedure creates the possibility of monopoly profits. Either the sanction of collective ratemaking without adequate supervision or elevated minimum tariffs can raise rates above costs. With restricted entry and state laws enforcing published rates, a monopoly profits rectangle up to the size of L in Figure 2-4 may be available without the discipline of competition.

Impact of Service Competition:

Posner[53] argues that a kind of competition develops as firms attempt to capture these extra-normal profits. Carriers and others who share these monopoly rents devote resources up to the expected value of L as they bid for the right to extract the monopoly profits. In most motor carrier regulatory jurisdictions, service levels are not regulated except that a minimum level of service is specified, i.e., service must be minimally above zero. Thus, carriers can attempt to capture a larger market share and hence a larger share of the monopoly profits by improving their services. More trucks can be added under the carrier's operating authority

to reduce shipping delay. In addition, increased advertising, more sales calls, and improved services for shipments are provided.

As the result of the improved service, the demand curve for motor carrier transport shifts to the right since the increased service increases the quantity of freight which shippers will desire to move at any given price. Costs will also increase until marginal costs and average costs coincide with P_m, the regulated price.

Following Posner's argument, the demand curve in Figure 2-6 is shifted from d to d' because of the service competition. For simplicity, no change in the intercept on the y axis (price) is assumed and it is also assumed that the equilibrium output, Q'_m, remains constant, with or without service competition. The costs of this extra service cause the increases in average and marginal costs (m).

The effect of regulation and the resulting service competition on society depends on the net change in consumer surplus. In a competitive market, the consumer surplus would be A + M + B. The regulated combination of inflated rates plus service competition yields a consumer surplus of A + C. In addition, the increased service causes additional resource costs of M + B + E to be incurred to produce the same amount of transportation, Q'_m. The welfare outcome depends on the relative sizes of M + B and C since the change in consumers surplus equals (A + M + B) - (A + C) = (M + B) - C.

It can be shown that M + B exceeds C, i.e., that the competitive consumer surplus exceeds the consumer surplus from service competition and higher rates. This is shown by comparing the area of A + M + B, i.e., $(1/2)(a - m)(Q'_m)$ with the area of A + C, i.e., $(1/2)(a - P_m)(Q'_m)$. Since $a - m > a - P_m$, it must be the case that A + M + B > A + C and hence M + B > C.

However, this conclusion holds because of the assumption that the output Q'_m doesn't change. It can be shown that it is possible that the net effect can be positive, i.e., C > M + B, if the shift in the demand curve is large enough. However, empirical evidence suggests that the shift in the demand curve, although positive with service improvements, is inelastic and thus, that the shifts are not likely to be great. Douglas and Miller[54] (for air service) and

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$

a

A   C

Average Cost′ = Marginal Cost′

M

E

M

B

m

Average Cost =
Marginal Cost

<--- d   <--- d′

Q′

Quantity

M
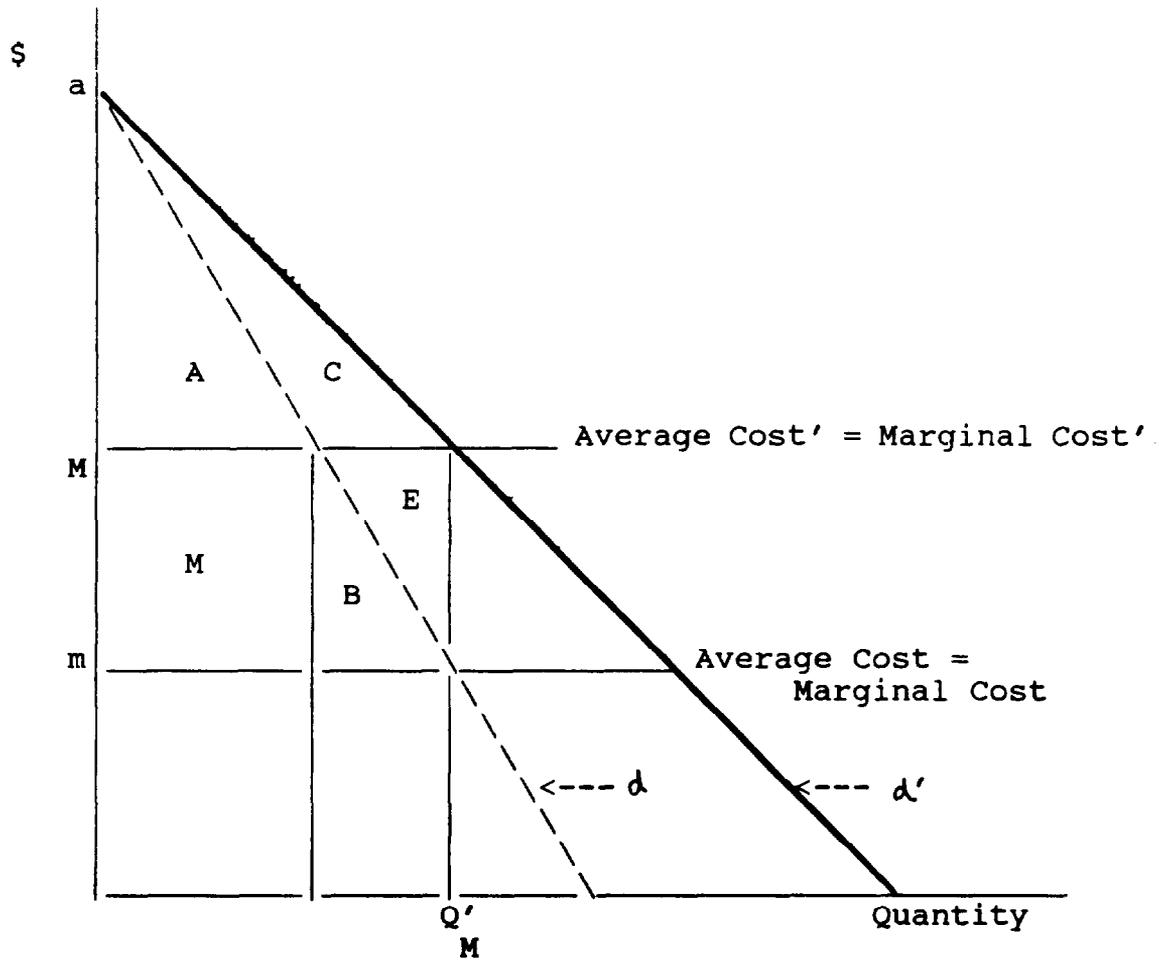
FIGURE 2-6

Modified Welfare Triangle Analysis Adjusted for Additional Service
Due to Regulation

Pustay   have also argued that consumers would lose consumer surplus under a situation as is depicted above.

Posner further argued that since L is consumed in the competition for extra-normal profits, it should be added to the social loss caused by monopoly (the cartel). The resources used in the activity have an opportunity cost. He assumes that the long run supply of the inputs is perfectly elastic with no rents embodied in their price. The assumption of constant and coincident variable and marginal costs is also necessary to the hypothesis that all monopoly rents, L , become social costs.

Posner's analysis denies that any social benefits accrue from the expenditures to acquire monopoly. The assumption is somewhat extreme. Although the dollars represented by area L are not spent by the consumers of motor carrier services as efficiency would dictate, they are available to other people. For instance, the expenses made by the truckers injects revenues into other industries. By the time that the successive rounds of spending are completed, surely some of the same expenditures that consumers would have made are made, e.g., the consumer of truck services may have purchased a TV with some of the L were he/she able to retain L through competition, but the driver hired to drive the extra truck caused by the increased service competition might also buy a TV with his/her wages. The true social cost would be the difference in the two final equilibrium spending totals in all sectors of the economy--a very difficult number to measure.

If Posner's argument is accepted, then the area L in Figure 2-4 should be added to the traditional area of social costs attributed to monopoly (the cartel), D.

Tollison   also makes an argument similar to Posner's. If only D is considered, a vast understatement in social loss can exist. As shown above in Figure 2-4, $D = (1/2) \triangle P \triangle Q$, and it can be shown that $L = \triangle PQ_m = \triangle P(Q_c - \triangle Q)$ where $\triangle P = P_m - P_c$ and $\triangle Q$

$= Q_c - Q_m$. Thus, the relative sizes of D and L are $(D/L) =$

$\triangle Q/[2(Q_c - \triangle Q)]$.

It can be shown that the ratio of D to L is small if the demand for the product is more steeply sloped and if the percentage price increase above the competitive price level is small.

For instance, if the demand relationship were $P = 6 - Q$ and the price were currently three, an increase in price of 10% would yield a (D/L) ratio of .055, and the use of D alone would capture only 5.3% of the social cost of prices in excess of marginal cost.

Posner also found that the social costs of monopoly, i.e., D + L, increase as the revenue of the industry at the competitive level increases. This condition holds when ep < 2, where e is

defined as the own price elasticity of demand (i.e., e = % /\Q / % /\P and p is the percent increase in price caused by monopolization.

Evidence suggests that motor carrier rates are 10 to 40% above the competitive level and the elasticity of demand is in the range of .4 to 1.841. Thus ep is likely to be less than one and hence well within the ep < 2 criterion. Thus, the implication is that the social costs of regulating the motor carrier industry are rising.

In a similar fashion, Posner noted that the social costs of monopoly become larger as the percentage difference between the monopoly price and the competitive price level increases. This conclusion holds in the range where ep < 1. As noted above, this constraint is unlikely to be violated in the motor carrier industry (e.g., at the extremes, .4 times 1.841 is .7364.)

Posner suggests that the way to determine the cost of monopoly pricing is to estimate the percent of the price increases and the elasticity of demand at relevant points along the demand curve. He estimated the price elasticity of demand at the optimal monopoly price by using the marginal revenue, i.e., $P_m (1- [1/e])$, equals marginal cost, P_c, relationship and

solving for e, i.e., $P_m /(P_m - P_c) = e$.

Finally, Posner derived the relationship:

$$C = R_m \{(1 - [1/e])^{-e} + 1\}/ 2e$$

where, C = total social cost of monopoly (D + L) at the optimal monopoly price

R_m = total industry revenue at the optimal monopoly price

e = price elasticity of demand at the optimal monopoly price

P_m

An estimate of e will yield C as a function of R_m.

Posner assumed that the profit maximizing price, P_m, would

be 62% above the competitive level, P_c, because of some studies

done by Farmer[57] on unregulated agricultural products truckload transportation and by Moore[58] on general truckload transportation. Since a sizable portion of the trucking industry business is in less-than-truckload (LTL), the applicability of Posner's results are not totally relevant to the overall trucking industry. In addition, the study described herein utilizes data from the general commodity sector, which has a high percentage of LTL traffic.

Using the 62% of Posner, the elasticity should be 2.613, i.e., 1.62/(1.62 - 1). This elasticity implies that $C = .672R_m$.

Thus, if the motor carrier industry engaged in a perfect cartel and hence behaved as a monopolist and, therefore, achieved its profit maximizing price, it would establish prices 62% above the competitive level. The social costs of such a monopolized motor carrier industry would reach their maximum at a level equal to 67% of the industry's revenues.

It can also be shown that $D = 1.256L$ if the elasticity is 2.613. Thus, if the social loss was only considered to be D, then $D = .373R_m$.

As mentioned above, other evidence suggests that motor carrier rates have been 10 to 40% above costs. At the same time, other research indicates that the price elasticity is in the range of .4 to 1.841.

Using Posner's formula for the relationship between profit maximizing prices and the related elasticities with these empirical estimates yields inconsistencies. If the 10-40% rate increases were profit maximizing, then elasticities should be in the range of 3.5 to 11.0. Since motor carrier elasticities seem to be much lower, current regulated motor carrier rates must not be as high as the carriers would set them if they were able to act as a perfect monopolist. The social costs of regulation are not at the maximum then, but rates remain well above the competitive level.

The implication that current motor carrier rates and social costs are somewhat below the level which would be established by a profit maximizing monopolist should not be viewed as an improvement brought about by regulation. The motor carrier industry could not succeed in monopolizing or cartelizing itself to reach P_m without regulation. In fact, the likely outcome in

most markets would be competitive prices set equal to marginal costs--a solution entailing no social costs. The difference between current social costs and this benchmark of zero social costs should be attributed to regulating an industry which would revert to competition in many markets if regulation were not imposed.

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Other reasons exist to believe that Posner's theory overestimates the social costs of monopoly pricing by motor carriers. As pointed out above, many of the expenditures made to provide service competition are likely to generate offsetting benefits in successive spending rounds. Secondly, the service competition has value to shippers in many instances where it reduces expenses they would have made otherwise. For example, regulation induced service competition might generate more frequently scheduled motor carrier deliveries, thereby lowering the users' carrying costs, inventory costs, and stockout costs.

Pustay[59] further developed this latter theory. Although the nominal dollar price for regulated service exceeds the dollar price for unregulated service, the shipper, contends Pustay, has a broader perspective. The shipper views his/her total costs, which are offset somewhat in the regulated market by the savings in other service costs. The total incremental dollar outlay for service in the regulated market is less than the total incremental dollar outlay for service in the unregulated market, because more service is embodied in the regulated transport and hence in its rate.

The total perceived shipping cost, W, is the sum of the regulated transportation rate, P_r, and the necessary incremental services purchased by the shipper, T_r, i.e., $W = P_r + T_r$. The total perceived unregulated shipping cost, X, is the sum of the unregulated transportation rate, P_u, and the necessary incremental services purchased by the shipper, T_u, (i.e., $X = P_u + T_u$.)

Pustay argued that the regulated total cost, W, exceeds the unregulated total cost, X, even though the regulated service expense, T_r, is exceeded by the unregulated service expense, T_u. Thus, shippers face higher total transportation costs because of regulation. However, Pustay argues that the difference is not as large as Posner defined it.

The Posner and Pustay arguments can be compared using Figure 2-7. Posner argued that deregulation would cause prices to fall to Y--which disregards the amount of outlay necessary to obtain
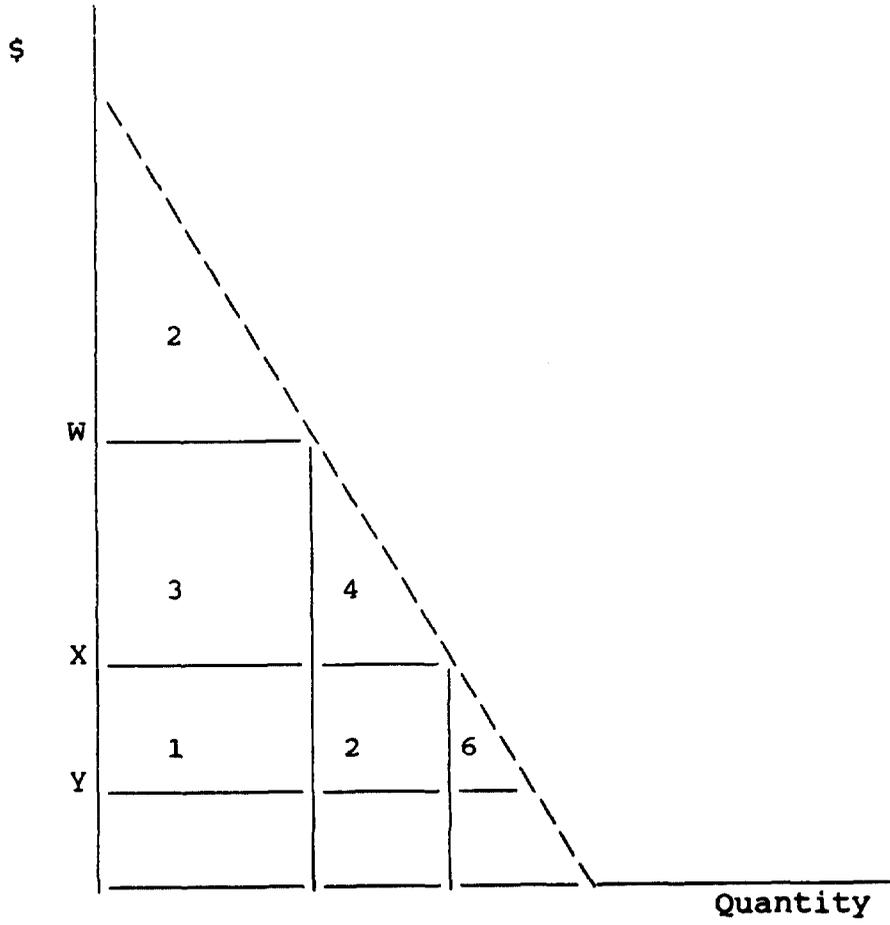
FIGURE 2-7

Pustay's Analysis of the Benefits of Deregulation

adequate service (since it assumes that the amount paid for service under regulation, T_r, would continue to be paid when rates fell

to P_u, i.e., $Y = P_u + T_r$. Pustay added the extra service costs which shippers would have to purchase once regulation and service competition were eliminated. Rather than fall from W to Y, as Posner implied, Pustay's fall in the total cost is to X, where $W > X > Y$.

Pustay, therefore, suggested that Posner's deadweight loss estimate of area 4 + 2 + 6 is an overestimate. Pustay would measure the deadweight loss as area 4. Further, while Posner would add the area 3 + 1 to the social loss, Pustay would consider adding only area 3.

There is an economic inefficiency associated with the service component of regulation. Even though the incremental costs are less, $T_r < T_u$, the shipper could attain the same overall level of satisfaction for less money. This inefficiency is found by measuring the ratio of the service value (the incremental cost saved) to its cost (the monopoly price increase). In Figure 2-7, this is the ratio of area 1 to area 3 + 1. Shippers would do better to choose and buy their own service combinations than to have regulation impose upon them a fixed degree of improved service at a high price.

Clearly, the carriers do expend some of their anticipated profits on extra services as Posner and Pustay suggest. It should be noted, however, that portions of the available monopoly profits go to other parties. Any input supplier capable of cornering the market in his/her input could exercise tremendous leverage on the carriers for a share of the monopoly rent. Teamster labor has been cited for such activity, with their higher wages providing supportive evidence (see Moore,[60] Kim,[61] Rose[62]. As discussed earlier, the carrier incentive to resist such higher input prices is lowered by their ability to cover cost through the operating ratio test.

Much more complex derivations of the theoretical welfare impacts of regulation have been developed by Winston[63] and Braeutigam and Noll.[64] Winston views welfare as the sum of rail and motor carrier profits, shipping firms' profits, and other income and theoretically shows the deadweight losses caused by motor and rail regulation and the gains to producers from deregulation. Braeutigam and Noll also assume cross elasticity of demand between rail and truck and view the dynamics of deregulation of rail and truck (i.e., the different attributions of the benefits of

deregulation depending on which is deregulated first.) In addition, failure to account for the impacts that each mode's deregulation has on the other mode (through the cross elasticity) and failure to allow for generation of traffic (as opposed to diversion) caused by lower rates (because most studies assume a perfectly inelastic demand for transportation) has led to other researchers underestimating the costs of regulation (which Braeutigam and Noll estimate to be $500 million for truck and rail).

Because of the shorter distances involved and because this study concentrates on LTL (less than truckload) movements (and hence makes rail and private trucking less likely alternatives), the intermodal competition models of Winston and Braeutigam and Noll are less relevant here. Because of this and because there is merit in Posner's analysis, this study will adopt the welfare trapezoid analysis of Posner.

Certificate Values:

Entrants to the industry sacrifice part of their monopoly return if they purchase a certificate of operating authority. Since entry via the application to the regulatory authority may be time consuming (and hence the flow of expected profits is delayed) and expensive (since lawyers and expert witnesses are likely to be used to counteract the protests of existing carriers) and the probability of success is extremely low in strict entry states, the expected benefits (the probability of success times the present value of the future stream of profits anticipated from entry) are likely to be exceeded by the costs of the application. As a result, entry can be secured on a virtually certain basis by purchasing the total or partial operating authority of an existing carrier. (See Snow and Sobotka[65] and Kafogolis[66] among others).

Carriers would not purchase operating authority unless the expected value of the stream of discounted future profits exceeded the purchase price. If entry via the administrative procedure is extremely difficult or impossible, a certificate will sell for the full expected value of the stream of discounted profits. In a freer entry situation, the seller of the certificate can only charge as much as the buyer's perceived cost of the administrative route to entry.

The existence of positive certificate values shows the existence of extra-normal profits. Since no assets are transacted in many cases, e.g., no terminals, no vehicles, and no goodwill is being purchased, i.e., only the right to operate in some geographical area with some commodity, then just the right to operate must have value. This occurs because the certificate conveys the opportunity to make an extra-normal profit.

The American Trucking Association once stated that certificates sold for 20% of the value of yearly gross revenues of the selling firm, i.e., certificate value = CV = .2PQ, where P is the price of motor carrier services and Q is the quantity of motor

carrier services sold. However, as just stated, the certificate value is the present discounted value of the stream of all future profits. In an industry without scale economies (average costs do not fall when output increases) and with constant costs prevailing (marginal costs (MC) equal average costs) and an infinite time horizon at a discount rate of i, the present discounted value of the future profit stream is $CV = [(P - MC)Q]/i$. Equating the two statements for CV and rearranging yields $(P - MC)/P = .2i$. A discount rate of 10% would then say that prices are 2% above marginal costs due to the certification procedure.

Certificate values in various states have also been documented.[67]

The Role of Entry Controls:

All of the groups which extract some share of the extra-normal profits from regulation want to ensure the continued availability of monopoly profits. Even if service competition, entry costs, high wages, and other forces have drawn carrier returns near to normal levels, they, too, will pursue the inflated rates. A sudden drop in rates to the competitive level could cause them to achieve subnormal returns until the infrastructure of inflated input prices settled back to competitive levels. Labor will protect its wages, and certificate holders will protect the values of their operating rights (which would disappear along with the monopoly rents.)

This rent protection is insured by the regulatory structure. Tariff compliance is mandatory in most states and can be enforced by audits. Carriers can meet to discuss their rates in government sanctioned rate bureaus. Rates charged by competitors, such as contract carriers, are often based on minimums set at the level of common carrier rates. Finally, many states require that the applicant demonstrate inadequacy of existing service before operating authority is granted. Existing carriers can exercise a great deal of coercion in the protest process. They can block applications completely or can force the applicant to narrow its request so as to eliminate competition with an existing carrier to avoid the cost of a long procedure or a denial.

The value of entry control in the maintenance of high rates is very substantial. In Figure 2-8, the marginal cost of existing carriers is shown as MC. Although a carrier with marginal costs below MC (MC') could change the competitive equilibrium, the cartel must also be wary of less efficient operators. Any entrant with marginal costs (MC") below the monopoly price, P_m, could undercut P_m to gain market share. The cartel cartel would then be forced to consider admitting the entrant into their group. In this way, they could restrict their output. Another possibility would be to allow the new carrier to take its share at a price lower than P_m, while splitting the remaining

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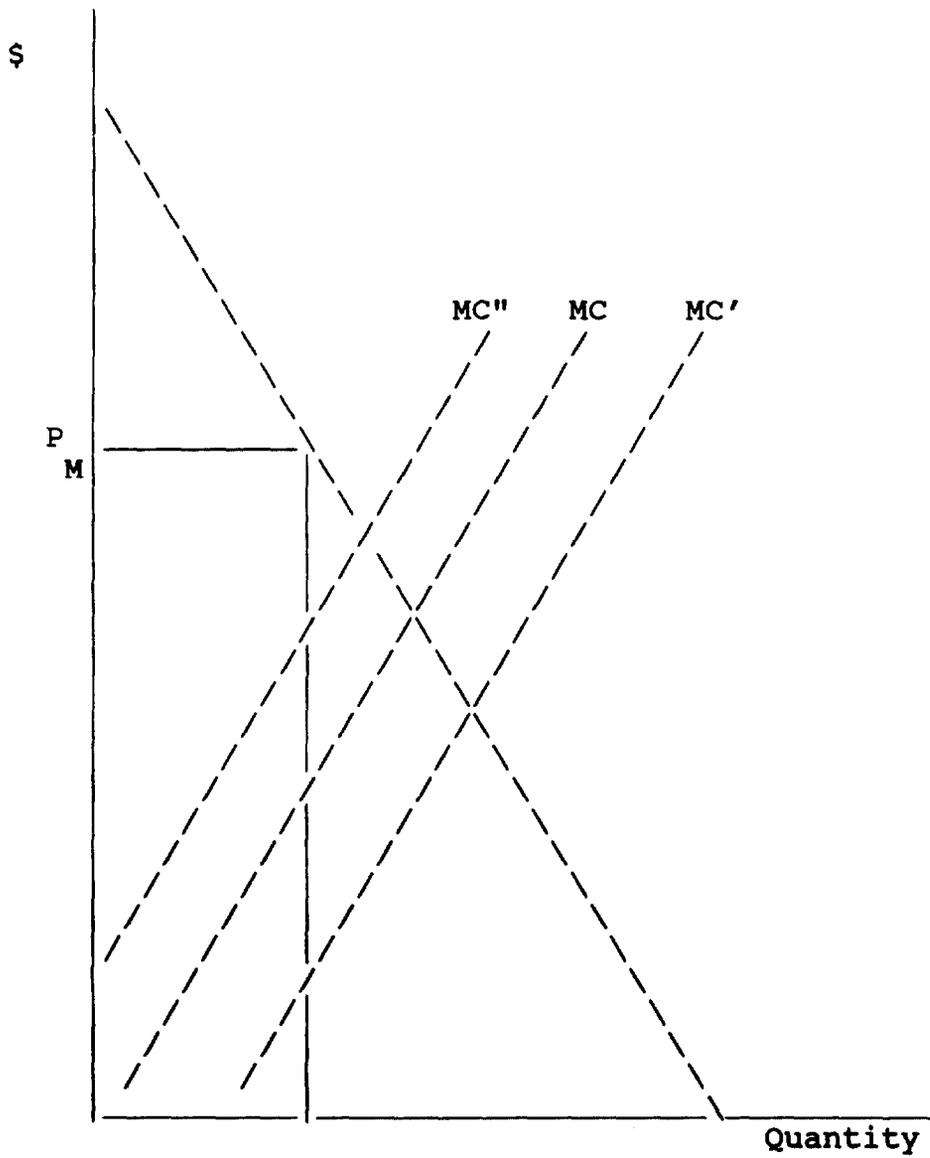
FIGURE 2-8

Impact of Entry Control in Maintaining High Rates

traffic at the monopoly price among the original cartel members. The original carriers would prefer strict entry conditions which would not allow the new entrant into the market. If the new entrant is admitted over the protests of the incumbents, under either scenario listed above, the incumbents must share the market with the newcomer. Thus, the incumbents prefer to keep the market to themselves, and, therefore, they favor strict entry control.

Allowing the newcomer to enter would likely entail more market losses for the incumbents over time. Few states limit equipment additions to authorities. Therefore, an efficient entrant, or even an inefficient entrant below the price of P_m, could expand.

Equally efficient cartel members would do better to defect from the cartel as the situation worsened. Observation of successful growth of the entrant would generate more entry. Free entry would erode the monopoly profits.

Thus, the role of entry restriction in the holding up of motor carrier price is critical. As long as the collective rates are voluntary and not mandatory, free entry can significantly undermine collective ratemaking as a monopoly pricing mechanism. Collective ratemaking might still exist under free entry (as it has on the federal level with virtually free entry since 1980): because it has brand recognition in the market, because it is a convenient base from which a carrier can quote discounts, and because of economies of scale in the publication of tariffs. These issues are discussed in Tye.[68] However, as shown below, a situation in New Jersey (where free entry exists) did not deter collective ratemaking and its ability to maintain rates above costs.

With completely free entry, any attempt by the cartel to raise rates to monopoly levels or above competitive levels will provoke entry into the market place--or so the theory goes.

However, several potential problems exist with the above argument. First, some barriers to entry may exist. Although relatively trivial, vehicles must be purchased or leased. For LTL freight, terminals are needed. Entering carriers lack goodwill or reputation, which may hinder their solicitation of business. An LTL carrier may require a substantial route network in order to obtain business (since a shipper may wish to deal with a single carrier for all its transportation needs, carriers in each market segment), and entering on the scale of a whole network is difficult.

Secondly, if the carriers desiring to sustain the cartel undercut the entering carrier, they can drive a non-deep pockets entrant from the market. While the conventional argument states that another entrant will appear when the cartel raises its rates again, repeated driving out of new entrants by the cartel sends a message to aspiring entrants that they cannot undercut the cartel price. While antitrust is a potential deterrent to such cartel behavior, it is ex post in nature, and no entrant may wish to pay the price of being driven from the market. In addition, although

exit is relatively easy (i.e., no sunk costs exist), the market for used equipment and terminals may be glutted. Consequently, the exit losses may be a high percentage of the entry costs.

The New Jersey Tank Truck Carriers Case:

An example of a sustainable cartel despite free entry seems to have existed in New Jersey in the tank truck industry. As mentioned above, the New Jersey intrastate motor carrier industry has never been regulated. Until 1970, the state of New Jersey had no antitrust statute. Prior to 1970, most tank truck operators in New Jersey had joined in a group, the New Jersey Tank Truck Carriers--NJTTC. This group met periodically and, among other items of business, openly discussed the rates that were to be charged for their services and published a group tariff.

Since no antitrust statute existed prior to 1970, the actions of the NJTTC were legal prior to 1970. However, after 1970, the group continued to meet and to discuss rates. As a result, the state Department of Criminal Justice filed suit to stop such a practice under the state's antitrust statute.

To consider in more detail the case in New Jersey, it was alleged that the members of the New Jersey Tank Truck Carriers (NJTTC) met from time to time both before and after the state's anti-trust statute went into effect and discussed rate policies of the participating carriers. It was noted that revenues increased and traffic volume fell after rate increases, implying that profits increased since variable costs would fall as output decreased, ceteris paribus. Thus such behavior by the NJTTC did as the theory presented herein contends, i.e., increased price and restricted output--all of which creates a social welfare loss.

Cartels are always concerned that "chiseling" of the rates will occur. Carriers in cartels note that the tactic of reducing rates in an effort by one carrier to secure business normally handled by another carrier only results in the lowering of the general level of rates to all shippers. Such a lowering of rates would be precisely in the interest of the shippers and the public, as contrasted to the artificial raising of the rates by the actions of a collective tariff. Such statements are typical of cartels attempting to get members to toe the line.

There is little to dispute that information is needed for a perfectly competitive market to perform. While the existence of the NJTTC tariff might appear to be an exchange of information, information can also be provided by non-rate bureau mechanisms. Also, as Scherer points out, "perfect information is unambiguously beneficial only in the context of purely competitive markets. When the market is oligopolistic, it may impair rather than invigorate rivalry."[69] The motor carrier industry may be an example of an inherently purely competitive market made monopolistic/ oligopolistic by the existence of rate bureaus especially, when accompanied by strict entry control.

Therefore, an exchange of price information can result in

prices stabilized in the area around the price published in the price information bulletin. Such price stability does not allow the market to respond to differing demand and supply conditions. In addition, such stabilization occurs at a price which is higher than the purely competitive price. The market would produce rates stable at the competitive level. This is not the same type of stability induced by the rate conferences.

While a uniform tariff does give a shipper information as to rates,[70] so, in fact, do multiple tariffs and information provided by and/or solicited from carriers. The fact that under individual rate negotiations, a given traffic manager won't know what rate his rival producer is paying should only make for more competitive pricing and more cost consciousness from the point of view of the producer. Knowledge of one's rival's cost of transportation should no more be public information than one's rival's labor costs, raw material prices, or other costs. Price shopping is a normal practice for businesspersons. A varied price structure is not the exception to the rule in the United States.

As far as motor carriers using the tariff as a benchmark for viewing if their costs are "in line" with other carriers, this is a matter for individual carriers to determine for themselves. Use of a tariff for this purpose just results in artificial price stabilization. As the FTC states, "A carrier has no such need to consult other carriers to determine if its own rates are reasonable. It is simply not credible to conclude that other carriers know more about the reasonableness of a proposed rate than does the carrier proposing it. In setting a rate, the carrier must merely consider its costs and establish a rate which will best maximize its profits."[71] Use of a collectively published tariff as a guide results in a stabilization of the price at an artificially high level. In the NJTTC, the tank truck carriers did just that.

It is important to note that carriers, when meeting to determine a tariff, are not relating past experiences as an information gathering educational experience, but are rather determining what rates will be like in a future time period. It will be in the collective vested interest of the carriers to all jointly establish rates above those that would be established if such rates were determined individually. Even if the fixed rates are not charged by 100% of the carriers involved, the setting of the collective rate level helps to set the entire rate structure at an artificially high level. The whole nature of the market is changed if any significant number of competitors charge the fixed, higher than cost, rates, because the lower priced carriers can afford to charge more than their own costs because the price competition of those others has been removed.

Therefore, collectively determined rates, whether as part of price fixing or as an exchange of information, are higher than market determined rates. Rate stability that is not determined by the marketplace will misallocate scarce economic resources. In addition, rates determined by the market in exempt from regulation

motor carrier markets have been shown to be stable at competitive levels. Shippers/receivers have no business (unless they consciously attempt to find out) knowing what freight rates their competitors are paying, i.e., this market intelligence should not be offered free by a regulatory agency. Motor carriers should make their pricing decisions based on their own costs. Exchanges of price information between potential competitors joined together for the purpose of such an exchange can only tend to oligopolize the industry and force prices upward and keep them rigid.

The tank truck carriers within the state of New Jersey were exempt from intrastate economic regulation until the enactment of the Bulk Commodities and Transportation Act of 1977 which became effective in 1978. The act only regulated entry into the industry (and not rates) and is administered by the Division of Motor Vehicles (DMV) in the state, rather than the traditional regulatory agency--the Public Utilities Commission. The Act is viewed in a safety context rather than as economic regulation. Entry is virtually free, with the function of the Act merely to collect a fee from the carriers and information as to where they can be found. Virtually all carriers applying were approved by the DMV. Thus, the intrastate tank truck industry in New Jersey has always been free from the traditional economic regulation faced by motor carriers.

While the federal carriers had permission to make rates collectively under the supervision of the ICC by the Reed-Bulwinkle Act, the state of New Jersey does not have such legislation granting antitrust immunity to carriers, permitting them to collectively set rates. In fact, in absence of such an exemption, collective rate fixing is patently prohibited by the state's antitrust laws.

The New Jersey Tank Truck Carriers (NJTTC) published a tariff which was essentially based on the ICC approved interstate tariff published by the Bulk Carriers Conference (BCC)--a conference representing carriers which move (basically interstate) the same type of commodities as moved by the NJTTC. The basic rate structure in the NJTTC tariff was essentially the same as that in the BCC, and the size and timing of the NJTTC tariff increases coincided with those of the BCC tariff. Given the fact that the NJTTC tariff was based on a regulated collectively set tariff with antitrust immunity, studies which compared regulated with unregulated rates are appropriate to estimate the degree of rate inflation in the NJTTC tariff. This relationship of regulated to unregulated rates provides an insight into the relationship which would have existed had the tank trucks in New Jersey set rates independently. The crucial question regarding collectively set rates in New Jersey was the role of free entry into the market. Could inflated rates exist with free entry?

In order to demonstrate the inflated rates of the NJTTC tariff, three sizable tank truck carriers in the intrastate New Jersey market who did not adhere to the NJTTC tariff were specifically analyzed. These carriers are identified as carriers A, B, and C. Rates charged by these three companies were contrasted

with rates listed in the NJTTC tariff for a given commodity, a given origin-destination pair, and a given shipment size. The rate from each source was plotted on a graph which had rate on the ordinate and calendar date on the abscissa. Thus, at any date, one could compare the rate of either A, B, or C with the NJTTC rate. Such comparisons were made in the time period between 1972 and 1977.

For carriers A and B, approximately 20 origin-destination pairs were chosen for various product types. This yielded 115 origin-destination/commodity comparisons. A percentage comparison of rates was made each time the carrier and the NJTTC rates differed. For example, if the NJTTC rate was 100 while carrier A's rate was 75, a savings of 25% was recorded. In the course of the six years under observation herein, as many as 13 differences between a carrier's rate and the NJTTC tariff were noted for a single commodity type and origin-destination pair. The percentage differences were added up for each period and divided by the number of rate difference periods. The result is an average percent that the individual carrier's rate is below the NJTTC rate (while above is a possibility and sometimes occurs, the averages are always below and so the term "below" will be used herein). A more sophisticated method was to weight each difference by the percentage of time the difference was in effect. This was done for a sample of origin-destination pairs. The difference between the weighted average and the simple average was quite small, and the unweighted average difference was always smaller than the weighted average.

Also noted for each observation was the number of times that the NJTTC tariff rates changed over the time horizon studied and the number of times that the individual carrier's rates changed in the same period. In all cases, the individual carrier's rates never changed more times than the NJTTC tariff changed. In fact, in only five cases (of the 107 where the analysis was done) were the number of changes the same. In the case of carrier B, in many cases where the NJTTC rate changed eight times, B's rate changed two or three times and, at most, five times. In the case of carrier A, where the NJTTC tariff changed five times, A never changed more than three times. Thus it appears that non-collusively set rates are actually more stable than the collectively set rates, in addition to being significantly lower.

Another interesting result of the A and B analysis bears mention. The measurement variable was the unweighted average percentage that a carrier's rate was below the NJTTC rate. It was chosen because it was obvious from the preliminary analysis that the individual carriers' rates were virtually always below the rates in the NJTTC tariff. In the 107 cases analyzed, 929 rate differences were observed. In only 30 of these 929 situations were the individual carriers' rates above those of the NJTTC tariff and in only 26 cases were the rates the same. Thus in 873 of the 929 rate differences (94%), the NJTTC tariff rate exceeded the individual carriers' rate.

There were three commodity types analyzed (by the bureau's

classification--note 1, note 2, and note 3). A's rates were 10.8% below for note 1, 11.7% below for note 2, and 21.8% below for note 3. B's rates were 18.2% below for note 1 and 19.3% below for note 2. B did not carry note 3 commodities. These rate comparisons show that these two carriers which did not follow the NJTTC tariff had rates which averaged 10-20% below the collectively made tariff.

For carrier C, two external pieces of information are utilized to show the magnitude of independently set rates versus the NJTTC tariff rates. The first is a rate comparison made by a traffic manager at a major chemical manufacturer in New Jersey, while the second is a rate comparison made by the president of carrier C in a letter to potential customers.

The chemical company's traffic manager's analysis from two company production points to over 60 destinations in New Jersey demonstrated that carrier C's rates ranged from 19.4 to 34.8% below the rates in the NJTTC tariff, with the average being 23.9% below. For another origin to 15 destination points in New Jersey, C's rates range from 1.4% above to 31.9% below the rates listed in the NJTTC tariff. In only one case, were carrier C's rates above the NJTTC tariff rate (1.4%). In this market, C's rates average 17.2% below the NJTTC rate over the whole time period. In addition, the traffic manager's analysis shows that C's accessorial charges are always less expensive than the same accessorial charges in the NJTTC tariff. Thus, the total cost of using C would always be less than the total cost of using a NJTTC tariff charging carrier no matter what degree of specialized service was desired. Therefore, the average of the total cost savings of using carrier C is greater than the 23.9% and 17.2% cited above.

In 1975, the president of C sent a letter to two major users of tank truck services in New Jersey. In the letter, he illustrated the rate savings from using his rates as opposed to those of the NJTTC tariff. Hypothetical deliveries were made using various origins and 50 destinations found in C's tariff. The comparison was for note 4, note 8, note 8A, and note 9 commodities. Note 4 commodities were 5% below NJTTC tariff rates; note 8 ranged from 10.39 to 23.78% below (with minimum charges ranging from 16.48 to 26% below); note 8A ranged from 5.36 to 11.88% below (with minimum charges ranging from 5.3 to 13.9% below); and note 9 was 5.89% below (with minimum charges ranging from 4.11 to 8.37% below). Since NJTTC rates always changed (increased) months before C's rates changed and since the NJTTC rates used in this comparison increased again soon after this comparison was made, the rate differences herein are the minimum differences. The maximum differences are in the 10 to 28% range.

The fact that carriers A, B, and C actively solicit business and remain in business over the long run demonstrates that the market does not require collective ratemaking to function. These carriers have been in business for over 20 years, and thus have been earning a return sufficient to replace capital and sufficient to reward their entrepreneurship. Since their rates were also more stable than the NJTTC rates, the result is an unequivocal gain to the users of these carriers.

The question remains, however, why shippers did not forsake the NJTTC carriers and use the services of A, B, and C exclusively and why, with free entry in New Jersey, other entrepreneurs did not enter the industry and compete away the profits made by charging the NJTTC rates? Lastly, what disciplinary ability did the NJTTC have to prevent cheating from the NJTTC tariff rates by its member carriers, i.e., was the cartel an effective one?

The Role of Information in the Functioning of Markets:

The answers to these questions lie in the problem of information determination and the role of information in the functioning of competitive markets. Indeed, the currently regulated sector pins some of its hopes to maintain regulation on the information provision available from the regulated system, while advocates of deregulation, such as USDOT, hope to make deregulated markets function better by requiring the provision of information, e.g., airline on time performance information. The Coalition For Sound General Freight Trucking (organized by the Regular Common Carrier Conference [RCCC] of the American Trucking Associations) argues that regulation yields the "enhanced flow of the critical
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information which fuels competition."   James Harkins, Managing Director of the RCCC notes that with the ICC, all buyers can know who all the sellers are and what prices they are charging. Without the ICC, one really would not know what was going on. "With that type of blackout of knowledge, you have a severe limitation on the
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ability of competition to work in the transportation field."
Tariff filing is part of the information set needed to make competition work claims Harkins. However, as explained herein, information can be provided from other sources to allow the markets to function.
In a regulated market with collective ratemaking dominant, information determination by shippers is very easy--ask any carrier for the rate for widgets from A to B and you will have the rate that all charge, or acquire the tariff yourself and look up the rate. A deregulated market or a market which allows collective ratemaking but where independent actions prevail, however, is a much different situation.
When a shipper must search for a rate, several decision models may be relevant. The first may be status quo, i.e., using one's existing carrier and rate. Such a rule will not work, of course, for new business. A second approach would be to choose a sample of n carriers, ask each for rates, and choose the carrier with the lowest rate (all other considerations being equal). A third approach would be to choose a target rate (one obtained by estimating what it should cost a carrier to produce the service, what rates exist in "comparable" markets to the one under consideration, what one discerns is available from popular press articles and conversations with other market participants, etc.) and sequentially search through the market until the target is

reached. If the target is not reached within a "reasonable" period of time, the target can be reassessed, or private carriage may become a viable option. In the study of the intrastate trucking markets in New Jersey and Delaware, the third approach was taken by many.[74]

Obviously, the search process takes longer and requires more "analysis" under deregulation than under regulation (Pustay's $T_u > T_r$ above). Under deregulation, the cost of search becomes

higher as the number of carriers searched, n, becomes larger. There are also, presumably, diminishing returns associated with continued search. The optimal search would conclude where the marginal benefits of an additional search just equalled the marginal costs of the search. The difficulty, of course, is in measuring these marginal benefits and marginal costs. Because of this difficulty and because of deregulation, shippers in the deregulated environment have a difficult time knowing if they have obtained the best rate. In addition, since rates can change instantaneously in a deregulated market, even if the best rate was obtained at time t, there is no guarantee that such rates would be best at time t+1.

In order for the competitive market to work, information must be present. Individual tariffs make information acquisition more difficult to obtain, and processing the information takes time and staff. Therefore, the lack of information about carriers A, B, and C can explain the ability of these carriers to exist at their rates and the NJTTC to exist at their higher rates. While the traffic manager of a major firm analyzed the rate differences, it is in the vested interest of that traffic manager not to share that information with the traffic managers of rival companies, since his company would earn larger profits and/or gain a larger share of the market by taking advantage of the lower costs of doing business. The president of carrier C attempted to provide information to the marketplace. Even this type of information imposes costs on the shippers, since they must take time to evaluate it. In addition, some traffic managers follow the first decision rule above and are not under any pressure from above to change their behavior. Some traffic managers are lazy and do not wish to change the status quo. In some cases, service levels are different. Therefore, it is totally possible for multiple rates to exist in an inherently competitive market when information is lacking.

Even in a perfectly competitive market with perfect information, different prices could prevail given the preferences of the traffic managers and the market structure in the industries that use the products being shipped. If the industries using the motor carrier services are making more than normal profits, then they may not worry about costs being higher than they would have to be--being, instead, satisfied that they were doing well enough. Likewise, if the product markets in which the transported good is being used is monopolistic or oligopolistic where the seller has

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some degree of monopoly power, the higher-than-they-would-have-to-be transportation costs could be passed on to consumers.

In a like manner, the lack of information may explain why new entry did not occur to join carriers A, B, and C in significantly undercutting the NJTTC tariff rates. An entry barrier, not often referred to in motor carrier studies but often discussed in the general service sector industry, was uncovered in the intrastate New Jersey trucking study,[75] and it relates to information in the context of reputation. A new carrier entering the market has no reputation. Thus, information available about the carrier is limited to what the carrier states about itself and perhaps the reputation of the individuals who make up the company. No checks can be made on the performance of the new firm. Especially in the movement of hazardous materials, but in all types of movement, reputation plays a major role. Successful new entrants do tend to be drivers from existing companies who established reputations and contacts as drivers.

There is some evidence that limited cheating went on with respect to NJTTC tariff rates. However, the longevity of the NJTTC would suggest that was not a problem. If it had been, one would have expected that the group would have disbanded as has been traditional in cartels where dissension reigns.

Some other evidence exists regarding the role of information in making the competitive market operational. In 1981, the ICC deregulated piggyback operations by rail (TOFC--highway trailer on flatcar and COFC--container on flatcar). While in 1984, the ICC, by voice vote, deregulated motor carrier movement incidental to TOFC/COFC (a motor carrier move is generally required from the true origin to the origin rail yard and from the destination rail yard to the ultimate destination), they never wrote the decision and thus, nominally such motor carrier operation is still regulated (except when provided by a rail owned motor carrier).

However, the reality of the MCA-1980 is that virtually anyone can enter the market (de facto free entry), and rates are legally very flexible and de facto perfectly flexible. Thus, de facto, the incidental to rail motor carrier market is, for all intents and purposes, deregulated. In addition, many of the moves took place in interstate commercial zones and thus the moves were legitimately deregulated.

The trucking portion of a piggyback move is called drayage. There are virtually no entry barriers (except reputation) into the drayage market. Since the railroad provides the trailer, only a tractor is needed, and no terminal facilities are required. Most participants in the drayage market are small, most are non-unionized, and many broker loads for owner-operators.

Given the lack of entry barriers, the large number of participants in the market, and the deregulated nature of the market, the initial investigation into the pricing behavior of the market led to the surprising result that rates ranged from

a low of $100 (long run average cost) to a high of $225 for the same service (origin-destination and service quality) in a major East Coast metropolitan area. Buyers paid rates within the above range.

As in the NJTTC case, the logical question exists as to why a homogeneous service would command such vast differences in prices? Further investigation showed that the market suffered from a severe lack of information. Sellers were small and relatively unsophisticated and did not know how to get the message to buyers. Ultimate buyers were many times insulated from the sellers by middlemen, and many middlemen either owned drayage services or had connections with them. The ultimate buyers paid a package price for a rail line haul and two drayage moves and were basically unaware of the motor carrier rates. While various brokers could compete for the business of shipper x, shipper x was far insulated from the ultimate market.

In the investigation of this particular case, drayman were solicited for their rates for various hypothetical moves. That information, along with information about the carrier, was compiled and sent to all shippers. Once shippers were aware that a service that some were charging $225 for could be obtained for $100, the average rates fell tremendously, and the variance of the rates paid around the mean also tightened considerably. Rate differences still exist for reasons given in the NJTTC example. Given information in the market, the market functions more smoothly and closer to theoretical expectations.

Thus information can be provided in a private sector context (analogous to Consumer Reports magazine or brokers' writeups on stocks). This information is presented without having collective ratemaking and without the concern that antitrust violations are occurring. It happens without regulation forcing it to occur. It facilitates the market between willing buyers and willing sellers.

Some carriers do not like the idea of such information provision. To the extent that they had monopoly power created by ignorance, information causes that power to dissipate, with a subsequent loss of profits. Other carriers like the idea of information provision (especially if they are low cost carriers), because many are small and had no idea as to how to market their product.

The information provision also is an aid to carriers, in the sense that it tells them what their competition is doing. Carrier behavior is motivated by the behavior of other carriers in the marketplace. The gathering of information enables them to make smarter business decisions.

If the information is gathered separately by each individual buyer and seller, it is likely that the unit cost of such information will probably be high, since each participant will be paying the total cost to discover the same thing. On the other hand, an information provider or providers can make the discovery and prorate the discovery costs and overhead to buyers at a lower cost per unit of information.

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An unanswered question is the role that government should play vis a vis entrepreneurs to ensure that information is available in the market in order that other policy objectives work in the manner which deregulation intended?

These examples suggest that higher rates can exist even in areas where entry is free--perhaps because potential entrants perceive retaliation by incumbents, because entry and exit are not completely costless, because information is very imperfect, and because traffic managers do not attempt to minimize costs/maximize profits, but rather have other objectives.

Such an explanation may also shed light on why the limit pricing theories and the theory of contestable markets may have limitations. These theories state that carriers already in a market may not price at cost but also may not price at cartel levels because of the threat of entry--not necessarily actual entry. The level of the price inflation over cost is related to the cost of entry of the new firm and the cost of exit. The theory suggests that free and costless entry and free and costless exit would yield limit prices at cost. However, the scenario described above of higher entry and exit costs (including the opportunity cost of the potential entrant's entrepreneurial ability) may keep entrants out even in a free market entry situation.

Thus, although free entry may strongly modify the behavior of the cartel, a strong and resolved cartel may be able to thwart the theory of limit pricing and contestable markets. It is not just that the assumptions of free entry and exit of perfectly contestable markets are not often met, but also the mindset that is created when a potential entrant feels that a price war may develop and that there are easier ways to earn money than to engage a hostile cartel. In a market where the cartel is not strong and not committed, then the threat of entry may be sufficient to prohibit monopoly pricing.

Impact of Entry:

The impact of entry on industry profits is shown in Figure 2-9. Entry by a new firm with marginal cost below the incumbent's shifts the marginal cost of the whole market down. This flattens the marginal cost curve over the relevant range of demand. Market price is driven down, and cartelization becomes more difficult. The new entry eliminates a deadweight loss triangle (DIL), lowers the cost of producing the previous output level Q_c

OHKDQ$_c$ to OHMJQ$_c$, increases output from Q_c to Q'_c, and alters the traffic split among the participating carriers (the new firm obtains the market expansion, $Q'_c - Q_c$, plus some of the share
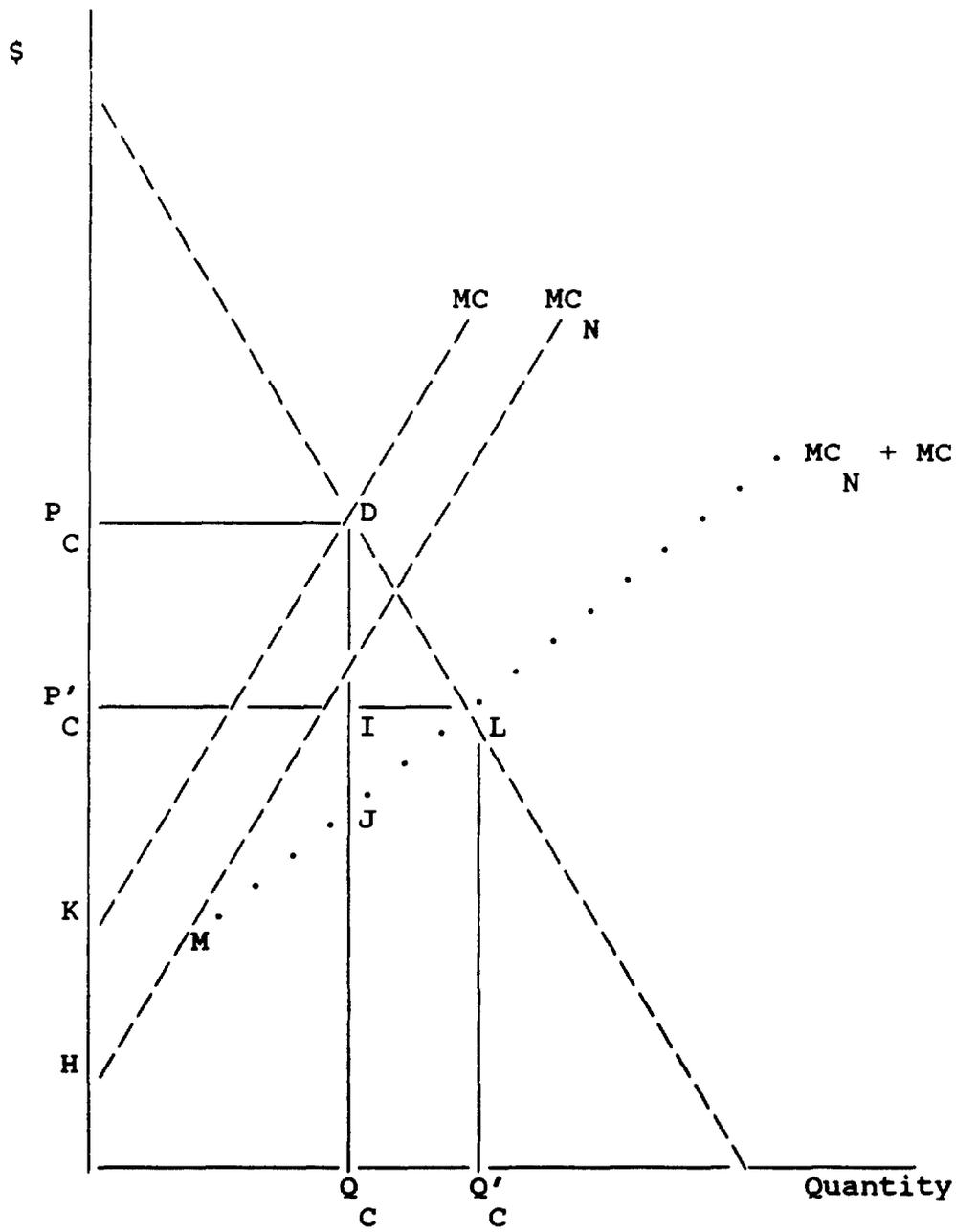
FIGURE 2-9

Impact of Entry on Industry Profits

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the incumbent's Q_c.

Tollison's Cost of Regulation:

Tollison[76] used similar logic to argue that the costs of regulation could exceed Posner's estimate. He noted that both the carriers and the shippers have an incentive to spend funds to sway the regulator's decision with respect to entry and rate regulation. According to Tollison, both groups would assign a probability to each of two possible outcomes. He postulated that $.X$ was equal to the probability that regulated price would be set at the competitive level, P_c, and $1 - .X$ was equal to the probability of a monopoly price, P_m, at equilibrium.

Using their estimates of $.X$, carriers and shippers calculate an expected price P^* as $P^* = .XP_c + (1 - .X)P_m$. The cartel will will then pay up to the value of its monopoly profits at P^* to promote its cause (e.g., the allowance of collective ratemaking, the barring of new entrants, etc.). In a like manner, the shipper/receivers will pay up to the amount of the consumer surplus that they expect to lose at P^* to lobby against P_m (e.g., to fight for deregulation, to disallow collective ratemaking, to allow freer entry, etc.)

Tollison's theory is illustrated in Figure 2-10. Carriers would pay up to P^*ABP_c ($= P^*GAP_m$ for $P^* = .5$) to fight for regulation. Consumers would pay up to P^*ACP_c to block the elevated prices. With $.X = .5$ as drawn, the total expenses to sway the regulators would equal P_mGACP_c, which exceeds the Posner trapezoid of P_mDACP_c by the triangle DGA. If the monopolist's position prevails, then Tollison adds the traditional welfare loss triangle DFC, thus exceeding Posner's total by DGA + DFC. Should the shipper/receivers prevail, then the Posner loss is exceeded by

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$

P
 M

$*$
P

P
 C

D | G

E | A

F | B C

Q
M

Q
C
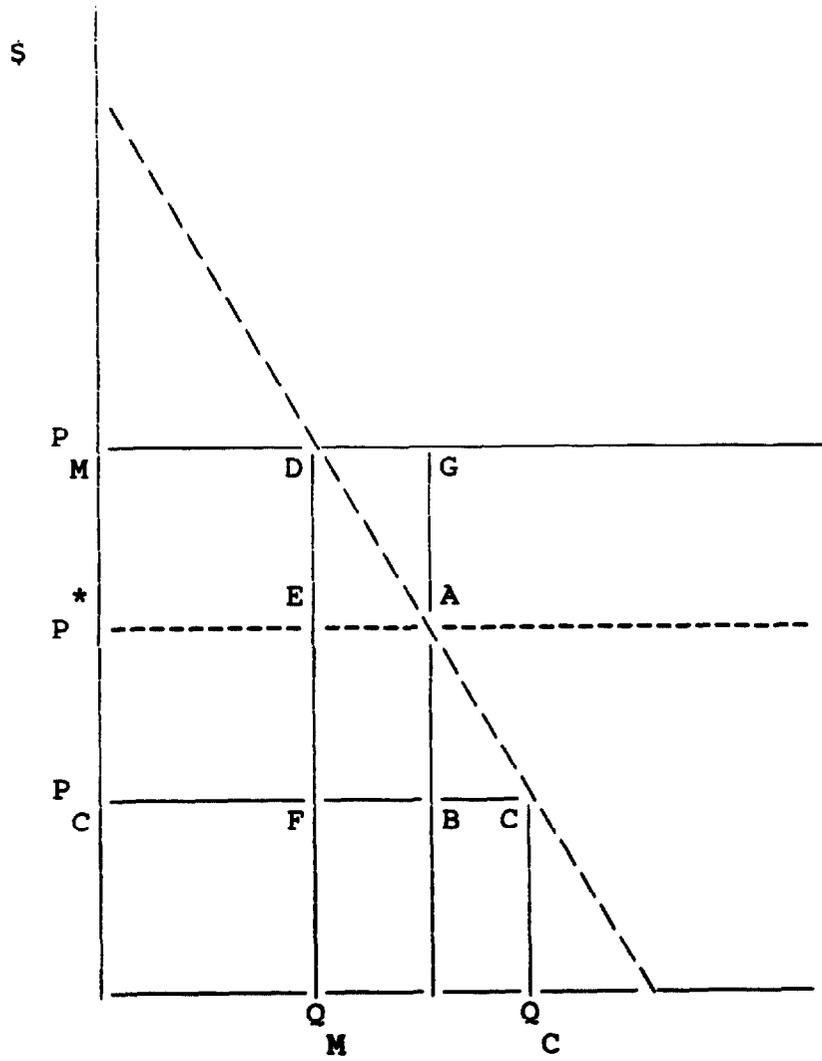
FIGURE 2-10

Tollison's Analysis of the Benefits of Deregulation

DGA. Since both the carriers and the shipper/receivers have an equal chance of prevailing in this case, the Tollison expected welfare loss exceeds the Posner welfare loss by (1/2)DFC + DGA.

However, Tollison's analysis may have some shortcomings which lead to an overestimate of the amount to be bid by each group. The relevant consideration for each bidder is the degree of change in his/her probability of winning which he/she can effect by bidding. For instance, carriers may determine that if they bid nothing, their expected probability of winning is still .X because of the strong proregulatory character of the regulatory agency (if .X is large) or because of the strong deregulatory proconsumer character of the agency (if .X is small.) With assumptions of how the shipper/receivers would behave, carriers would have to estimate the probability of success, $.X_G$, associated with different amounts of

their spending G. Each bid level, G, would have an expected value E(G) of $(.X_G - .X)Y - G = E(G)$, where Y is the expected gain from

a carrier win, i.e., $P = P_m$, where E(G) is the expected gain less

the cost of bidding required to obtain the gain. The carrier would choose the value of G which maximizes the expected value of E(G). If all values of E(G) are negative, then the carriers will spend nothing.

In situations where the regulatory agency is proderegulation, the chances of a carrier victory with bidding would seem to be close to zero. Any improvement in .X to be gained by spending G would likely be small. Thus, the net expected gain from bidding would likely be negative, and the carriers would bid nothing. On the other hand, in a proregulation-procarrier environment, the probability of the carrier winning without any expenditure might be quite high. A small bidding expenditure might generate significant improvements, while further bidding would likely have diminishing returns. Each side will make these calculations and bid the amount which maximizes its net gain after bidding costs, perhaps bidding nothing. In the latter case of a procarrier regulatory agency, the carriers may bid nothing, feeling that their position is a certain victor; the shipper/receivers may bid nothing because they feel that their position is a certain loser. Only when the regulatory agency appears to be influenceable would Tollison's bidding rules appear to hold.

A second problem with Tollison's argument is his measurement of the expected gain by each side. Tollison determines expected gain Y by measuring the surplus available at the expected price. Herein lies the difficulty. Each side should consider the expected surplus by weighting the surpluses available at P_m and P_c by their

subjective probability estimates. This problem causes an

overestimate in the amount bid by both carriers and shippers, as will be shown below.

In Figure 2-10, the producer surplus (profit) is zero when the price is P_c and $PA_m DFP_c$ when the price is P_m. Thus, the expected

producer surplus is $.5P_m DFP_c$, i.e., $(.X) \times (0) + (1 - .X)P_m DFP_c$

or $P_c EFP^*$. Thus, the carrier would not be willing to pay the

$P_c ABP^*$ suggested by Tollison, but rather a fraction of it, i.e.,

$P_c EFP^*$. Tollison's amount is overestimated by EABF.

Likewise, shipper/receivers would not be willing to invest up to $P_c \overline{ACP}^*$ to block monopoly prices. If the monopoly price is

charged, the shipper/receivers will lose $P_m DCP_c$ in consumer

surplus, whereas if the competitive price is charged, the shipper/receivers will lose no consumer surplus. Therefore, their expected loss is $.5P_m DCP_c = P_c ABP^*$ rather than $P_c ACP^*$, and the

expected deadweight loss is .5DCF or DAE + ABC. Therefore, the expected societal cost under this latter form of Tollison's analysis is $P_m DCP_c$, i.e., the Posner trapezoid.

The Costs of Regulation Administration:

As Skogh[77] has pointed out, expenses by carriers and shipper/receivers are not the direct dollar outlay associated with regulation. Government enforcement of the regulation requires resources too. The money spent by government regulators should be added to the social costs of a regulated motor carrier industry. In Wisconsin, these costs were estimated to be $500,000 per year (which, at a 10% discount rate to infinity, yields a present value of $5 million).[78] In Washington state, the administration costs of the motor carrier portion of Washington Utilities and Transportation Commission are estimated to be between $1.161

million and $1.556 million per year.   Table 2.1 shows the
regulatory expenditures by state for just the economic regulation
of motor carriers, e.g., no safety or other modes are included.
This totals $66 million for a recent year.

The Public Interest Theory of Regulation:

Despite the various arguments given above concerning the high
social costs which are accrued in a regulated environment,
regulation of the motor carrier industry is defended by some as
necessary. Some acknowledge the above faults of regulation but
argue that regulation "done right" will eliminate the abuses above
and also accomplish social goals. Others claim that without
regulation, the industry would become chaotic, with unstable rates,
cutthroat competition and an abundance of unstable, unreliable
operators. It is argued that small communities would not receive
service and progressively larger carriers would drive the small
carriers out of the market.
    An example of the social goals of regulation are those
stated in a recent California Public Utility Commission
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study.   These are goals reflecting equity and efficiency. Eight
goals are stated:

(1) Equal opportunity for shippers (avoid prejudice
    and undue discrimination).

(2) Appropriate uniformity and diversity of rates,
    practices, services, terms, and conditions.

(3) Appropriate stability and responsiveness of rates.

(4) Adequate services to small communities and rural
    areas.

(5) Adequate interlining, through rates, and joint
    rates.

(6) Appropriate rates for small shippers and LTL cargo.

(7) Prevent destructive competition and predatory pricing
    among carriers and assure adequate service.

(8) Keep costs to shippers as low as reasonably possible.

Posner calls these justifications for regulation the "public
interest theory". As discussed above, predation (pricing at below
marginal cost) is not likely to occur, as the markets would appear
to be contestable. In addition, the contestability in this market
is not only from new entrants but also from existing carriers
expanding their markets. A carrier with terminals in Dallas and

Houston for the purposes of being in interstate markets could very easily enter the intrastate Texas market between Dallas and Houston with virtually no entry costs nor exit costs, were the entry to the intrastate Texas market to be free.

Safety and Regulation:

The link between unsafe operations and economic regulation is also inappropriate. Unregulated carriers would have an interest in viable cost savings, but heavy loss and damage claims and accidents would tarnish their reputation, and higher insurance costs would absorb their profits. As a result of conditions in the insurance industry, insurance costs have risen rapidly in the 1980's.

Insurance is mandatory for operation in interstate commerce. Since better record carriers should have lower rates than poorer record carriers, it should not be in the vested interest of a carrier to run in an unsafe fashion. If insurance rates were out of equilibrium (so that the expected maintenance savings from running unsafe exceeded the expected increase in insurance premiums), a second force should be at work. Safety regulation can be enforced without inflated rates and non-free entry. Since such enforcement applies to all, no unfair advantage is imposed. Society has mandated certain safety standards and law enforcement agencies should enforce them. By making the penalty for noncompliance high enough and the probability of apprehension high enough, the expected penalty will also be high. This expected penalty plus the premium on insurance should be set to exceed the savings from skimping on maintenance.

A safe operator will pay nothing in penalties and will have a lower insurance premium (although higher than it would be if all carriers operated safely). As a result of these lower costs, safe carriers should be able to offer lower rates than non-safe carriers, ceteris paribus. In addition, non-safe carriers should be constantly removed from the list of participants as their violations records increase and their insurance costs rise.

Some proponents of economic regulation have argued that very large increases in trucker reported truck accidents (e.g., 18% in 1984) can be attributed to deregulation. They believe that pressure on prices puts pressure on costs, resulting in reduced maintenance and the use of inexperienced drivers, which results in more accidents. However, the accident level throughout the 1980's (except for 1984) has been less than that of 1979 (the last full year before the MCA-1980). Given more vehicle miles driven due to the emergence from the recession and lower nominal and real gasoline prices, the downsizing of automobiles, the deterioration of the highway system, weather idiosyncracies, etc., it is difficult to attribute causality (in only one year-1984) to deregulation. This is pointed out by established truckers who favor

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deregulation.

In addition, Representative DeLay (R-TX) notes that "at our recent hearings on the Motor Carrier Act, we established a record

that concerns over these three issues (safety, insurance, and bankruptcies) have little or nothing to do with deregulation of the trucking industry."[82] Although accidents nominally increased in 1984 and 1985, miles travelled increased at a faster rate; consequently, the incidence rate of accidents per mile actually decreased.

A recent study by Cherry,[83] which adjusts dollar damages in accidents for inflation and adjusts the accident data for vehicle miles driven, substantiates the point that real accident rates have fallen since deregulation. The California Highway Patrol Report[84] and the results of a recent safety conference at Northwestern University[85] demonstrate that there is no link between safety and economic deregulation. A recent report advocating the economic deregulation of motor carriage in Indiana[86] recommended that the budget used for economic regulation be transferred over for use in enforcing safety regulation.

Motor Carrier Concentration:

Scale economies have been shown to be relatively insignificant in the motor carrier industry. Thus, the natural monopoly theory of regulation (basically due to high fixed costs, lack of substitute products, and significant barriers to entry) does not hold.

While the level of concentration in the LTL motor carrier industry has increased since deregulation, the phenomena seems to be on a national level rather than on a route or a traffic lane level where concentration has always been high. Route or traffic lane concentration ratios were shown by Cherry[87] to be quite high under regulation, i.e., a very large percentage of the traffic lanes had the top five carriers with over 75% of the traffic. Prior to deregulation, these top five carriers tended to differ from traffic lane to traffic lane; however, since deregulation, the top five are more likely to be the same carrier and hence the nationwide increase in concentration.

In Texas, the claim is that the top eight carriers have 94% of the revenues. In Georgia, the top three carriers have 80% of the traffic. In both Maine and South Dakota, several carriers dominated the intrastate market under regulation. In Florida, the top six carriers (prior to deregulation) had 94% of the general freight revenue.[88] Thus, concentration under regulation is the rule.

Part of this is a continuation of a trend that was occurring even under regulation. This was related to service levels. Since traffic managers prefer to have one carrier (or a few carriers) to take them to n places rather than n carriers which can only go to

one place (or a few places), carriers had been merging to form companies which could service a full range of points. Deregulation allowed this phenomena to occur much more rapidly, since as carriers could apply for and receive authority to expand without merging with or acquiring another carrier.

The Small Community Argument:

A final component of the public interest argument is the claim that truck service to small communities is inherently unprofitable and that without regulation these places would not be served. It is argued that regulation either forces carriers to serve the points or establishes a system of cross subsidy which allows high rates on monopoly routes to make up for the lost profits on small community routes.

If, in fact, rate differentials existed such that rural areas were unprofitable to serve, while urban areas were supra-profitable to serve, the resultant incentives would seem to be clear. Rational carriers would attempt to abandon the unprofitable routes. A rational entrepreneur would not be benevolent and achieve the composite return if he/she could obtain just the supra-normal return. Thus, if the regulatory obligation to serve (the common carrier obligation) were not enforced and rural service was inherently unprofitable, small communities would not receive service just because such service could be covered by the higher urban rates. Rather, only urban service would be offered. Numerous studies have shown cases where the obligation is not enforced, yet rural service is provided. The implication is that much of the rural service is profitable and is provided without compulsion.
See Banks[89] among others.[90]

Using regulation to enforce a cross subsidy as described above is called the "taxation theory of regulation". If such cross subsidization took place, then income would be redistributed from urban areas to rural areas. Such indirect taxation and income redistribution through cross subsidy causes distortion in individuals' consumption decisions. Urban users (the subsidizers) would face a higher price than is optimal and consume less service as a result. Rural users (the subsidizees) would face a price below the true resource costs of the service and consume beyond the efficient level. In addition, equity holders of the carriers would also be providing a subsidy, since they would receive lower dividends than if only the profitable urban service were provided.

Furthermore, the implicit social policy and expenses are hidden from public scrutiny. It is unclear whether society would choose to conduct this program if explicit tax appropriations were required. In addition, tax policy is more appropriately the domain of the legislative and executive branches of government.

Finally, in some cases, carriers apparently ignore their common carrier obligation and do not fulfill their mandate to provide small community service and hence the subsidy does not take place.

When the rates are below costs and the carriers do not produce service, they are acting in a rational manner. If they provide service only because they are being supra-compensated elsewhere, they are rational only if they could not perform the supra-compensated service alone, i.e., if the two are a tied package. Under deregulation, a rational entrepreneur would only provide service where rates exceeded costs (unless the service was a loss leader). Thus if a cross subsidy existed and regulation was eliminated, entry would eliminate the supra-normal rates in the urban market and remove the compulsion to be in the rural markets. Rational carriers would either abandon or raise rates in the rural markets. Should society feel that such service is deserving, a direct government subsidy could be paid for such services, e.g., the subsidy to provide air services to small communities (under the Airline Deregulation Act of 1978), school lunch programs, etc. However, as stated above, the evidence suggests that cross subsidy is not an issue and that rural communities can be self sustaining.

It is true that the nature of the motor carrier industry has changed dramatically over time. Perhaps the justifications for the public interest theory were once valid. Posner postulated that the task of regulation may have become too difficult and too costly relative to its benefits. Less legislative scrutiny of the use of delegated authority also might contribute to the breakdown of regulatory efficiency.

The Capture Theory of Regulation and the Economic Theory of Regulation:

Perhaps in response to the limited credibility of the public interest theory as an explanation for all regulation, other

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theories have been postulated. Stigler   described an "economic" theory of regulation wherein he contends that regulation and coercive government power confer valuable benefits on various market participants. As noted above, those who benefit from regulation will likely expend funds to ensure its preservation.

The "capture theory" also describes a distortion in regulation caused by personal interest. Special interest groups either propose regulatory structures which would serve their purposes and/or "capture" an existing structure by getting individuals attuned to their way of thinking appointed to the agency. Industry proposals, therefore, have the advantage versus the proposals of the shipper/ receivers. Even if their own people are not appointed to the agency, regulators have or acquire very specific expertise which will direct their careers into the industry which they regulate. The theory implies that regulators would be unwise to alienate the carriers by putting unfavorable regulations in place. Therefore, it is suggested that regulators make decisions so as to maximize their future income.

Stigler's claim that private economic interests guide regulation is consistent with the earlier discussion of the relative costs of cartelization versus regulatory enforcement.

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Particularly in highly atomistic industries such as motor carriage, private cartelization is expensive--if it is possible at all. If the industry desires cartelization but it is difficult to provide it privately, the large number of atomistic supporters becomes a constituency for political support for the regulation. The government enforcement provides a mandatory cartel for what would be an unstable and illegal entity if handled privately.

The approaches which the groups use to attain and maintain regulation vary. Stigler theorized that political peculiarities influence the technique chosen. In an "entrepreneurial" system, regulatory legislation is sold to those who value it most highly, parallelling the arguments made by Tollison. Or legislation can be obtained by "coercion" by groups capable of threatening society with disruptive activities. Finally, "democratic" systems provide legislation to groups able to sway the largest number of votes.

The motor carrier industry could employ any or all of these techniques in a quest for regulation. Powerful and well-funded motor carrier organizations spend money to "educate" legislators and administrators at the state and federal level. Since the industry provides a vital service, any large scale disruption would cause serious harm. Votes could be influenced by the sheer number of workers involved in trucking and related industries, as well as campaign contributions generally and PACs specifically. These various theories depict the conflicting influences exerted on regulators.

A Composite Theory of Regulation:

A composite theory links both the public interest theory and the capture theory. For the sake of the public interest, motor carrier services should be provided at the lowest possible price subject to the coverage of costs. At the same time, the "captured" regulators wish to provide the carriers with supra-normal profits. The interaction between these two conflicting goals is analyzed below.

Assume that a regulator has a preference function which contains a public interest theory variable, price (P), and a capture theory variable, profit (TT). This preference function is shown in Figure 2-11a. The regulator's utility increases as carrier profits rise while holding price constant, i.e., at

price $\overline{P}$, the regulator's satisfaction is higher at profit B than at profit A, since, at a constant price, the shipper/receivers are indifferent as to the profit level attained by the carriers while the carriers prefer the higher level. Likewise, if the same

profits, $\overline{TT}$, can be maintained, the regulator's satisfaction will be higher at a lower price C as opposed to the higher price A. This is so because at a constant profit, carriers are indifferent as to the price level available to the shipper/receivers while the shipper/receivers prefer the lower level. Figure 2-11a maps out loci of equal preference for the regulator; higher levels of
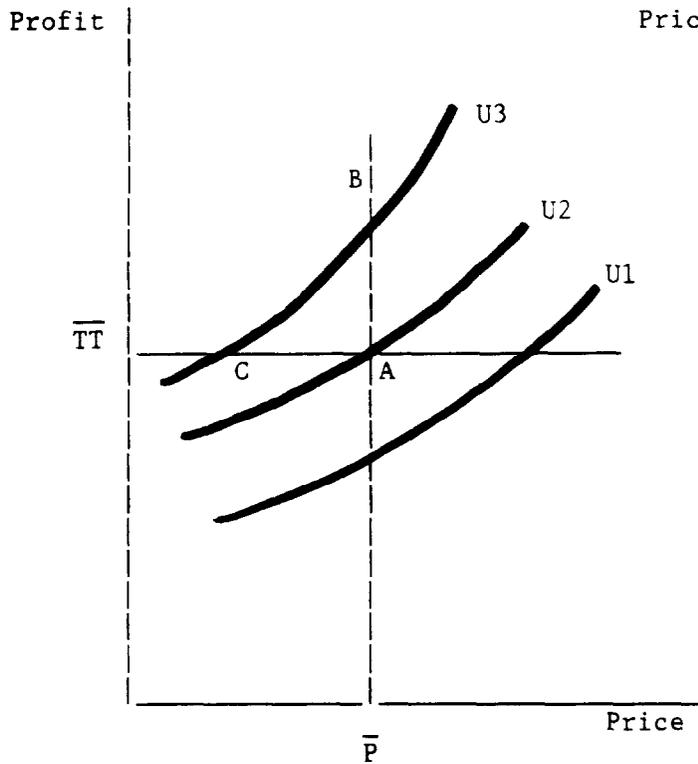
Figure 2-11a

Profit Versus Price Utility Curves For
Regulators
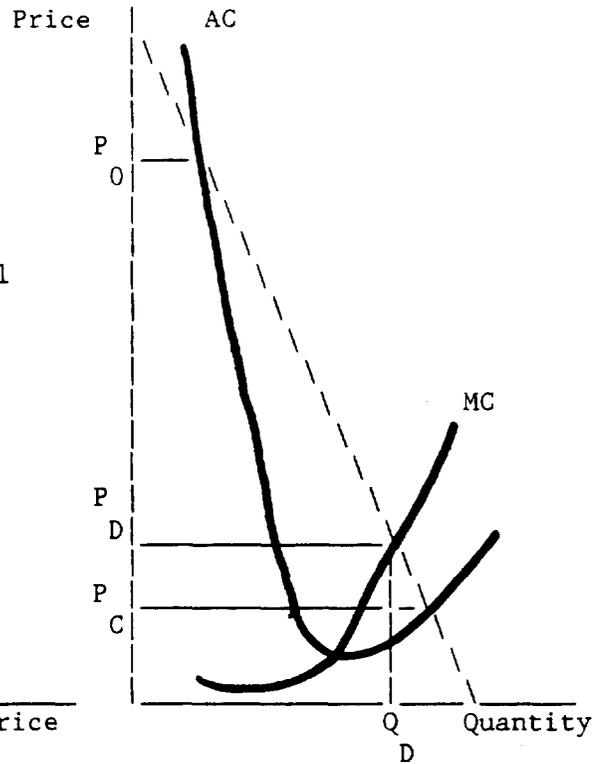
Figure 2-11b

Determination of Profitable
Price Range
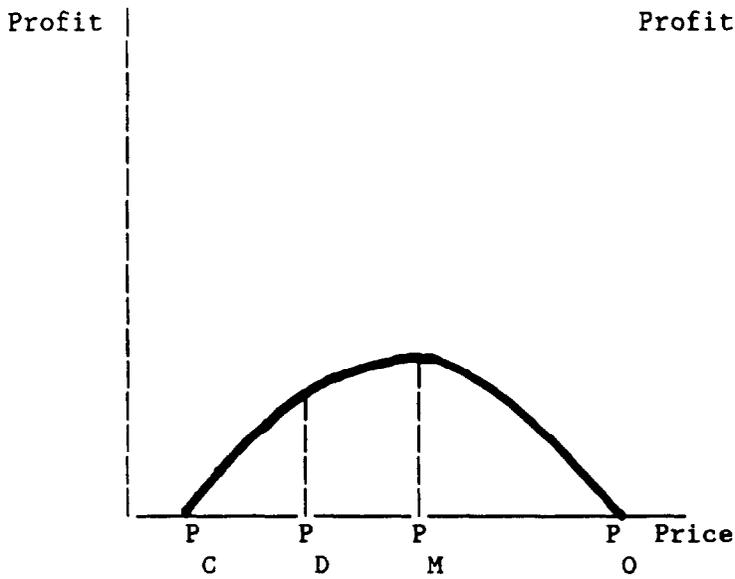
Figure 2-11c

Profits Within Range of Profitable Prices
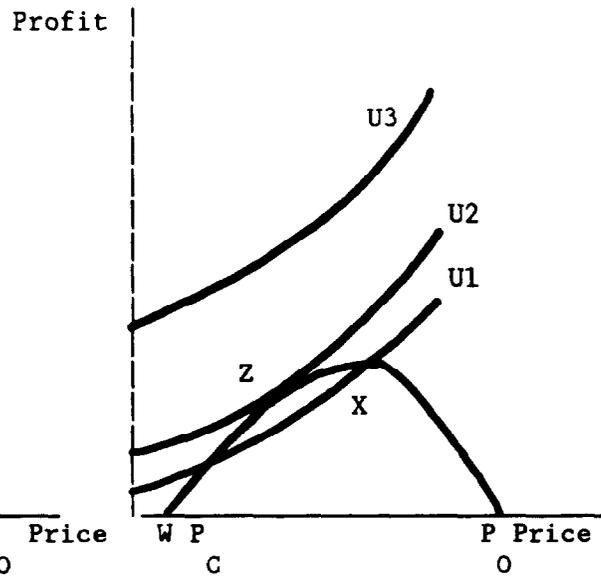
Figure 2-11d

Utility Maximizing for
Regulators

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preference are found as one moves northwesterly, i.e., higher profits and lower prices.

The height of the preference level attained is constrained by the market relationship between price and profit, which is determined by the demand function facing the carrier and the carrier's average cost. A demand and average cost relationship as in Figure 2-11b will yield a price and profit constraint as shown in Figure 2-11c. Profit is maximized at price P_m, while the minimum price that could be charged that would sustain the firm would be at P_c.

Superimposing Figures 2-11a and 2-11c yields Figure 2-11d, the constrained maximization, i.e., the highest level of satisfaction attainable by the regulator subject to the market constraint on prices and profit. This occurs at point Z. The carriers cannot obtain their desired point of X. To have the highest level of satisfaction at X would require that the satisfaction curves in Figure 2-11a not satisfy that relation that more profit and less price is better. While it is possible that the maximum level of satisfaction could be at W, the consumers' best point (assuming that the consumer realizes that the carrier must earn normal profits in the long run), it is only one of an infinite number of possible maximums between W and X.

It is possible to get close to X however. A regulatory agency which is captured relatively completely by the industry would have fairly flat preference curves, hence yielding a tangency close to X. Steep preference curves would exist when the public interest compulsion is strong. It is even possible that rates can be set where the firm loses money, i.e., below W. This accounts for the small community cross subsidy possibility. It is also possible that the tangency occurs at point D where price equals marginal cost, i.e., the socially optimal price.

In most theories describing regulatory behavior and equilibrium, regulation is not the best alternative available to carriers and shipper/receivers. Tollison's argument implied that each side bid money to avoid the loss in having the price set at his opponent's best level. The Peltzman[92]-Gold[93] argument in this section, using the regulation constrained preference functions, showed that the most likely outcome of regulation was a compromise from the carrier's best position and from the shipper/receiver's best position which reflects the trade-off between price and profit (and whatever else one might wish to add to the regulator's preference functions) by the regulator.

Carriers and Public Gain from Regulation:

Lee,[94] in contrast, described a situation where both the

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monopolist and the public gain from regulation. A carrier or a cartel wishing to monopolize the industry would have to expend resources to attain the monopoly position. In an atomistic industry with free entry and many substitutes, these enforcement costs would be very high. On the other hand, a highly concentrated industry would have fewer control problems and lower enforcement costs.

In the former case, private enforcement of the cartel may not be possible or may be too costly. Without regulation, prices would be set equal to marginal cost in a competitive environment. Since this is socially desirable, consumers would not seek regulation, while the producers might seek it.

It is in this latter case where Lee's argument applies. Suppose that the producers can achieve P_m, the monopoly price,

price, via private cooperation. They must, however, deduct all private enforcement costs from their monopoly producer surplus. Regulation, in Lee's model, might yield P_m, but, as in the

Peltzman-Gold model, is likely to yield a lower price. Such a price, however, relieves the carriers of their enforcement costs. At some price P', the producers surplus with regulation will equal the producers surplus at the unregulated monopoly price net of private enforcement costs. If the regulated price lies above P', then the carriers will earn more profit by submitting to regulation. These prices are shown in Figure 2-12.

Likewise, consumers have a surplus at the unregulated equilibrium price, P_c (a consumers surplus). By imposing regulation

regulation from their perspective (consumer protection regulation), their surplus can be increased, but the gain will be reduced by the enforcement costs which the consumers then would bear. The "social concession price", P'', is the price at which regulated consumers surplus, net of enforcement costs, equals the consumer surplus at P_c. If regulation yields any price below P'', it improves the

expected consumers surplus. An implicit assumption in this analysis is that the cost to society of regulatory enforcement does not change with the price which is set.

Figure 2-12 shows a situation with a range in which both consumers and producers gain from the presence of regulation. Since consumers are better off at any price below P'' and producers are better off at any price above P', if P'' > P', then the two prices are the endpoints of a bargaining zone. Suppose that the resulting price is P^*. Bargaining, political influences, and the regulator's preferences all would bear on the equilibrium price when such a bargaining range exists.

The location, width, and even existence of a bargaining zone
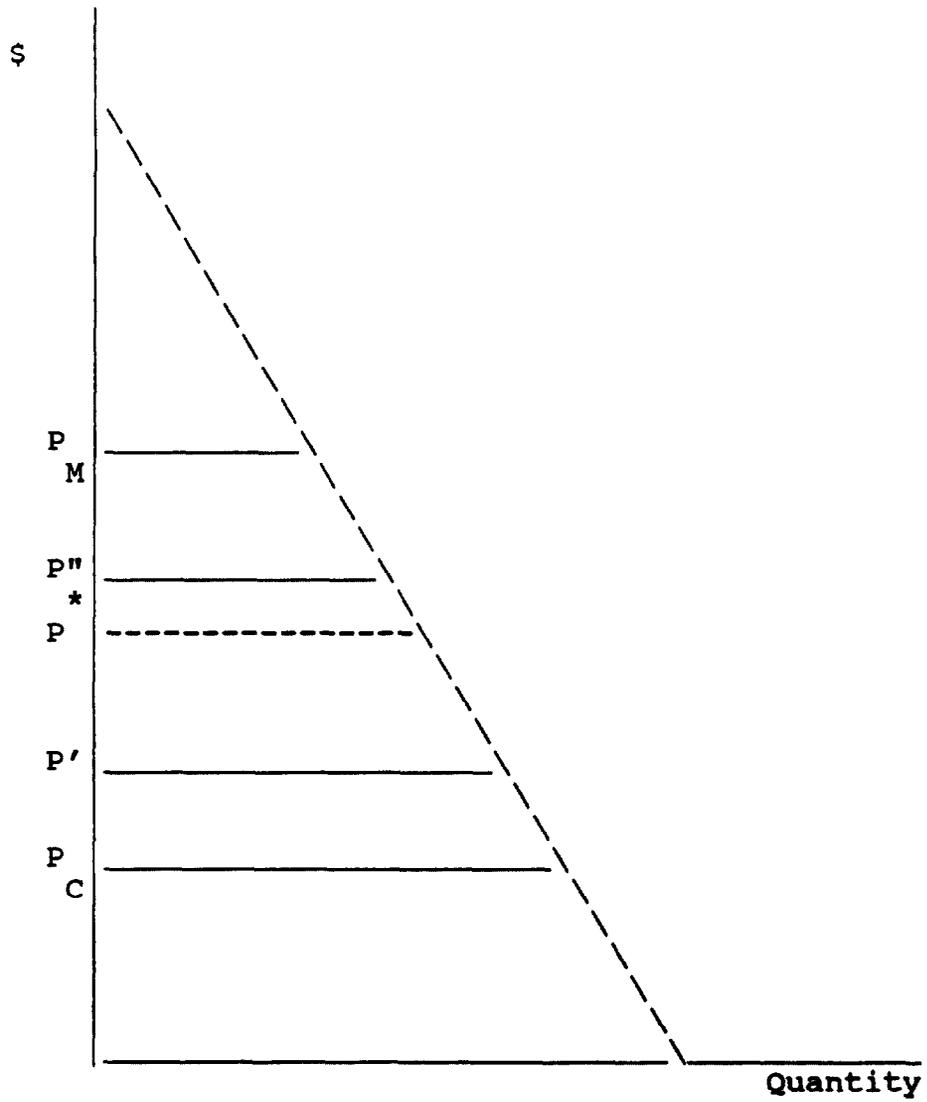
FIGURE 2-12

Lee's Analysis of the Impacts Deregulation

are determined by several factors. Industry concentration is related negatively to private enforcement costs. As the number of carriers increases, industrial concentration falls, ceteris paribus, and control becomes more difficult.

As concentration increases, shipper/receivers' expected consumer surplus without regulation will decline. The carriers will be better able to patrol a cartel. If shipper/receivers decide to regulate as concentration increases, their regulatory enforcement costs also rise, which partially offsets the gain from regulation. Concentration also reduces the shipper/receiver gain from regulation, because it increases the carriers' bargaining power in the establishment of a regulated price.

Carrier gains from regulation also vary with industry concentration. As industry concentration increases, the carriers have more power to bargain in the regulated environment for a higher price. However, at higher levels of concentration, the opportunity cost of being regulated rises. Private enforcement costs are lower at higher concentration levels, taking less from the unregulated cartel's producers surplus.

Industry output is also related to enforcement. As output increases, enforcement costs increase.

When private enforcement costs are high, the carrier's concession price will be close to P_c. Since the carriers expect that the enforcement costs will consume most of the monopoly rent, nearly any increase above P_c without the enforcement burden improves their return. In the same situation, consumers recognize the heavy burden of the carriers and can force the final price, P^*, close to P_c. An extreme case, where excessive enforcement costs preclude private monopoly, eliminates any bargaining. Consumers would expect P_c without any enforcement expenditure and would not request regulation.

Lee's argument suggests that shipper/receivers using motor carriers should not request regulation. Because entry seems to be easy, intra and intermodal competitive pressures are significant, and no substantial scale economies exist, the industry would seem to be inherently competitive. Thus, shipper/receivers should yield to regulation only if the regulated price is very close to the competitive price if they regulate at all. The motor carrier prices would go to P_c without regulation if the private enforcement costs exceed the expected gain in producers surplus. Regulation, under these circumstances, not only transfers the enforcement costs to

the consumer but opens the possibility of regulated rat $_c$ above P$_c$ if regulation is inefficient.

Lee extends his analysis to consider the impact of antitrust regulation on the regulated bidding range. The concept is very important in the motor carrier industry, since most states permit collective ratemaking by carriers in rate bureaus.

The existence of antitrust laws, even when they are not directed against the trucking industry, lowers the expected price associated with a monopolized market. Since carriers without immunity or with weak immunity never know if they will be prosecuted, they will tend to exercise caution. Rates might be set below the optimal monopoly price to reduce complaints and visibility. An increase in expected consumers surplus will result. Several rate bureaus have modified their procedures to reduce antitrust exposure. This, too, would tend to reduce the expected price, since cheating and independent rate actions become easier.

Once a reduction in the expected unregulated price is affected, the carrier's bargaining power is decreased. The carrier's concession price will be lower since the expected unregulated surplus is smaller. Likewise, the consumers will perceive a larger surplus available in the unregulated market. Regulation must, therefore, offer a lower price in order to be attractive.

The reduction in bargaining power (and hence in expected regulated price) associated with antitrust exposure explains the carrier interest in strong, effective antitrust immunity. Once the rate bureaus are exempt from the antitrust laws, the level of antitrust prosecutions in the economy would not concern them. Their target price would return to P$_m$, their bargaining power would increase, and the regulated price, P*, would rise.

The various outlays of those who benefit from regulation have taken on the characteristics of capital investments. Operating certificates have high prices, are traded, and have a long run discount period. Carriers holding the certificates proffer the devaluation of their certificates and implicitly other investments in the regulatory climate as justification for regulation's continuation. The arguments concerning certificate value have been discussed above.

Intermodal Competition:

Finally, regulation is defended as necessary to maintain competition between the modes. Adverse effects on the railroads are cited as an example. This could be a problem if truckers do not pay the full cost of their use of the highway infrastructure, including an allocation of risk. If, however, when all costs are accounted for, the motor carriers can underprice the railroads, then the "adverse" effect on the railroads is a desirable efficiency gain

for society. Traffic should be distributed such that the marginal
social cost of moving goods by each mode is equal (assuming rising
marginal social cost curves), so that the societal cost is
minimized. Cases of extreme scale economies with falling marginal
costs which entail allocation to only one mode are shown by
Senaca.[95] However, as mentioned above since this study concentrates
more on LTL shipments of general freight, intermodal competition
is not that relevant.

Conclusion:

Theory suggests that the motor carrier industry does not
require regulation to function efficiently. No significant
economies of scale or entry barriers exist. The markets are highly
contestable and competition or potential competition exists from
other modes and also via product or geographic competition. The
large number of participants, the high degree of contestability,
and the lack of significant fixed costs would create few incentives
for destructive competition. Public policy, safety, and health
objectives could be accomplished through explicit legislation
rather than indirectly through motor carrier regulation.

The carriers have rational incentives to pursue economic
regulation when the regulation permits and sustains rates above the
competitive level. Carriers expend resources to obtain and sustain
regulation, and these expenditures have been described as a social
cost. Other costs accrue as a result of those regulations which
elevate prices above marginal cost, e.g., commodity restrictions,
gateway restrictions, etc.

Most of the welfare losses which stem from regulation of the
motor carrier industry involve resource misallocation. Inflated
rates lead to distorted modal choices or deterred shipments.
Service competition to capture monopoly rents consumes excess
resources above what is necessary to provide a given level of
service. Legal fees, delays, and operating restrictions raise
operating costs.

Certain components of regulatory structure are necessary to
maintain the monopoly profits which lead to economic distortions.
States which permit collective ratemaking and restrict entry run
the largest risk of having rates above marginal cost. Several other
regulatory components enhance the possibility of monopoly rents.

Secure immunity from antitrust prosecution increases the
carriers' ability to inflate rates. Inadequate information for the
regulator because of inadequate staffing will tend to raise rates,
since the agency relies on the carriers' data and analysis which
tend to measure average or the least efficient (rather than
efficient) operating costs. Regulatory mechanisms which restrict
independent actions, limit intermodal or intramodal price
competition, or constrain other competitive balances, reduce
pressure on the cartel. Stiff entry requirements also eliminate a
source of pressure for efficiency and low rates.

Regulation induced cost increases cause social welfare losses.

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Operating restrictions, legal fees, delay times, paperwork, and limited managerial flexibility raise the costs of trucking. To the extent that services are not consumed, a deadweight loss is incurred. For services that are consumed, more resources than necessary are used.

In general, any regulation imposed on the trucking industry which inflates marginal costs or permits rates to raise above marginal costs results in efficiency losses. Typically, those regulations fall into the categories of rate and entry restrictions. The design of the regulation, its enforcement, and its interaction with other regulations are important in the level of social costs incurred.

Rates in states with collective ratemaking and strict entry controls are most likely to approach monopoly, P_m, levels. Rates in state with collective ratemaking and minimal or liberal entry requirements would be subject to greater competitive pressures and would tend to be lower. States without collective ratemaking but with strict entry would tend to have rates lower than P_m and potentially close to P_c if the traffic lanes had multiple participants of similar size (because of contestability). States with no collective ratemaking and liberal entry should have the lowest rates and hence the lowest social cost.

States with collective ratemaking and solid legislative and administrative support would be likely to experience higher rates since the bureaus would have less reason to act defensively. Protective motor carrier legislation in the face of few restrictions on prospective competitors, i.e., contract carriers, might not generate high rates.

It would seem clear from the analysis in this chapter that states with large gaps between P_m and P_c and states with large amounts of traffic Q_m would be the states most likely to have the highest social costs of regulation, since the measure of the Posner trapezoid is $(1/2)(P_m - P_c)(Q_m + Q_c)$. States with strict entry and with collective ratemaking are most likely to have large gaps between P_m and P_c.

The approach used in subsequent chapters to measure the social cost of regulation will concentrate on states with large quantities of movement as potential candidates for high social cost states.

The analysis will be broad brush in nature and not attempt the more detailed analytical approaches of Harbeson,[96] Moore,[97] Levin,[98] Boyer,[99] Friedlaender and Spady,[100] etc., which require estimations of demand, service levels provided, marginal costs, etc.

In the analysis herein, if $Q_m = Q_c$, then $P_m = P_c$ and hence no social costs exist. Thus, a large state with free entry and no collective ratemaking is not likely to incur a social cost. On the other hand, a small state with a significant gap between P_m and P_c can have a large trapezoid.

Should only the deadweight loss triangle be considered, the measure, $(1/2)(P_m - P_c)(Q_c - Q_m)$ is also dependent on Q_m and the price difference, $P_m - P_c$. If the marginal cost (equal average cost) of motor carrier movements are the same across states, then if the slope of the demand curve in the small quantity state is steeper than the slope of the demand curve in the large quantity state, the large quantity state will have the larger deadweight loss. This can correspond to situations where the small quantity state's demand is more elastic or less inelastic than the larger state's demand at the competitive price, P_c. When the smaller state's demand is as elastic or less inelastic than the larger state's demand, the larger state's deadweight loss always exceeds the smaller state's deadweight loss. For more elastic cases, i.e., the small state's demand is more elastic than the large state's demand at P_c, the deadweight loss of the large state will exceed that of the small state if the ratio of the price intercept of the small quantity demand curve to the price intercept of the large quantity demand curve is less than k, where k is the ratio of the elasticity of the large demand curve to the elasticity of the small demand curve at P_c. Because of these conditions, large quantity states are likely to be high impact states if P_m

exceeds P   .
          c

Thus, under either the deadweight loss triangle or the Posner trapezoid, large quantity states are likely candidates for large social welfare losses associated with regulation. However, all states will be initially examined for impacts of regulatory costs. Chapter 3 investigates the magnitude of intrastate traffic.

ENDNOTES FOR CHAPTER 2

1. See discussion of the famous regulator, James M. Landis, in Thomas K. McCraw, Prophets of Regulation, Harvard University Press, Cambridge, MA, 1984. Landis advocated independent regulatory regimes lead by men "bred to the facts".

2. Statement of Mr. Liniel G. Gregory, Vice President for Traffic and Commerce, Russell Transfer Inc., Salem, VA, presented to a Congressional Committee, circa 1978, pp. 5-6.

3. "Shippers' Lot Improved, Truck Failures Complex, Analyst For FRA Reports", Traffic World, January 20, 1986, p. 26. Most of the failed motor carriers in the post MCA-1980 period had been unprofitable prior to the MCA-1980. They "had been protected from default by the regulatory system. As formerly 'protected' markets became open to many competitors, problem companies became exposed." See also, "PCTA Foresees 'New Era For Trucking' As Group Gathers For Dallas Meeting", Traffic World, April 21, 1986, p. 25, where Herald Smith, Chairman of the Board of CRST, Inc. (a major motor carrier) stated that the MCA-1980 "has benefited everyone. Everyone, that is, except those bloated carriers with sloppy business practices that, without regulatory protection, soon go belly up."

4. Grant Davis and Charles Sherwood, Rate Bureaus and Antitrust Conflicts in Transportation, Praeger Publishers, New York, 1975, p. xv.

5. Paul S. Gardiner, "Rate Bureau Functions Without Antitrust Immunity: A Suggested Strategy For Motor Freight Carriers", ICC Practitioners' Journal, Vol. 46, No. 5, 1979, pp. 651-668.

6. Before the Interstate Commerce Commission, Ex Parte No. 297, (Sub-No.3), statement of the Federal Trade Commission, Washington, D.C., no date, p. 15.

7. Extended statement of Brock Adams, Secretary of Transportation, Before the Senate Committee on Commerce, Science, and Transportation, on the Trucking Competition and Safety Act of 1979, June 26, 1979, p. 54.

8. Edward M. Kennedy, Restoring Competition to the Regulated Trucking Industry, Testimony of Senator Edward M. Kennedy before the Senate Committee on Commerce, Science, and Transportation, March 28, 1979, p. 6.

9. "ICC Issues Staff Report Showing Changes In Motor Carrier Field", Traffic World, March 24, 1986, p.42 and Staff Report
   ----
No. 10. Highlights of Activity In The Property Motor Carrier Industry, Office of Transportation Analysis, Interstate Commerce Commission, Washington, DC, March, 1986.

10. Ibid, Traffic World, p. 42.
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11. Testimony of John H. Shenefield, Assistant Attorney General, Antitrust Division, U.S. Department of Justice, before the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, United States Senate, Concerning the Regulation of the Motor Carrier Industry, Washington, D.C., October 27, 1977, p. 9.
12. Edward M. Kennedy, The Trucking Competition and Safety Act of 1979, Testimony of Senator Edward M. Kennedy before the Senate Committee on Commerce, Science, and Transportation, June 26, 1979, p. 9.

13. op. cit. endnote 12 p. 8.

14. op. cit. endnote 8 p. 6.

15. Statement of the Honorable Neil Goldschmidt before the Committee on Commerce, Science, and Transportation, United States Senate, Regarding Motor Carrier Regulatory Reform, February 26, 1980, p. 3.

16. op. cit. endnote 7 p. 51.

17. Letter from Secretary of Transportation, Elizabeth H. Dole, to the Honorable George Bush accompanying the U. S. Department of Transportation's submission to Congress of the Administration's 1985 transportation deregulation package, September 12, 1985, p. 2.

18. (a) "Facts About the Motor Carrier Reform Act", U.S. Department of Transportation, Washington, D.C., undated, and (b) Extended Statement of John W. Snow, Administrator, National Highway Traffic Safety Administration, U.S. Department of Transportation, for the House Committee on Public Works and Transportation, Subcommittee

on Surface Transportation, on Motor Carrier Regulatory Reform, DOT-HS-810296, Washington, D.C., no date.

19. op. cit. endnote 11.

20. (a) Before the Interstate Commerce Commission, Washington, D.C., Ex Parte No. 297 (Sub-No.3), David I. Wilson, Assistant Director; Alfred F. Dougherty Jr., Director; John E. Stinchfield; R. Jeffery Behm; and Donna N. Kooperstein, Bureau of Competition, Federal Trade Commission, Washington, D.C., April 3, 1978, p. 12 and (b) "Federal Regulation in the Motor Carrier Industry", statement of Alfred F. Dougherty Jr., Director, Bureau of Competition, Federal Trade Commission, Before the Subcommittee on Antitrust and Monopoly, Committee on the Judiciary, United States Senate, Washington, D.C., May 22, 1978.

21. Interagency Task Force, Truck Regulatory Reform Options, The White House, Washington, D.C., December 15, 1978. The Task Force had members from the Departments of Agriculture, Commerce, Defense, Energy, Justice, Labor, Transportation, and Treasury; the Council of Economic Advisors; Council on Wage and Price Stability; Federal. Trade Commission; Interstate Commerce Commission; Office of Consumer Affairs; and the Office of Management and Budget.

22. Memorandum for the President of the United States from Brock Adams and James McIntyre, Reform of ICC Motor Carrier Regulation, Executive Office of the President, Office of Management and Budget, Washington, D.C., undated.

23. op. cit. endnote 18 (a) p. 22.

24. op. cit. endnote 18 (b).

25. op. cit. endnote 20 (a) p. 12.

26. op. cit. endnote 20 (b) pp. 4-5.

27. op. cit. endnote 11 p. 7.

28. op. cit. endnote 11 p. 1.

29. op. cit. endnote 8 p. 6.

30. "Trucking Regulation: In the Public Interest", American Trucking Associations, Inc., Washington, D.C., September, 1979, p. 2.

31. Jesse J. Friedman, "Collective Ratemaking in Trucking: The Public Interest Rationale", Washington, D.C., October, 1979.

32. Jesse J. Friedman, "Collective Ratemaking by Motor Common

Carriers: Economic and Public Policy Considerations",
Transportation Law Journal, Vol. 10, 1978, pp. 33-53.

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33. op. cit. endnote 31 p. 3.

34. op. cit. endnote 32 p. 35.

35. op. cit. endnote 32 p. 41. See also the statements by James
Harkins, Managing Director of the Regular Common Carrier Conference
of the American Trucking Associations, on the relationship of
regulation and information in "Debate On ICC Truck Roles, Sunset
By Harkins-Sender Ruled A Draw", Traffic World, January 6, 1986,
                                          ----
p. 22 and in "Rationale For Trucking Regulation Espoused By New,
Informal Coalition", Traffic World, March 24, 1986, p. 35.
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36. op. cit. endnote 6.

37. op. cit. endnote 6 p. 33.

38. Before the California Public Utilities Commission, San
Francisco, CA, Case No. 10368, Verified Statement of Gloria J.
Hurdle, Submitted by the United States Department of Justice,
Washington, D.C., July 13, 1978.

39. op. cit. endnote 38 p. 17 and p. 28.

40. Collective Ratemaking in the Trucking Industry, A Report to
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the President and the Congress of the United States, submitted by
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the Motor Carrier Ratemaking Study Commission, Washington, D.C.,
June 1, 1983, p. xv. "The information we have reviewed supports
claims that regulation and collective ratemaking lead to higher
wages and higher rates." (p. 240) and "collective ratemaking tends
to generate a high rate level" (p. 257).

41. This argument can be found in the U.S. Department of Justice's
submissions in United States of America, plaintiff, versus Southern
Motor Carriers Rate Conference, Inc.; Motor Carriers Traffic
Association, Inc.; North Carolina Motor Carriers Association, Inc,
defendants, commonly known as the SMCRC case. It is also found in
Senator Kennedy's testimony in endnote 12.

42. op. cit. endnote 17 p. 2.

43. See "Rationale For Trucking Regulation Espoused By New,
Informal Coalition", Traffic World, March 24, 1986, pp. 35-37 and
                     ----

"Major Truck Field Force Maneuvers To Counter Rate Attack ICC Sunset", Traffic World, March 18, 1986, pp. 71-72. The group "has
 ----
sounded industry wide alarm bells to peal for the preservation of collective ratemaking for motor freight carriage." (p. 71).

44. "Intrastate Collective Ratemaking Wins Approval of Supreme Court", Traffic World, April 1, 1985, p. 12.
 ----

45. See Transport Topics, Washington, DC, No. 2564, October 1,
 ----
1984, p. 1 for the FTC filings.

46. "Staff Advises FTC To End Tri-State, MAC Actions: 'Mass Movers' Gets Twist", Traffic World, June 3, 1985, p. 11.
 ----

47. "FTC Drops Lawsuit On Bureau's Legality In Massachusetts", Transport Topics, No. 2654, Alexandria, VA, June 2, 1986, p. 1 and
 ----
p. 4.

48. 1985 Report of the Administrative Director on Litigation, National Association of Regulatory Utility Commissioners, Washington, D.C., 1986, p. 4.

49. op. cit. endnote 48, p. 5.

50. op. cit. endnote 48, p. 6.

51. "Intrastate Rate Immunity Unwarranted For Truckers, Gov't Tells High Court", Traffic World, December 3, 1984, p. 96.
 ----

52. Ibid., p. 95.

53. Richard Posner, "The Social Costs of Monopoly and Regulation", Journal of Political Economy, Vol. 83, No. 4, 1975, pp. 807-827.
 ----

54. George W. Douglas and James C. Miller III, Economic

Regulation of Domestic Air Transport: Theory and Policy, The

Brookings Institution, Washington, D.C., 1974.

55. Michael Pustay, "The Social Costs of Monopoly and Regulation: An Empirical Evaluation", Southern Economic Journal, Vol. 45, No.

2, October, 1978, pp. 583-591.

56. Robert Tollison, "Regulation and Regulatory Reform in Historical Perspective", prepared for the Conference on Regulation and Regulatory Reform, American Enterprise Institute for Public Policy Research, Washington, D.C., December 19, 1977.

57. Richard N. Farmer, "The Case for Unregulated Truck Transportation", Journal of Farm Economics, Vol. 46, May, 1964, pp. 398-409.

58. Thomas Gale Moore, Freight Transportation Regulation, American Enterprise Institute, Washington, D.C., 1972.

59. Op. Cit. endnote 55.

60. Thomas Gale Moore, "The Beneficiaries of Trucking Regulation", Journal of Law and Economics, Vol. 21, October, 1978, pp. 327-343.

61. Moshe Kim, "The Beneficiaries of Trucking Regulation, Revisited", Journal of Law and Economics, Vol. 27, April, 1984, pp. 227-241.

62. Nancy L. Rose, "Union Wages Gains Under Regulation: Evidence From the Trucking Industry", Unpublished paper, Massachusetts Institute of Technology, January, 1986.

63. Clifford Winston, "The Welfare Effects of ICC Rate Regulation Revisited", Bell Journal of Economics, Vol. 12, No. 1, Spring, 1981, pp. 232-244.

64. Ronald R. Braeutigam and Roger G. Noll, "The Regulation of Surface Freight Transportation: The Welfare Effects Revisited", The Review of Economics and Statistics, Feb., 1984, pp. 80-87.

65. John Snow and Stephen Sobotka, "Certificate Values", Chapter 6 in Paul MacAvoy and John Snow (editors), Regulation of Entry and Pricing of Truck Transportation, American Enterprise Institute, Washington, D.C., 1977, pp. 153-156.

66. The Value of Motor Carrier Operating Authorities, A Report From The Council On Wage And Price Stability, Executive Office of the President, CWPS 247, Washington, D.C., June 9, 1977.

67. "S.C. Legislature Votes To Save PSC, But State Truck

Regulations Eased", Traffic World, July 18, 1983, p. 77., Michael
W. Pustay, "Intrastate Motor Carrier Regulation in Texas",
Logistics and Transportation Review, Vol. 19, No. 2, p. 151, and

Michael W. Pustay, "Regulation of the Intrastate Motor Freight
Industry in Ohio", ICC Practitioners' Journal, Vol. --, No. --,

198-, p. 427, Keon S. Chi,"Intrastate Motor Carrier Deregulation:

The Florida Experience", Innovations, Council of State Governments,

RM 704, Lexington, KY, 1982, p. 2.

68. William B. Tye, "Scenarios of the Motor Carrier Industry
Without Collective Ratemaking", Transportation Practitioners'

Journal, Vol. 52, No. 4, Summer, 1985, pp. 493-511.

69. Frederick M. Scherer, Industrial Market Structure and

Economic Performance, Rand McNally College Publishing Co., Chicago,

IL, 1970.

70. Fred Smith, "Why Not Abolish Antitrust?", Regulation, January/
February, 1983, pp. 23-28 and 33; Memorandum to Vice Chairman of
the ICC, Frederic N. Andre, from C. C. Barnekov, Staff Economist,
"Analysis of Evidence in Ex Parte No. MC-172, Withdrawal of

Anti-trust Immunity", Washington, D.C., August 6, 1984; and
"Heritage Foundation Renews Its Call For Truck Deregulation",
Traffic World, January 27, 1986, p 53.

71. op. cit. endnote 6 p. 64.

72. "Rationale For Trucking Regulation Espoused By New, Informal
Coalition", Traffic World, March 24, 1986, p. 35.

73. "Debate On ICC Truck Roles, Sunset By Harkins-Sender Ruled A
Draw", Traffic World, January 6, 1986, p. 22.

74. W. Bruce Allen, Steven Lonergan, and David Plane, Examination

of the Unregulated Trucking Experience in New Jersey, Final Report,

DOT-OS-70064, United States Department of Transportation, Office

of University Research, Washington, D.C., December, 1979, and W. Bruce Allen and Charles Taylor-Brown, Examination of the Unregulated Trucking Experience in Delaware, Final Report, DOT-RC-82012, United States Department of Transportation, Office of University Research, Washington, D.C., January, 1980.

75. op. cit. endnote 74 with respect to New Jersey.

76. op. cit. endnote 56.

77. Goran Skogh, "The Social Costs of Monopoly and Regulation: Some Comments", Journal of Political Economy, Vol. 84, No. 6, 1976, pp. 1319-1323.

78. "Truck Deregulation in Wisconsin Emerged From Careful Planning", Traffic World, December 13, 1982, p. 31.

79. Paul Sommers, "Potential Benefits of Reforming Intrastate Trucking Regulation in Washington", Report for the Alliance of Consumers, Truckers, and Shippers, Seattle, WA, January 14, 1985.

80. "Should California Allow Truckers to Set Rates Collectively?", CPUC Staff Economic and Policy Analysis and Recommendation, California Public Utilities Commission, Case No. 10368, San Francisco, CA, December 7, 1983, p. ES-2.

81. Testimony of Herman Granberry, President, Private Carrier Conference, Inc. of the American Trucking Associations, Inc. before the Subcommittee on Surface Transportation, House Committee on Public Works and Transportation, November 6, 1985, pp. 8-13.

82. "PCTA Foresees 'New Era For Trucking' As Group Gathers For Dallas Meeting", Traffic World, April 24, 1986, p. 24.

83. Russell C. Cherry, Did Regulatory Reform Reduce Truck Safety?, Economics and Management Consulting, Washington, DC, May 20, 1987.

84. Report of the Legislative Analyst to the Joint Legislative Budget Committee, The 1987-88 Budget: Perspectives and Issues, "State Regulation of the Trucking Industry", California Office of the Legislative Analyst, California Office of State Printing, Sacramento, CA, 1987, pp. 221-230 and California Public Utilities Commission and California Highway Patrol, Joint Legislative Report, Final Report on Truck Safety, San Francisco, November, 1987.

85. Transportation Deregulation and Safety, Conference Proceedings,

June 23-25, 1987, Transportation Center, Northwestern University, Evanston, IL, 1987.

86. Peter M. Boerger, Motor Carrier Regulation in Indiana, Sunset Audit, Motor Carrier Division of the Indiana Utility Regulatory Commission, Addendum to Volume Two, Indianapolis, IN, Indiana Legislative Services Agency, 1987.

87. See "Senator Kennedy Releases New Trucking Industry Data Revealing High Market Concentration", Office of Senator Edward M. Kennedy, U.S. Senate, Washington, D.C., June 24, 1979 for a study by Russell Cherry which show the average four firm city pair market share for all long haul markets (750 miles and up) at 62%, for 300-750 miles at 64%, and under 300 miles at 64%. The same four firms do not dominate each city pair market, but in the average city pair market, four firms haul over 60% of the traffic. See also, Russell C. Cherry, "Rate Effects of Collective Ratemaking and the Meaning of Concentration in Regulated Motor Carriage", Arthur D. Little, Inc., Acorn Park, Cambridge, MA, circa 1982.

88. For example, "GPSC Told It's 'Tough' Regulator of Truckers, Urged to Relax Stance", Traffic World, July 1, 1985, p. 124, where three carriers are identified to have 78% of all Georgia intrastate trucking revenues and "Texas 'Sunset' Commission Favors Easier Entry Into Trucking Field", Traffic World, January 24, 1983, p. 7, where, in the general commodity segment of the industry, just a handful of carriers have all of the business. See also, Keon S. Chi, "Intrastate Motor Carrier Deregulation: The Florida Experience", Innovations, The Council of State Governments, RM 704, Lexington, KY, 1982, p. 2, where it is pointed out that prior to deregulation, the top six carriers had 94% of the general commodities revenue in Florida.

89. R. L. Banks and Associates, Inc., "Service to Small Communities", Chapter 5 in Paul W. MacAvoy and John W. Snow (editors), Regulation of Entry and Pricing in Truck Transportation, American Enterprise Institute, Washington, D.C., 1977, pp. 139-152.

90. "Shippers' Lot Improved, Truck Failures Complex, Analyst For FRA Reports", Traffic World, January 20, 1986, and "ICC Issues Staff Report Showing Changes In Motor Carrier Field", Traffic World, March 24, 1986, p. 42.

91. George Stigler, "The Theory of Economic Regulation", Bell Journal of Economics and Management Science, Vol. 2, No. 1, Spring, 1971, pp. 3-21.

92. Samuel Peltzman, "Toward a More General Theory of Regulation", Journal of Law and Economics, Vol. 19, 1976, pp. 211-240.

93. Andrew Gold, "Commission Decision Making in Intermode Transportation Rate Cases", unpublished PhD dissertation, Department of Economics, Northwestern University, Evanston, IL, 1967.

94. Li Way Lee, "A Theory of Just Regulation", American Economic Review, Vol. 70, No. 5, 1980, pp. 848-862.

95. Rosalind Senaca, "Inherent Advantage, Costs, and Resource Allocation in the Transportation Industry", American Economic Review, December, 1970, pp. 945-956.

96. Robert W. Harbeson, "Towards Better Resource Allocation in Transport", Journal of Law and Economics, Vol. 11, October, 1969, pp. 321-338.

97. Thomas Gale Moore, "Deregulating Surface Freight Transportation", in Almarin Philips (editor), Promoting Competition in Regulated Markets, Brookings Institution, Washington, D.C., 1975, pp. 55-98.

98. Richard C. Levin, "Allocation in Surface Freight Transportation: Does Rate Regulation Matter?", Bell Journal of Economics, Vol. 9, No. 1, Spring, 1978, pp. 18-45 and Richard C. Levin, "Railroad Rates, Profitability, and Welfare Under Deregulation", Bell Journal of Economics, Vol. 12, No. 1, Spring, 1981, pp. 1-26.

99. Kenneth Boyer, "Minimum Rate Regulation, Modal Split Sensitivities, and the Railroad Problem", Journal of Political

Economy, Vol. 85, No. 3, June, 1977, pp. 493-512.
----

100. Ann F. Friedlaender and Richard Spady, Freight

Transportation Regulation, MIT Press, Cambridge, MA, 1981.

CHAPTER 3

LARGE TRAFFIC STATES FOR INTRASTATE MOTOR CARRIAGE

In order to determine the impact of state regulation of motor carriage, two analyses must be performed. The first evaluates the regulatory process in each state and compares such a process versus the competitive norm (i.e., estimate $P_m - P_c$, the difference between the regulated price and the price which would exist if the market was deregulated). This process is complicated in nature. The second analysis is of the amount of traffic in each state, Q_m, and of the likely amount of traffic which would move if the rates were P_c. While the determination of Q_m poses some problems, the determination of Q_c is more difficult.

Each state has a statute which codifies its laws. This is de jure regulation (as discussed in Chapter 4). However, each state regulatory agency is constantly determining how they will interpret those statutes. This is de facto law (as discussed in Chapter 5). A state which nominally has strict regulation de jure, may, in fact, have loose regulation de facto (analogous to the federal situation in the late 1970's). It is the comparison between the de facto situation and the competitive norm which will be of interest herein. One objective is to view the states where regulatory reform would likely have the greatest benefit. As pointed out above in Chapter 2, this is likely to be in states where $P_m - P_c$ is the largest and where Q_m is the largest.

Because resources were limited and all 50 states and the District of Columbia could not be surveyed for their de facto behavior, a first cut at the analysis selected the states with the highest Q_m and then surveyed these large states for their de facto regulatory policies. Thus, while a decision rule could have

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been to survey all the states and rank order them by their likely $P_m - P_c$ differences and then investigate the largest difference

states, that rule was not chosen because of its expense. Ranking by Q_m was much cheaper. With greater resources, all 51 areas

could have been developed. All 51 areas are surveyed for de jure regulation, because such information can be gathered from published sources. In addition, all areas (except the deregulated states, Hawaii, and the District of Columbia) were analyzed in the rates sample (described below).

A given level of social cost can be produced by an infinite number of combinations of traffic and price deviations. A small amount of traffic but very severe differences between P_m and P_c

can create as large a social cost as a vast amount of traffic but only a small deviation between P_m and P_c. Since both a high

Q_m and a high P_m and P_c deviation will mean high social cost and

since it is easier and cheaper to select states for analysis by Q_m, this will be the method followed.

Two data sources are used to calculate intrastate motor carrier flows. The first data set was the CTS (Continuing Studies of Traffic) obtained by Senator Kennedy's Committee on the Judiciary for the year 1976. The data is proprietary in nature and is controlled by the ICC. Because no disclosure could take place of detailed moves, through permission of the Federal Trade Commission (FTC), the data set was run by the ICC to yield intrastate general freight flows by state by tonnage, ton miles, and revenues. The data herein represent the 48 contiguous states plus the District of Columbia (except for tonnage, where the data are just for the 48 contiguous states). While the data are a decade old, these data, although collected by the motor carriers yearly, are never made public. Because of this ability to use the carriers' own data and because the traffic patterns are not anticipated to change RANK dramatically over time, this data source was chosen for use.

It is important to note that the CTS does not cover all intrastate traffic flows. The limits of the CTS sample have been enunciated by W. Edwards Deming, the motor carriers' statistical consultant. Deming states:

"In the first place, a conclusion drawn from the data can refer only to the frame studied. It cannot refer to (in this

instance) carriers or hauling that are foreign to the universe covered by the samples."

"The continuing studies of traffic cover only some of the general freight hauled, not household goods, not refrigerated products, not farm produce, nor the hauling of petroleum, automobiles, new furniture, and a number of other special products or commodities."

"Private hauling and contract hauling are, of course, not in the continuing studies of traffic."

"The information in the continuing studies of traffic does not apply to carriers that for any reason are not participants in the studies."

"It should be repeated here that participation in the continuing studies of traffic is voluntary. There are some large carriers of intrastate general freight that have chosen not to participate; likewise, some small carriers also do not participate."

"There are carriers that collectively, and some individually, have substantial amounts of general freight but do not belong in the continuing studies of traffic, and are not in them, for the simple reason that their business is dominated by intrastate hauling or by special hauling that is not general freight, interstate."

"Another segment of general freight not covered by the continuing studies of traffic is hauling done by carriers that are not members of the participating rate bureaus."

"In summary, the continuing studies of traffic cover only the general freight hauled by the carriers that participate in the
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continuing studies of traffic." Thus the CTS will understate the volume of intrastate traffic, because not all carriers and commodities are in the data base.

Since the CTS data only include the intrastate traffic that was handled by interstate carriers that are part of the CTS and carriers are not randomly selected for the CTS, then to use the CTS data to rank states according to the volume of intrastate trucking done on an annual basis requires the assumption that, for each state, the CTS carriers handle the same percentage of the state's total intrastate traffic. Thus, if the CTS carriers handled 80% of the intrastate traffic in both states A and B and state A was reported to have moved 100 tons while state B had 80 tons, even though the true movements were 125 tons in A and 100 tons in B, A would be ranked above B in an ordinal sense by either. But if the CTS carriers moved 80% of A's traffic but only 60% of B's traffic, then the reported traffic would show A ranked higher than B (100 to 80) but the actual traffic would show B before A (133.33 to 125). Thus, relatively small changes in this percentage could produce major shifts in the rankings.

Utilizing this CTS data and recognizing its limitations as expressed above, four tables are presented. Table 3-1 ranks the states in order of their total intrastate general freight tonnage. Analogous to typical Lorenz curves of income distribution, a very

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TABLE 3-1

STATE RANKING BY INTRASTATE GENERAL FREIGHT TONNAGE: CTS DATA

State	Intrastate General Freight Tons	Percent of Total	Cumulative Percent
1. Texas	4,831,779.19	16.906	16.906
2. Michigan	4,468,035.33	15.634	32.540
3. Ohio	2,027,171.96	7.093	39.633
4. California	1,851,583.58	6.479	46.112
5. North Carolina	1,328,157.16	4.647	50.759
6. New York	1,227,146.21	4.294	55.053
7. Pennsylvania	1,193,899.30	4.177	59.230
8. Georgia	1,144,343.93	4.004	63.234
9. Washington	1,139,515.74	3.987	67.221
10. Massachusetts	876,473.19	3.067	70.288
11. Missouri	750,800.73	2.627	72.915
12. New Jersey	685,568.62	2.399	75.314
13. Illinois	680,668.35	2.382	77.696
14. Indiana	675,076.92	2.362	80.058
15. Wisconsin	673,788.03	2.358	82.416
16. Oregon	485,822.88	1.700	84.116
17. Minnesota	426,794.33	1.493	85.609
18. Virginia	420,821.12	1.472	87.081
19. Louisiana	358,135.16	1.253	88.334
20. Florida	355,112.00	1.243	89.577
21. Tennessee	325,796.96	1.140	90.717
22. South Carolina	304,089.67	1.064	91.781
23. Kansas	299,073.59	1.046	92.827
24. Maine	184,389.33	.645	93.472
25. Iowa	172,968.00	.605	94.077
26. Maryland	153,808.16	.538	94.615
27. Colorado	153,484.83	.537	95.152
28. Arkansas	137,229.96	.480	95.632
29. Kentucky	135,687.83	.475	96.107
30. Alabama	117,642.24	.412	96.519
31. Connecticut	108,142.38	.378	96.897
32. New Hampshire	103,371.68	.362	97.259
33. Utah	96,971.86	.339	97.598
34. Arizona	85,957.22	.301	97.899
35. Mississippi	85,804.45	.300	98.199
36. Montana	79,060.42	.277	98.476
37. Nebraska	74,833.36	.262	98.738
38. West Virginia	58,967.35	.206	98.944
39. North Dakota	54,318.08	.190	99.134
40. Rhode Island	46,103.82	.161	99.295
41. Idaho	40,685.00	.142	99.437
42. Nevada	27,373.25	.096	99.533
43. Wyoming	27,287.98	.095	99.628
44. Delaware	26,141.57	.091	99.719
45. New Mexico	23,455.13	.082	99.801

TABLE 3-1 (Con't)

46. Oklahoma	21,941.58	.077	99.878
47. South Dakota	20,202.16	.071	99.949
48. Vermont	14,009.75	.049	99.998
TOTAL	28,579,491.34	100.000	100.000

Source: CTS Tape Special Run

small percentage of the states have a very large share of the intrastate general freight tonnage. The top five states (10.4% of the states) have over 50% of the tonnage, while the top ten states (20.8% of the states) have over 70% of the tonnage. The top 15 states have 82.4% of the tonnage. Only four states have over five percent of the tonnage: Texas 16.9%, Michigan 15.6%, Ohio 7.1%, and California 6.5%.

In the case of both Texas and California, the states are large in area and contain major centers which are spatially separated, and thus a large volume of intrastate freight is expected. In the cases of Michigan and Ohio, a number of population centers exist which generate trade; and, in addition, extensive industrial linkages exist, thus generating trade among the industrial agglomerations of those states. These four states have 25.6% of the nation's population yet account for 46.1% of the intrastate tonnage traffic.

A totally equal distribution of traffic over the states would have yielded approximately a 2.1% share for each state. In fact, only 15 states had a share of 2.1% or more. In general, the states with more than 2.1% are the most populous states.

On the other hand, the states at the bottom of the list, e.g., Nevada, Wyoming, Delaware, New Mexico, Oklahoma, South Dakota, and Vermont tend to be very small states either in area or in population (in the aggregate, they have only 3.3% of the nation's population). In small area states, e.g., Delaware, private carriage
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is highly probable because even empty backhauls would involve a small number of miles. The large area states with small populations have limited industrial bases and retail trade bases to support intrastate general freight movements.

Tonnage, however, can be a misleading indicator of activity because it may not be hauled very far. It is possible that a much smaller trucking industry could exist in a small state which hauled X tons per year (because the tonnage could not be hauled very far), as opposed to a large state which moved X tons per year (because the tonnage could be hauled for long distances).

To account for the spatial dimension of output, ton miles are used as an indicator. However, ton miles suffer from an ambiguity, i.e., what is being produced when xy ton miles is reported: x tons shipped y miles or y tons shipped x miles or any of an infinite number of combinations of tons times miles yielding xy? Obviously, a rectangular hyperbola of possibilities exists to describe any given number of ton miles. Different sizes and types of trucking companies may be required if small amounts of tons are moved large distances, as opposed to large amounts of tons moved small distances.

Table 3-2 ranks the states by ton miles. As might be expected, some of the smaller area states which were in the top 15 states in tonnage, e.g., New Jersey and Massachusetts, drop out when ton miles are utilized. Texas is again the major state and, because it is a large state with its population centers spatially dispersed, its lead in tons is intensified into a dominant position with

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TABLE 3-2

STATE RANKING BY INTRASTATE GENERAL FREIGHT TON MILES: CTS DATA

State		Intrastate General Freight Ton Miles	Percent of Total	Cumulative Percent
1.	Texas	412,040,096	26.21	26.21
2.	California	216,818,548	13.79	40.00
3.	Ohio	106,213,236	6.76	46.76
4.	North Carolina	84,775,861	5.39	52.15
5.	Michigan	63,963,126	4.07	56.22
6.	Georgia	62,210,917	3.96	60.18
7.	New York	57,271,625	3.64	63.82
8.	Washington	56,089,132	3.57	67.39
9.	Missouri	44,931,433	2.86	70.25
10.	Oregon	44,339,691	2.82	73.07
11.	Pennsylvania	39,106,361	2.49	75.56
12.	Wisconsin	37,768,517	2.40	77.96
13.	Illinois	30,325,030	1.93	79.89
14.	Minnesota	29,527,714	1.88	81.77
15.	Florida	25,657,987	1.63	83.40
16.	Tennessee	24,610,452	1.57	84.97
17.	Indiana	21,579,547	1.37	86.34
18.	Virginia	21,118,976	1.34	87.68
19.	Kansas	17,507,938	1.11	88.79
20.	Colorado	15,939,254	1.01	89.80
21.	South Carolina	15,455,020	.98	90.78
22.	Louisiana	14,217,802	.90	91.68
23.	Iowa	12,635,043	.80	92.48
24.	Massachusetts	11,866,174	.75	93.23
25.	Montana	10,304,042	.66	93.89
26.	Arkansas	8,470,659	.54	94.43
27.	Nebraska	8,066,679	.51	94.94
28.	Alabama	7,905,721	.50	95.44
29.	North Dakota	7,658,740	.49	95.93
30.	Arizona	7,555,462	.48	96.41
31.	New Jersey	7,428,878	.47	96.88
32.	Maine	7,407,583	.47	97.35
33.	Mississippi	7,126,614	.45	97.80
34.	Utah	3,892,821	.25	98.05
35.	Wyoming	3,587,296	.23	98.28
36.	Kentucky	3,481,697	.22	98.50
37.	New Mexico	3,298,625	.21	98.71
38.	Idaho	3,064,066	.19	98.90
39.	South Dakota	3,054,869	.19	99.09
40.	Maryland	2,692,201	.17	99.26
41.	West Virginia	2,380,455	.15	99.41
42.	Connecticut	2,269,799	.14	99.55
43.	Oklahoma	2,183,116	.14	99.69
44.	Nevada	2,007,578	.13	99.82
45.	New Hampshire	1,223,159	.08	99.90

TABLE 3-2 (Con't)

46. Vermont	1,014,294	.06	99.96
47. Rhode Island	169,432	.01	99.97
48. Delaware	5,217	.00	99.97
49. District of Columbia	2,825	.00	99.97
TOTAL	1,572,221,308	100.00	100.00

Source: CTS Tape Special Run

respect to ton miles (with over one of every four intrastate ton miles taking place in Texas.) California is second with a little less than one of every seven intrastate ton miles. These two states alone account for 40% of the intrastate ton miles. Only two other states account for over 5% of the intrastate ton mileage: Ohio 6.76% and North Carolina 5.39%.

The concentration relationship is even stronger with ton miles as opposed to tons. The top five states move 56.22% of the intrastate ton miles, the top ten states move 73.07%, and the top 15 states move 83.4%.

The impact of the length of haul can be dramatically seen with Massachusetts (which was tenth in terms of tonnage with 3.07% of the total tons but is 24th in ton miles with .75%) and New Jersey (which is 12th in terms of tons with 2.4% of the total tons but is 31st in ton miles with .47%.)

Only 12 states have ton mile shares greater than 2.1%. Some of the states which were at the bottom of the tonnage list are also at the bottom of the ton mile list, indicating that the small amount of tonnage shipped did not, in the aggregate, travel very far (e.g., Vermont, Nevada, Delaware, Oklahoma, etc.)

A third ranking of the states was made on intrastate revenues, (see Table 3-3.) There are obviously expensive ton miles and inexpensive ton miles. Some of the expensive ton miles can be caused by regulation holding rates above competitive levels. Some ton miles will be expensive vis a vis other ton miles because of the operation of the quantity/distance taper, i.e., a state that moves many tons many miles will have a lower rate/ton mile (ceteris paribus) than a state that moves a few tons a few miles. Thus, the former state will have a proportionally smaller share of revenues than they do ton miles, as shown by Figure 3-1. Revenues will also differ due to traffic mix, since rates on commodities differ by their shipping characteristics (e.g., density, number of packages, etc., and, most importantly, their perceived elasticity of transport demand.)

The revenue rankings follow much the same pattern as with tons and ton miles. Texas is again the leading state with 18.88% of the revenues. California is second and the only other state with over a 10% share at 12.94%. Only Ohio at 8.22% and Michigan at 5.42% are above 5% in terms of shares. The concentration is still very high, with the top five states with 49.72% of the revenues, the top ten states with 67.31%, and the top 15 states with 80.11%. Sixteen states have shares greater than 2.1%.

Reflecting the high rate/ton mile for shorter hauls and also the higher value of the commodities shipped and the higher costs of doing business in heavily urbanized states, Massachusetts and New Jersey have moved up to rank 16th and 17th respectively in general freight revenues. The same states (e.g., Delaware, Vermont, Nevada, etc.) are again at the bottom of the rankings.

All three measures have some merit for the rank ordering of states. Ton miles are the traditional output measure of the industry. Revenues are important because value of service type pricing is an outgrowth of monopolistic profit maximizing price

TABLE 3-3

STATE RANKING BY INTRASTATE GENERAL FREIGHT REVENUES: CTS DATA

State	Intrastate General Freight Revenues	Percent of Total	Cumulative Percent
1. Texas	119,844,237	18.88	18.88
2. California	82,104,408	12.94	31.82
3. Ohio	52,175,727	8.22	40.04
4. Michigan	34,401,782	5.42	45.46
5. New York	27,034,147	4.26	49.72
6. North Carolina	26,161,487	4.12	53.84
7. Georgia	23,531,447	3.71	57.55
8. Washington	22,242,399	3.50	61.05
9. Pennsylvania	20,329,617	3.20	64.25
10. Oregon	19,389,516	3.06	67.31
11. Missouri	17,978,699	2.83	70.14
12. Wisconsin	17,960,558	2.83	72.97
13. Minnesota	16,490,105	2.60	75.57
14. Indiana	15,292,072	2.41	77.98
15. Illinois	13,490,811	2.13	80.11
16. Massachusetts	13,333,506	2.10	82.21
17. New Jersey	10,173,225	1.60	83.81
18. Virginia	9,925,901	1.56	85.37
19. Tennessee	8,513,681	1.34	86.71
20. Kansas	8,011,926	1.26	87.97
21. Colorado	7,835,546	1.23	89.20
22. Florida	7,283,000	1.15	90.35
23. Iowa	6,645,905	1.05	91.40
24. Louisiana	6,085,689	.96	92.36
25. South Carolina	5,281,677	.83	93.19
26. Arizona	4,214,154	.66	93.85
27. Arkansas	3,881,226	.61	94.46
28. Maine	3,753,318	.59	95.05
29. Montana	2,926,988	.46	95.51
30. Maryland	2,693,957	.42	95.93
31. Alabama	2,621,957	.41	96.34
32. North Dakota	2,578,962	.41	96.75
33. Nebraska	2,570,527	.41	97.16
34. Connecticut	2,143,981	.34	97.50
35. Mississippi	2,090,917	.33	97.83
36. Utah	2,016,846	.32	98.15
37. Kentucky	1,905,627	.30	98.45
38. New Mexico	1,474,741	.23	98.68
39. West Virginia	1,312,069	.21	98.89
40. South Dakota	1,307,084	.21	99.10
41. Wyoming	1,208,835	.19	99.29
42. Oklahoma	980,552	.15	99.44
43. Idaho	938,501	.15	99.59
44. New Hampshire	884,052	.14	99.73

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TABLE 3-3 (Con't)

45. Nevada	616,370	.10	99.83
46. Vermont	608,564	.10	99.93
47. Rhode Island	309,792	.05	99.98
48. Delaware	26,680	.00	99.98
49. District of Columbia	19,945	.00	99.98
TOTAL	634,602,713	100.00	100.00

Source: CTS Tape Special Run

Deviation
From
Competitive
Base
$(P_M - P_C)$

Social Cost A > Social Cost B

Social Cost B

Social Cost A

Traffic Volume Quantity
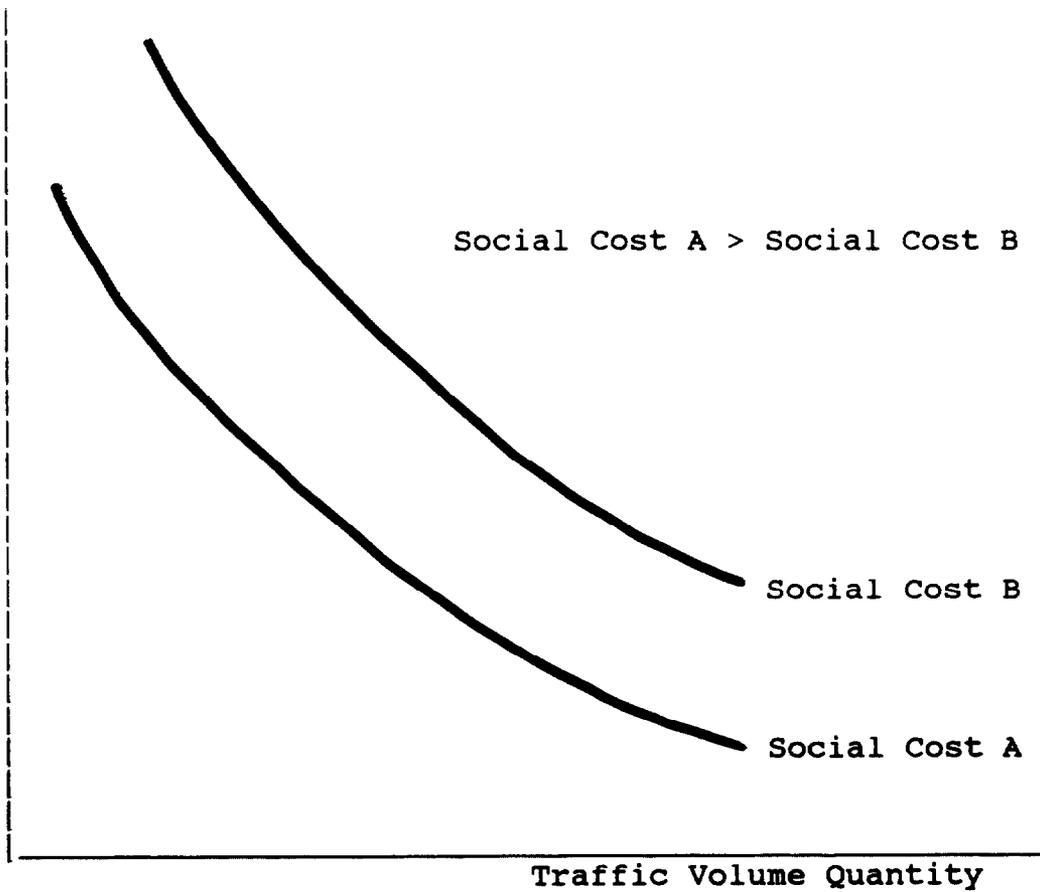
FIGURE 3-1

Social Costs at Different Traffic Volumes and Deviations
from Competitive Base

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behavior sanctioned by many regulatory agencies, and thus high revenues (ceteris paribus) suggest larger welfare gains from competitive pricing (although high revenues may merely be the result of large amounts of traffic moving). Tonnage is another output measure which can take some of the ambiguity away from the ton miles measure, but it is obviously flawed due to the lack of movement information.

Despite the differences pointed out above with respect to New Jersey and Massachusetts, a comparison of the three rankings showed many states in comparable positions on each list. Because no one measure is clearly superior to another measure of intrastate trucking activity, Table 3-4 was constructed to yield the top 15 states by constructing an index number which was simply the sum of each state's ranking in intrastate general freight tonnage, intrastate general freight ton miles, and intrastate general freight revenues.

As can be seen in Table 3-4, the rankings of each separate table (Tables 3-1, 3-2, and 3-3) are very similar. On the tonnage ranks, only Massachusetts and New Jersey of the top 15, do not make the composite 15. Since New Jersey is a state which is not regulated, its absence from the list of major states will not influence the study of the economic costs of intrastate motor carrier regulation. In addition, since unregulated carriers exist in New Jersey and do not belong to rate bureaus, New Jersey's figures are probably biassed downward--although non-rate bureau carriers exist in all states. As the result of New Jersey and Massachusetts not being on the combined list, Oregon and Minnesota are added.

The combined list of states contains every state from the top 15 ton mile states except for state 15, Florida. Since Florida is also deregulated, for reasons outlined above for New Jersey, its exclusion from a study of the impact of intrastate motor carrier regulation is not crucial. In Florida's place is the 17th ranked ton mile state, Indiana. The combined list has all 15 of the top revenue states.

Were this information the only information on intrastate motor carrier movements, the above states could be the basis for the analysis. However, the 1977 Census of Transportation (COT) also contains information that enables the calculation of intrastate truck traffic flows. Given the caveats associated with the CTS data, the COT data was run to check for consistency between the two data sets.

The COT tapes contain ton and ton mile (but no revenue) information for ICC regulated, non-ICC regulated, and private carriage. Several differences between the Census data and the CTS data should be noted. The major difference is that the COT information is for all manufactured goods, STCC (Standard Transportation Commodity Code) 20 through STCC 39. Thus the COT data is not general freight data, but rather general freight tends to be a subset of the COT data. For example, new automobiles (part of STCC 37) tend to move by auto rack trailers, and frozen foods (part of STCC 20) tend to move by refrigerated trailers--both

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TABLE 3-4

COMBINED STATE RANKING BY INTRASTATE GENERAL FREIGHT TONNAGE, TON
MILES, AND REVENUES: CTS DATA

State	Rank Tons	Rank Ton Miles	Rank Revenue	Total Of The Three Measures
Texas	1	1	1	3
California	4	2	2	8
Ohio	3	3	3	9
Michigan	2	5	4	11
North Carolina	5	4	6	15
New York	6	7	5	18
Georgia	8	6	7	21
Washington	9	8	8	25
Pennsylvania	7	11	9	27
Missouri	11	9	11	31
Oregon	16	10	10	36
Wisconsin	15	12	12	39
Illinois	13	13	15	41
Minnesota	17	14	13	44
Indiana	14	17	14	45

Source: Calculated From Tables 3-1, 3-2, 3-3.

specialized freight. Some thought was given to creating a general freight STCC file and then only running the intrastate truck data for such STCC's. However, budget constraints precluded such an approach.

In addition, the COT information includes general freight flows performed by carriers who are not participants in the CTS since, the Census data is shipper based, whereas the CTS is carrier based. Therefore, the motor carrier use base is theoretically larger for the COT data base. Strictly intrastate carriers would be included in the COT as well as exempt carriers (e.g., agricultural co-ops and non-rate bureau carriers.)

The COT flows are only for the first move of the product (i.e., the move out of the manufacturing plant.) This excludes the movement of goods from distribution centers to wholesalers and from wholesalers to retailers--much of which occurs by truck. Thus, the COT data is likely to understate intrastate motor carrier freight.

Finally, the COT is reconciled (as of 1977) with the Census of Manufacturing. Thus the COT flows are supposed to be one and the same as the total flows from manufacturing establishments which have taken place in the U.S. in 1977. The CTS make no such claim of exhaustiveness.

Since intrastate for-hire flows may be performed by ICC certificated carriers (with the appropriate state authority if required) and by non-ICC certificated carriers (again with the appropriate state authority--except where not needed, e.g., New Jersey, Delaware, Maryland (truckload), Virginia (truckload), etc.), the flow information on ICC regulated and non-ICC regulated intrastate truck traffic was extracted from the Census. Non-ICC certificated carriers moved approximately 40% as much tonnage as did ICC certificated carriers. These data are reported separately and in a combined table.

The COT data show less concentration than the CTS data. For intrastate tonnage moved by ICC certificated carriers (Table 3-5), the top five states have 46.56% of the tonnage, the top ten have 66.86%, and the top 15 have 77.70%. In the case of the COT, data for all 50 states plus the District of Columbia are available. Only 13 states have greater than a 2.1% share of the market.

California is the major state with 15.37% of the tonnage. Surprisingly, Alabama is ranked tenth with 3.03% of the tonnage and Louisiana is ranked 12th with 2.22% of the tonnage. Other states different from the CTS top 15 are Florida, Minnesota, and Oregon (ranked 20th, 17th, and 16th in the CTS tonnage).

The intrastate tonnage rankings by non-ICC carriers (Table 3-6) show similar characteristics to the ICC carriers' tonnage (i.e., heavy concentration.) California tops the list with 30.42% of the tonnage, followed, surprisingly, by Maine (perhaps because of paper loadings) with 9%. The top five states have 59.41% of the tonnage, the top ten have 80.05%, and the top 15 have 89.22%. New states included in the top 15 are Maine (2), Washington (7), Virginia (11), and Maryland (15). However, since the non-ICC carriage is only 40% of the ICC carriage, the ICC carriage dominates and the composite table (Table 3-7) looks very much like

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TABLE 3-5

STATE RANKING OF INTRASTATE ICC REGULATED MOTOR CARRIER TONNAGE: 1977
CENSUS OF TRANSPORTATION DATA

State	Intrastate ICC-Regulated Tons*	Percent of Total	Cumulative Total
1. California	34,206	15.365	15.365
2. Texas	19,274	8.658	24.023
3. Illinois	19,157	8.605	32.628
4. Ohio	17,960	8.067	40.695
5. Pennsylvania	13,064	5.868	46.563
6. Michigan	11,518	5.174	51.737
7. Florida	10,937	4.913	56.650
8. Indiana	8,576	3.852	60.502
9. New York	7,409	3.328	63.830
10. Alabama	6,742	3.028	66.858
11. New Jersey	5,580	2.506	69.364
12. Louisiana	4,950	2.223	71.587
13. Minnesota	4,707	2.114	73.701
14. Oregon	4,462	2.004	75.705
15. Georgia	4,448	1.998	77.703
16. Kansas	4,396	1.975	79.678
17. Washington	4,290	1.927	81.605
18. Maine	4,067	1.827	83.432
19. North Carolina	4,045	1.817	85.249
20. Mississippi	3,879	1.742	86.991
21. Oklahoma	3,067	1.378	88.369
22. Wisconsin	2,950	1.325	89.694
23. Tennessee	2,376	1.067	90.761
24. Missouri	2,208	.992	91.753
25. South Carolina	1,545	.694	92.447
26. Massachusetts	1,531	.688	93.135
27. Kentucky	1,493	.671	93.806
28. Virginia	1,370	.615	94.421
29. Arizona	1,370	.615	95.036
30. Colorado	1,245	.559	95.595
31. Iowa	1,192	.535	96.130
32. Arkansas	1,191	.535	96.665
33. West Virginia	1,117	.502	97.167
34. Montana	1,100	.494	97.661
35. South Dakota	947	.425	98.086
36. Maryland	926	.416	98.502
37. Utah	857	.385	98.887
38. Nebraska	632	.284	99.171
39. Idaho	454	.204	99.375
40. Hawaii	393	.177	99.552
41. Wyoming	280	.126	99.678
42. New Hampshire	255	.115	99.793
43. Connecticut	137	.062	99.855

TABLE 3-5 (Con't)

44. New Mexico	135	.061	99.916
45. Delaware	91	.041	99.957
46. Nevada	53	.024	99.981
47. Rhode Island	23	.010	99.991
48. Vermont	10	.004	99.995
49. District of Columbia	4	.002	99.997
50. North Dakota	3	.001	99.998
51. Alaska	Z	.000	100.000
TOTAL	222,622	100.00	100.000

* In thousands of tons
Z=Less than one half of the unit of measure

Source: 1977 Census of Transportation, Commodity Transportation Survey, Summary, U.S. Department of Commerce, Bureau of the Census, Washington, D.C., Table 1.

TABLE 3-6

STATE RANK OF INTRASTATE NON-ICC REGULATED MOTOR CARRIER TONNAGE: 1977
CENSUS OF TRANSPORTATION

State	Intrastate ICC Non-Regulated Tons*	Percent Of Total	Cumulative Total
1. California	27,649	30.418	30.418
2. Maine	8,160	8.977	39.395
3. Illinois	6,321	6.954	46.349
4. Ohio	6,192	6.812	53.161
5. Michigan	5,679	6.248	59.409
6. Texas	4,851	5.337	64.746
7. Washington	4,271	4.699	69.445
8. Georgia	3,383	3.722	73.167
9. Florida	3,316	3.648	76.815
10. Pennsylvania	2,937	3.231	80.046
11. Virginia	2,129	2.342	82.389
12. Louisiana	1,632	1.795	84.184
13. Indiana	1,561	1.717	85.901
14. New Jersey	1,508	1.659	87.560
15. Maryland	1,505	1.656	89.216
16. Colorado	1,338	1.472	90.688
17. Iowa	1,040	1.144	91.832
18. North Carolina	961	1.057	92.889
19. New York	938	1.032	93.921
20. Arizona	901	.991	94.912
21. Minnesota	786	.865	95.777
22. Oregon	629	.692	96.469
23. Delaware	573	.630	97.099
24. Alabama	553	.608	97.707
25. Wisconsin	505	.556	98.263
26. Kansas	305	.336	98.599
27. Missouri	230	.253	98.852
28. Kentucky	212	.233	99.085
29. Massachusetts	183	.201	99.286
30. Tennessee	165	.182	99.468
31. Idaho	124	.136	99.604
32. West Virginia	122	.134	99.738
33. Nebraska	50	.055	99.793
34. Hawaii	49	.054	99.847
35. North Dakota	31	.034	99.881
36. South Carolina	30	.033	99.914
37. Oklahoma	26	.029	99.943
38. Mississippi	15	.017	99.960
39. Arkansas	14	.015	99.975
40. Vermont	11	.012	99.987
41. Connecticut	8	.009	99.996
42. Utah	3	.003	99.999
43. South Dakota	1	.001	100.000

TABLE 3-6 (Con't)

44. Montana	0	.000	100.000
45. New Hampshire	-	.000	100.000
46. District of Columbia	-	.000	100.000
47. Nevada	-	.000	100.000
48. New Mexico	-	.000	100.000
49. Rhode Island	Z	.000	100.000
50. Wyoming	Z	.000	100.000
51. Alaska	Z	.000	100.000
TOTAL	90,897	100.000	100.000

* In thousands of tons
-=not given, presumed to be zero
Z= Less than one half of the unit of measure

Source: 1977 Census of Transportation, Commodity Transportation Survey, Summary, U.S. Department of Commerce, Bureau of the Census, Washington, D.C., Table 1.

TABLE 3-7

STATE RANK OF INTRASTATE TONNAGE BY ICC AND NON-ICC MOTOR CARRIER
(EXCLUDING PRIVATE TRUCK): 1977 CENSUS OF TRANSPORTATION

State	Intrastate ICC and Non-ICC Regulated Tons*	Percent of Total	Cumulative Total
1. California	61,855	19.728	19.728
2. Illinois	25,478	8.126	27.854
3. Ohio	24,152	7.703	35.557
4. Texas	24,125	7.694	43.251
5. Michigan	17,217	5.491	48.742
6. Pennsylvania	16,001	5.103	53.845
7. Florida	14,253	4.546	58.391
8. Maine	12.227	3.900	62.291
9. Indiana	10,137	3.233	65.524
10. Washington	8.561	2.730	68.254
11. New York	8,347	2.662	70.916
12. Georgia	7,831	2.498	73.414
13. Alabama	7,295	2.327	75.741
14. New Jersey	7,088	2.261	78.002
15. Louisiana	6,583	2.100	80.102
16. Minnesota	5,492	1.752	81.854
17. Oregon	5,091	1.624	83.478
18. North Carolina	5,006	1.597	85.075
19. Kansas	4,701	1.499	86.574
20. Mississippi	3,894	1.242	87.816
21. Virginia	3,499	1.116	88.932
22. Wisconsin	3,455	1.102	90.034
23. Oklahoma	3,093	.986	91.020
24. Colorado	2,583	.824	91.844
25. Tennessee	2,541	.810	92.654
26. Missouri	2,438	.778	93.432
27. Maryland	2,431	.775	94.207
28. Arizona	2,270	.724	94.931
29. Iowa	2,232	.712	95.643
30. Massachusetts	1,714	.547	96.190
31. Kentucky	1,704	.543	96.733
32. South Carolina	1,575	.502	97.235
33. West Virginia	1,239	.395	97.630
34. Arkansas	1,204	.384	98.014
35. Montana	1,100	.351	98.365
36. South Dakota	949	.303	98.668
37. Utah	860	.274	98.942
38. Nebraska	682	.218	99.160
39. Delaware	664	.212	99.372
40. Idaho	579	.185	99.557
41. Hawaii	443	.141	99.698
42. Wyoming	280	.089	99.787

TABLE 3-7 (Con't)

43. New Hampshire	255	.081	99.868
44. Connecticut	145	.046	99.914
45. New Mexico	135	.043	99.957
46. Nevada	53	.017	99.974
47. North Dakota	33	.011	99.985
48. Rhode Island	23	.007	99.992
49. Vermont	21	.007	99.999
50. District of Columbia	4	.001	100.000
51. Alaska	Z	.000	100.000
TOTAL	313,538	100.000	100.000

* In thousands of tons
Z= Less than one half of the unit of measure

Source: 1977 Census of Transportation, Commodity Transportation Survey, Summary, U.S. Department of Transportation, Bureau of the Census, Washington, D.C., Table 1.

the ICC certificated table except, that Maine and Washington replace Oregon and Minnesota in the top 15 in the composite table.

The composite table (Table 3-7) is dominated by California with 19.73% of the intrastate tonnage. The top five states have 48.74% of the tonnage, the top ten have 68.25%, and the top 15 have 80.10%. Only 15 states have a greater than a 2.1% share. The bottom of the COT table is similar to the bottom of the CTS table (e.g., Nevada, Rhode Island, North Dakota, Vermont, etc.) The CTS data show greater concentration than do the COT data.

Another table of intrastate tonnage was developed for private carrier tonnage (Table 3-8). A possible hypothesis would be that in heavily regulated states, the shippers would turn to private carriage. The argument here is that the regulated market limits the number of carriers in the market, and the price/service options available are also limited. A shipper in a regulated market has a lower probability of finding the price/service combination he/she desires than he/she would likely find in a deregulated market. Thus, faced with a make versus buy situation, under these conditions, more shippers would choose to make their own trucking (i.e., private carriage.) The importance of this is shown in the fact that private carriage hauls twice as much intrastate tonnage than does for-hire carriage.

However, other reasons also exist for the formation of private carriage. These include the desire to control the product's movement, the ability to expedite shipments, the "rolling billboard" advertising potential, etc. The 1978 Toto decision and the provisions of the MCA-1980 allow private carriers to do many things they previously were prohibited from doing. For example, they can apply for interstate common and/or contract authority. They also can engage in compensated intercorporate hauling for corporate affiliates 100% owned. The list of exempt commodities has been expanded. Thus, ceteris paribus, a private carrier should be able to increase its expected load factor as the result of obtaining more business. This should make private

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carriage more desirable.

On the other hand, many firms engaged in private carriage did so because of what they perceived to be a lack of for-hire alternatives because of regulation. Given the MCA-1980, those alternatives have appeared in the market and thus some shippers may give up their private carriage and tender their business to for-hire carriage which is now providing the price/service options

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desired. Many shippers express a desire to exit from the transportation business to concentrate on the production of their primary product. However, because intrastate hauls are likely to be shorter and the empty backhaul problems not as severe, private carriage may be preferred.

Table 3-8 shows that the same general group of states from the for-hire carriers' tonnage (Tables 3-5 through 3-7) also appears at the top of the private carriage tonnage.

TABLE 3-8

STATE RANK OF INTRASTATE PRIVATE MOTOR CARRIER TONNAGE:
1977 CENSUS OF TRANSPORTATION

State	Intrastate Private Carrier Tons*	Percent Of Total	Cumulative Percent
1. California	119,453	12.573	12.573
2. Texas	75,483	7.945	20.518
3. New York	64,423	6.781	27.299
4. Pennsylvania	46,893	4.936	32.235
5. Ohio	43,211	4.548	36.783
6. Illinois	41,832	4.403	41.186
7. Oregon	36,876	3.881	45.067
8. Georgia	34,960	3.680	48.747
9. Florida	32,713	3.443	52.190
10. Washington	26,185	2.756	54.946
11. Louisiana	25,832	2.719	57.665
12. Missouri	24,990	2.630	60.295
13. Wisconsin	24,900	2.621	62.916
14. Minnesota	24,088	2.535	65.451
15. North Carolina	22,582	2.377	67.828
16. Michigan	22,273	2.344	70.172
17. Indiana	21,643	2.278	72.450
18. Virginia	18,609	1.959	74.409
19. Tennessee	18,286	1.925	76.334
20. Oklahoma	17,410	1.832	78.166
21. Iowa	15,908	1.674	79.840
22. Alaska	15,477	1.629	81.469
23. Maryland	14,893	1.568	83.037
24. Arizona	13,567	1.428	84.465
25. Colorado	12,791	1.346	85.811
26. Massachusetts	12,500	1.316	87.127
27. New Mexico	11,450	1.205	88.332
28. Alabama	10,677	1.124	89.456
29. Arkansas	9,772	1.029	90.485
30. Idaho	9,348	.984	91.469
31. Montana	9,310	.980	92.449
32. Utah	8,550	.900	93.349
33. South Carolina	8,306	.874	94.223
34. Connecticut	7,057	.743	94.966
35. Kansas	5,858	.617	95.583
36. Kentucky	5,756	.606	96.189
37. New Jersey	5,118	.539	96.728
38. Nebraska	4,749	.500	97.228
39. North Dakota	4,510	.475	97.703
40. Wyoming	4,398	.463	98.166
41. Mississippi	4,246	.447	98.613
42. New Hampshire	2,774	.292	98.905

TABLE 3-8 (Con't)

43. Hawaii	2,549	.268	99.173
44. Delaware	2,391	.252	99.425
45. Maine	1,948	.205	99.630
46. West Virginia	1,357	.143	99.773
47. District of Columbia	974	.103	99.876
48. Rhode Island	386	.041	99.917
49. Vermont	346	.036	99.953
50. Nevada	323	.034	99.987
51. South Dakota	182	.019	100.006
TOTAL	950,113	100.000	100.000

* in thousands of tons

Source: 1977 Census of Transportation, Commodity Transportation Survey, Summary, U.S. Department of Transportation, Bureau of the Census, Washington, D.C., Table 1.

The second set of data from the COT was on intrastate ton miles. As above, these were broken down into ICC certificated and non-ICC certificated and then combined to form a composite table.

The ICC certificated carriers' ton miles shows virtually one of every three ton miles being in either California or Texas (Table 3-9). The top five states show a 52.55% share of the intrastate ton miles, the top ten states have 70.39%, and the top 15 states have 80.96%. The COT concentration is slightly below that of the CTS ton miles. Twelve states have a share greater than 2.1%.

Comparing the COT and the CTS, North Carolina (4), Georgia (6), Missouri (9), Wisconsin (12), and Minnesota (14) appear on the CTS top 15 but not in the COT top 15 ton mile states, while Indiana (9), Kansas (10), Alabama (12), Louisiana (13), and Oklahoma (15) appear in the COT top 15 but not in the CTS top 15.

The non-ICC certificated ranking of ton miles (Table 3-10) shows California alone with virtually one of every two intrastate ton miles. The top five states have 69.2% of the ton miles, the top 10 have 81.54%, and the top 15 have 90.09%. Only nine states have a share greater than 2.1%.

The combined ranking of the ICC certificated and non-ICC certificated ton miles (Table 3-11) is led by California with 24.47% of the ton miles and Texas with 13.21%. Again, these two states dominate with over one of every three intrastate ton miles. The top five states have a 55.32% share of the ton miles, the top ten states have 71.46%, and the top 15 states have 81.38%. Eleven states have a share exceeding 2.1%.

As with the CTS data, a table was constructed which combined the rankings for the tonnage and ton mile tables (Table 3-12). The ranking on the combined table is based on the sum of the rankings in the tonnage and ton mile tables. The COT combined list contains several states not on the CTS list, e.g., Florida (7), Alabama (11), Louisiana (13), and Kansas (15) and excludes the following four states included on the CTS list, i.e., North Carolina (5), Missouri (10), Wisconsin (12), and Minnesota (14). Eleven of the 15 states are common to both lists. The COT and CTS composite lists are compared in Table 3-13. While the resulting 19 states are likely to be the large impact states, this list is compared to the 42 states in the rate sample as explained below.

Data on intrastate motor freight is also available from
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commercial sources. While these data are advertised as being contemporary, it is strongly based on the COT data used herein projected forward to the present time. Some of this data is used to obtain estimates of Q_m for the current time.

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TABLE 3-9

STATE RANK OF INTRASTATE ICC REGULATED MOTOR CARRIER TON MILES:
1977 CENSUS OF TRANSPORTATION

State	Intrastate ICC Regulated Ton Miles	Percent of Total	Cumulative Percent
1. California	3,086,840,000	19.232	19.232
2. Texas	2,181,530,000	13.592	32.824
3. Ohio	1,197,100,000	7.458	40.282
4. Pennsylvania	1,060,170,000	6.605	46.887
5. Illinois	909,012,000	5.664	52.551
6. Florida	654,367,000	4.077	56.628
7. Michigan	643,635,000	4.010	60.638
8. New York	626,413,000	3.903	64.541
9. Indiana	477,618,000	2.976	67.517
10. Kansas	460,475,000	2.869	70.386
11. Oregon	420,079,000	2.617	73.003
12. Alabama	370,952,000	2.311	75.314
13. Louisiana	312,130,000	1.945	77.259
14. Washington	300,367,000	1.871	79.130
15. Oklahoma	293,127,000	1.826	80.956
16. North Carolina	289,698,000	1.805	82.761
17. Georgia	283,085,000	1.764	84.525
18. Minnesota	279,552,000	1.742	86.267
19. South Dakota	214,637,000	1.337	87.604
20. Missouri	189,217,000	1.179	88.783
21. New Jersey	188,426,000	1.174	89.957
22. Mississippi	177,839,000	1.108	91.065
23. Wisconsin	168,208,000	1.048	92.113
24. Tennessee	142,789,000	.890	93.003
25. Arizona	127,933,000	.797	93.800
26. Arkansas	114,426,000	.713	94.513
27. South Carolina	104,216,000	.649	95.162
28. Iowa	97,205,700	.606	95.768
29. Montana	91,856,600	.572	96.340
30. Kentucky	88,031,300	.549	96.889
31. Virginia	83,386,100	.520	97.409
32. Massachusetts	60,270,300	.376	97.785
33. Hawaii	57,511,800	.358	98.143
34. Idaho	52,519,600	.327	98.470
35. Colorado	51,782,600	.323	98.793
36. Nebraska	30,310,600	.189	98.982
37. Utah	30,030,900	.187	99.169
38. West Virginia	28,721,100	.179	99.348
39. Maryland	26,907,300	.168	99.516
40. Maine	26,525,700	.165	99.681
41. Wyoming	26,358,200	.164	99.845
42. New Mexico	11,588,100	.072	99.917
43. Nevada	4,423,880	.028	99.945

TABLE 3-9 (Con't)

44. Connecticut	3,727,850	.023	99.968
45. New Hampshire	2,543,080	.016	99.984
46. Delaware	1,942,870	.012	99.996
47. North Dakota	256,889	.002	99.998
48. Vermont	207,342	.001	99.999
49. Rhode Island	147,870	.001	100.000
50. Alaska	92,353	.000	100.000
51. District of Columbia	21,784	.000	100.000
TOTAL	16,050,260,818	100.000	100.000

Source: Run from the 1977 Census of Transportation Tapes

TABLE 3-10

STATE RANK OF INTRASTATE NON-ICC REGULATED MOTOR CARRIER TON MILES:
1977 CENSUS OF TRANSPORTATION

State	Intrastate Non-ICC Regulated Ton Miles	Percent Of Total	Cumulative Percent
1. California	1,849,460,000	44.814	44.814
2. Texas	484,167,000	11.732	56.546
3. Michigan	199,826,000	4.842	61.388
4. Ohio	169,089,000	4.097	65.485
5. Maine	153,495,000	3.719	69.204
6. Illinois	129,544,000	3.139	72.343
7. Florida	105,466,000	2.556	74.899
8. Louisiana	100,639,000	2.439	77.338
9. Pennsylvania	94,620,300	2.293	79.631
10. Iowa	78,960,100	1.913	81.544
11. Georgia	75,439,000	1.828	83.372
12. North Carolina	73,225,400	1.774	85.146
13. Virginia	72,425,900	1.755	86.901
14. Colorado	67,065,300	1.625	88.526
15. Arizona	64,450,900	1.562	90.088
16. Oregon	59,351,300	1.438	91.526
17. New York	43,433,200	1.052	92.578
18. Maryland	41,269,300	1.000	93.578
19. Minnesota	40,276,700	.976	94.554
20. Washington	29,651,400	.718	95.272
21. Indiana	24,871,200	.603	95.875
22. Wisconsin	24,383,500	.591	96.466
23. New Jersey	23,910,700	.579	97.045
24. Kansas	20,287,300	.492	97.537
25. Idaho	19,238,900	.466	98.003
26. Alabama	16,939,000	.410	98.413
27. Missouri	14,866,200	.360	98.773
28. West Virginia	11,417,300	.277	99.050
29. Delaware	11,351,200	.275	99.325
30. Kentucky	9,272,290	.225	99.550
31. Tennessee	5,850,830	.142	99.692
32. South Carolina	4,909,480	.119	99.811
33. Massachusetts	3,507,600	.085	99.896
34. Mississippi	1,202,160	.029	99.925
35. Arkansas	833,211	.020	99.945
36. Oklahoma	755,275	.018	99.963
37. Vermont	434,270	.011	99.974
38. North Dakota	420,084	.010	99.984
39. Connecticut	249,532	.006	99.990
40. Hawaii	246,903	.006	99.996
41. Wyoming	63,773	.002	99.998
42. Nebraska	61,829	.001	99.999
43. Utah	33,600	.001	100.000

TABLE 3-10 (Con't)

44. South Dakota	7,280	.000	100.000
45. Rhode Island	229	.000	100.000
46. Montana	0	.000	100.000
47. Nevada	0	.000	100.000
48. New Hampshire	0	.000	100.000
49. New Mexico	0	.000	100.000
50. Alaska	0	.000	100.000
51. District of Columbia	0	.000	100.000
TOTAL	4,126,968,446	100.000	100.000

Source: Run from 1977 Census of Transportation Tapes

TABLE 3-11

STATE RANK ON INTRASTATE TON MILES BY ICC AND NON-ICC MOTOR CARRIERS:
1977 CENSUS OF TRANSPORTATION

State	Intrastate ICC and Non-ICC Regulated Ton Miles	Percent of Total	Cumulative Percent
1. California	4,936,300,000	24.465	24.465
2. Texas	2,665,697,000	13.211	37.676
3. Ohio	1,366,189,000	6.771	44.447
4. Pennsylvania	1,154,790,300	5.723	50.170
5. Illinois	1,038,556,000	5.147	55.317
6. Michigan	843,461,000	4.180	59.497
7. Florida	759,833,000	3.766	63.263
8. New York	669,846,200	3.320	66.583
9. Indiana	502,489,200	2.490	69.073
10. Kansas	480,762,300	2.383	71.456
11. Oregon	479,430,300	2.376	73.832
12. Louisiana	412,769,000	2.046	75.878
13. Alabama	387,891,000	1.922	77.800
14. North Carolina	362,923,400	1.799	79.599
15. Georgia	358,524,000	1.777	81.376
16. Washington	330,018,400	1.636	83.012
17. Minnesota	319,828,700	1.585	84.597
18. Oklahoma	293,882,275	1.457	86.054
19. South Dakota	214,644,280	1.064	87.118
20. New Jersey	212,336,700	1.052	88.170
21. Missouri	204,083,200	1.011	89.181
22. Wisconsin	192,591,500	.954	90.135
23. Arizona	192,383,900	.953	91.088
24. Maine	180,020,700	.892	91.980
25. Mississippi	179,041,160	.887	92.867
26. Iowa	176,165,800	.873	93.740
27. Virginia	155,812,000	.772	94.512
28. Tennessee	148,639,830	.737	95.249
29. Colorado	118,847,900	.589	95.838
30. Arkansas	115,259,211	.571	96.409
31. South Carolina	109,125,480	.541	96.950
32. Kentucky	97,353,590	.482	97.432
33. Montana	91,856,600	.455	97.877
34. Idaho	71,758,500	.356	98.243
35. Maryland	68,176,600	.338	98.581
36. Massachusetts	63,777,900	.316	98.897
37. Hawaii	57,758,703	.286	99.183
38. West Virginia	40,138,400	.199	99.382
39. Nebraska	30,372,429	.151	99.533
40. Utah	30,064,500	.149	99.682
41. Wyoming	26,421,973	.131	99.813
42. Delaware	13,294,070	.066	99.879

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TABLE 3-11 (Con't)

43. New Mexico	11,588,100	.057	99.936
44. Nevada	4,423,880	.022	99.958
45. Connecticut	3,997,382	.020	99.978
46. New Hampshire	2,543,080	.013	99.991
47. North Dakota	676,973	.003	99.994
48. Vermont	641,612	.003	99.997
49. Rhode Island	148,099	.001	99.998
50. Alaska	92,353	.000	99.998
51. District of Columbia	21,784	.000	99.998
TOTAL	20,177,229,264	100.000	100.000

Source: Run from the 1977 Census of Transportation Tapes

TABLE 3-12

COMBINED STATE RANKING BY INTRASTATE GENERAL FREIGHT TONNAGE AND TON
MILES: CENSUS OF TRANSPORTATION DATA

State	Rank Tons	Rank Ton Miles	Total Of The Two Measures
California	1	1	2
Texas	4	2	6
Ohio	3	3	6
Illinois	2	5	7
Pennsylvania	6	4	10
Michigan	5	6	11
Florida	7	7	14
Indiana	9	9	18
New York	11	8	19
Washington	10	16	26
Alabama	13	13	26
Georgia	12	15	27
Louisiana	15	12	27
Oregon	17	11	28
Kansas	19	10	29

Source: Calculated From Tables 3-7 and 3-11

TABLE 3-13

COMPARISON OF CONTINUING TRAFFIC STUDY AND CENSUS OF TRANSPORTATION
COMPOSITE TOP 15 STATES LIST

CONTINUING TRAFFIC STUDY		CENSUS	
RANK	STATE	RANK	STATE
1.	Texas	1.	California
2.	California	2.	Texas
3.	Ohio	3.	Ohio
4.	Michigan	4.	Illinois
5.	North Carolina	5.	Pennsylvania
6.	New York	6.	Michigan
7.	Georgia	7.	Florida
8.	Washington	8.	Indiana
9.	Pennsylvania	9.	New York
10.	Missouri	10.	Washington
11.	Oregon	11.	Alabama
12.	Wisconsin	12.	Georgia
13.	Illinois	13.	Louisiana
14.	Minnesota	14.	Oregon
15.	Indiana	15.	Kansas

ENDNOTES FOR CHAPTER 3

1. W. Edwards Deming, Memorandum on the Continuing Studies of Traffic, in Federal Restraints on Competition in the Trucking Industry: Antitrust Immunity and Economic Regulation: Appendix the Report of the Committee on the Judiciary, US Senate, 96th Congress, 2nd Session, USGPO, Washington, DC, October, 1980, pp. 996-1000.

2. W. Bruce Allen and Charles Taylor-Brown, Examination of the Unregulated Trucking Experience in Delaware, Research and Special Programs Directorate, Office of University Research, US Department of Transportation, DOT-RC-82012, DOT-RSPA-DPB-50/81/18, Washington, DC, January, 1980.

3. See, Staff Report No. 10, Highlights of Activity in the Property Motor Carrier Industry, Office of Transportation Analysis, Interstate Commerce Commission, Washington, DC, March, 1986, for a discussion on private carriers taking advantage of the provisions of the MCA-1980, e.g., p. 11.

4. See statement of Frank Jones, Vice President and Director of Transportation of Southwire Co., in "Georgia Rates Held Higher Than Interstate, Shippers Tell GSPC", Traffic World, February 10, 1986, p. 69.

5. For example, Transearch, The Data Base for Freight Transportation, produced by Reebie Associates of Greenwich, CT.

CHAPTER 4

ANALYSIS OF SOCIAL WELFARE LOSS WITH THE MULTIREGIONAL INPUT-OUTPUT
MODEL

One of the major contributions of this research is the linking
of the Samuelson[1] spatial price equilibrium model and the
Posner[2] / Braeutigam-Noll[3] / Winston[4] theory of regulatory impact
(as adjusted to yield the Posner welfare trapezoid) with the US
Multiregional Input Output Model (MRIO)[5]. This linkage enables the
welfare trapezoids of each commodity in each state to be
distributed over all commodities and all states so that the
incidence of state motor carrier regulation can be shown over all
commodity groups and all states. This is accomplished by linking
the "price model"[6] of the MRIO to the welfare trapezoid as
explained in this chapter.

In essence, the price model of the MRIO predicts how the
prices of all goods in all regions will change if the price of good
i in region j changes exogenously (or if multiple prices change
exogenously). In the case herein, it is hypothesized that
deregulation in certain states will lower intrastate rates from

$$P_m^{ij} \text{ to } x_m^{ij} P_m^{ij} \quad (\text{where } [1 - x_m^{ij}]100 \text{ is the percentage decrease}$$

in intrastate motor carrier rates predicted for economic sector i
in state j if state j deregulates). Because of the interdependence
of the economy assumed in the MRIO, when the motor carrier rates
drop, prices of other goods k both in state j and in other states
n may occur. These price drops will generate welfare trapezoids for
these goods in their respective states.

Because of the monetary and time expense involved in running
the price model, it is assumed herein that all candidate states
deregulate simultaneously. Thus, the analysis herein does not
attribute the social costs of deregulation specifically to a
specific state's actions (although it shows impacts of regulation
on a state by state basis). Braeutigam and Noll show the danger of
attribution of the impacts of deregulation in a situation where
just rail is deregulated, just truck is deregulated, and if both
are deregulated. The case herein is analogous to their case. In
future runs, the model can just deregulate a single state and view
its impacts on the US economy, ceteris paribus.

The US MRIO is a 51 area (50 states plus the District of
Columbia) model with 125 economic sectors. Each MRIO economic
sector is an aggregation of many economic sectors. While some
input-output (I-O) models have over 500 sectors, some have as few
as nine. While aggregation sacrifices detail, aggregation makes the

analysis more mathematically tractable.

With 51 areas and 125 economic sectors, there are 40,640,625 possible interactions, e.g., sector i in state j interacting with sector m in state n -- coal in WV interacting with steel production in IN. Because a mathematical procedure known as matrix inversion is required for the price model and because inverting a 6375 by 6375 matrix is no trivial task, further aggregation of the US MRIO was undertaken, as explained in more detail in Chapter 5.

Briefly, states which would not experience rate decreases as the result of deregulation (e.g., the already deregulated states, states already practicing de facto deregulation, or small states -- ----- from an economic activity perspective) were aggregated in their respective regions. This has its costs, because it does not enable us to present the impact of motor carrier deregulation that the states where rates would fall under deregulation would have on the the food industry in Montana for example. Rather, we must be satisfied with an impact on the food industry in the Rocky Mountain states. However, the big economic activity states and the states where deregulation would lower motor carrier rates are not aggregated. Twenty eight "states" remain.

Likewise, sectors of the economy are aggregated. For instance, all of the service sectors were aggregated into a single sector. This was done because the service sector is not a major shipper of goods (although certain subsets of it are major users of goods which are shipped by motor carriage). Thus, we cannot state the impact of intrastate motor carrier deregulation on the banking or restaurant sectors per se, but rather only the impact on the service sector. However, all of the manufacturing economic sectors were kept in the disaggregate form of the MRIO. Seventy two economic sectors remain.

The net result of the aggregation was to give a matrix 2044 by 2044, which is a more manageable matrix to invert (with only a tenth as many elements as the disaggregated matrix). Future research will run the totally disaggregated model on all 51 states and all 125 economic sectors.

A more detailed explanation of the MRIO can be found in
    7
Faucett, and a general description of I-O and MRIO can be found
      8
in Miller and Blair. The price model can be found in Miller and
      9
Blair and Young. The use of the MRIO model in this particular context and the linkage to the welfare trapezoids will now be explained.

The multiregional input output (MRIO) price model is an extension of the national input output price model by the inclusion of trade of intermediate inputs between regions. The MRIO price model is normally used to show the interdependencies of a particular sector in a region with other sectors within or outside of the region. Hence, the MRIO price model can be expanded to measure the distribution of social welfare loss or gain in the

whole economy caused by a particular regional or state level policy.

The major assumptions of the MRIO price model are as follows:

(1) perfect competition:

This assumption says that, in equilibrium, the price of a commodity must be equal to the cost of producing one unit of the commodity. In addition, the value of commodities is measured in purchaser prices, which includes the transportation in the wholesale and retail price. Therefore, the domestic producing price in the region must be equal to the import price in that region for the same commodity.

(2) constant technology and constant returns to scale:

Constant technology implies no substitution among inputs. This also implies that technology is independent of industrial output, i.e., all steel producers, large and small, have the same production function.

Constant returns to scale implies that each firm in an industry is identically efficient and hence produces at the same lowest level of average cost.

In addition, the factor prices in the MRIO model are implicitly assumed to be independent of industrial output.

All of the above assumptions together imply that the supply curve of an industry is infinitely elastic, i.e., a horizontal line.

(3) constant trade coefficients:

Constant trade coefficients imply that, in the short run, trade relationships between regions will not change as input prices change.

(4) constant industry shares of each industry in a region:

This assumption implies that all industries in a region import identical fractions of a particular intermediate input.

Since input-output implies that constant costs exist, the Samuelson spatial price equilibrium model and the Posner/Braeutigam-Noll/Winston analysis are now couched in terms of horizontal supply curves. As a result of the constant cost supply curves, the export price is equal to the local price of the exporting region and the import price is equal to the local price in the importing region, where the difference between the import price and the export price equals the transportation rate. This allows the importing region to both import and produce (but not for export) the imported good.

The quantitative impact of the input-output assumptions on the Posner/Braeutigam-Noll Winston (P/B-N/W) analysis are unclear. On

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the one hand, the upward sloping supply curves of P/B-N/W allow
for two welfare trapezoids instead of one and a larger welfare
triangle, reflecting a loss of producer surplus in addition to the
loss in consumer surplus from the analysis herein. This would
suggest that our results are understated. However, the lack of
substitution in the input-output model does not allow firms to
switch to the optimal input combinations when factor prices change.
This would suggest that our results are overstated. Other
compromises from economic theory are also made as the result of
the above assumptions. The net resolution of using the strict
input-output assumptions in this analysis cannot be stated.
However, input-output analysis is often used in policy analysis.
It is a way of capturing the dynamic interdependencies of the
economy.

Consider a two good (sector 1, sector 2), two region (Region
L, Region M) situation. The demand and supply relationships for
sector 1 in both regions are shown below.

REGION L

Sector 1

$ |Y
     |\
     | \
     | \
     | \
     | \
     | \
     | \
* M | \ E   M   M
p |————————\—————————————————————————   MC   = AC   = supply
 1 | \   1   1   curve
     | \
0 | |\   M
     |——————————|—\——————————————————————————————————   Q
     F   =M \   _M
                Q   Q
                 1   1

                |<————>|
                    M
                  ΔQ
                    1

            |<————————>|
               exports

$$\Delta Q^{L}_{1} = \Delta Q^{M}_{1}$$, i.e., imports = exports

By assumptions (1) and (2), the total social welfare loss of increasing transportation cost within a region in the two region, one good case is shown in the first graph above.

In the bottom diagram, Region M is the only region that exports commodity 1 to Region L. The supply curve of Region M is equal to the marginal cost and average cost of sector 1 and is, therefore, a horizontal line. Distance OF is the amount of the supply of sector 1 that is locally consumed in Region M at constant

price p^{*M}_{1}. At this price level, p^{*M}_{1}, Region M can supply an

infinite amount of sector 1's product for export.

In the top graph, Region L is the only importer for commodity 1 from Region M. Hence, if there is no transportation cost, the domestic producing cost of Region L must be equal to the price p_1^{*M}. Distance $0\overline{Q}_1^L$ is the combination of Region L's production and imports. The amount of Region L's imports are the same amount as Region M's exports, which equals the distance $F\overline{Q}_1^M$.

Suppose that T is the transportation cost per unit of commodity 1. The new domestic and import prices of commodity 1 in Region L are both equal to p_1^{*M} plus T which is p_1^L, and the new horizontal supply curve is denoted as $AC_1^L = MC_1^L$. With this new price level, region L reduces its imports by $\triangle Q_1^L$, while Region M cuts down on its exports by the same amount, i.e., $\triangle Q_1^M$.

The impact of increasing the transportation cost from zero to T on the social welfare of both regions can be explicitly analyzed from the diagrams above. In Region M, since the supply curve is infinitely elastic, the increase in the transportation cost does not have any effect on the price level p_1^{*M}. Although the total production is reduced from $0\overline{Q}_1^M$ to $0\overline{\overline{Q}}_1^M$ due to the reduction of exports by $\triangle Q_1^M$, social welfare, which is denoted by the area of

triangle $YE \, P_1^{*M}$, remains unchanged. This is because the

equilibrium price in Region M is still at P_1^{*M} . In Region L, since

the price has been changed from P_1^{*M} to P_1^{L} , the social welfare

loss will be equal to the trapezoid $p_1^{L} AB \, p_1^{*M}$.

For the general case, the analysis usually involves more than one type of sector. The simple two dimension graph above is no longer an effective tool to trace the distribution of welfare loss/gain. The MRIO model is now applied to the two region, two good case and can be generalized to the n region, m good case.

From the MRIO price model, it is known that:[10]

[1] $\qquad P = (C\hat{A})^t \, P + U$

where $\qquad$ P = a 4 x 1 column vector of prices of goods or services

$\qquad$ C = a 4 x 4 matrix of trade coefficients

$\qquad$ $\hat{A}$ = a 4 x 4 matrix of regional technical coefficients

$\qquad$ U = a 4 x 1 column vector of value added components

C and $\hat{A}$ are assumed to be constant in the short run by assumptions (3) and (4). Then [2] can be written:

[2] $\qquad \triangle P = (C\hat{A})^t \, \triangle P + \triangle U$

or in the two region, two good case:

$$[3] \quad \Delta p_1^L = c_1^{LL} a_{11}^L \Delta p_1^L + c_2^{LL} a_{21}^L \Delta p_2^L + c_1^{ML} a_{11}^L \Delta p_1^M +$$

$$c_2^{ML} a_{21}^L \Delta p_2^M + \Delta U_1^L$$

$$[4] \quad \Delta p_2^L = c_1^{LL} a_{12}^L \Delta p_1^L + c_2^{LL} a_{22}^L \Delta p_2^L + c_1^{ML} a_{12}^L \Delta p_1^M +$$

$$c_2^{ML} a_{22}^L \Delta p_2^M + \Delta U_2^L$$

$$[5] \quad \Delta p_1^M = c_1^{LM} a_{11}^M \Delta p_1^L + c_2^{LM} a_{21}^M \Delta p_2^L + c_1^{MM} a_{11}^M \Delta p_1^M +$$

$$c_2^{MM} a_{21}^M \Delta p_2^M + \Delta U_1^M$$

$$[6] \quad \Delta p_2^M = c_1^{LM} a_{12}^M \Delta p_1^L + c_2^{LM} a_{22}^M \Delta p_2^L + c_1^{MM} a_{12}^M \Delta p_1^M +$$

$$c_2^{MM} a_{22}^M \Delta p_2^M + \Delta U_2^M$$

The changes in quantity demanded resulting from the changes in prices can be determined by assuming the price elasticities of demand. It is assumed that the demand elasticities are known, or assumed as part of a sensitivity analysis, giving the new quantities demanded at the new prices (see below).

Multiplying equations [3], [4], [5], and [6] by

$$(1/2)(\bar{Q}_1^L + \overset{=}{Q}_1^L) = D, \quad (1/2)(\bar{Q}_2^L + \overset{=}{Q}_2^L) = E, \quad (1/2)(\bar{Q}_1^M + \overset{=}{Q}_1^M) = F,$$

and $(1/2)(\bar{Q}_1^M + \overset{=}{Q}_1^M) = G$ respectively, where:

$\bar{Q}_i^R$ = the quantity of goods in sector i in Region R before

changing p_i^R

$\bar{\bar{Q}}_i^R$ = the quantity of goods in sector i in Region R after

changing p_i^R

yields the following four equations for the two region, two good model:

$$[7] \quad (1/2)(\triangle p_1^L)(\bar{Q}_1^L + \bar{\bar{Q}}_1^L) = (1/2)(\triangle p_1^L)(\bar{Q}_1^L + \bar{\bar{Q}}_1^L)c_1^{LL}a_{11}^L +$$

$$(1/2)(\triangle p_2^L)(\bar{Q}_1^L + \bar{\bar{Q}}_1^L)c_2^{LL}a_{21}^L + (1/2)(\triangle p_1^M)(\bar{Q}_1^L + \bar{\bar{Q}}_1^L)c_1^{ML}a_{11}^L +$$

$$(1/2)(\triangle p_2^M)(\bar{Q}_1^L + \bar{\bar{Q}}_1^L)c_1^{ML}a_{21}^L + (1/2)(\triangle U_1^L)(\bar{Q}_1^L + \bar{\bar{Q}}_1^L)$$

or

$$[7'] \quad D(\triangle p_1^L) = D(\triangle p_1^L)c_1^{LL}a_{11}^L + D(\triangle p_2^L)c_2^{LL}a_{21}^L +$$

$$D(\triangle p_1^M)c_1^{ML}a_{11}^L + D(\triangle p_2^M)c_2^{ML}a_{21}^L + D(\triangle U_1^L)$$

$$[8] \quad E(\triangle p_2^L) = E(\triangle p_1^L)c_1^{LL}a_{12}^L + E(\triangle p_2^L)c_2^{LL}a_{22}^L +$$

$$E(\triangle p_1^M)c_1^{ML}a_{12}^L + E(\triangle p_2^M)c_2^{ML}a_{22}^L + E(\triangle U_2^L)$$

$$[9] \quad F(\Delta p_1^M) = F(\Delta p_1^L)c_1^{LM}a_{11}^M + F(\Delta p_2^L)c_2^{LM}a_{21}^M +$$

$$F(\Delta p_1^M)c_1^M a_{11}^{MM} + F(\Delta p_2^M)c_2^{M'}{}^M a_{21}^M + F(\Delta U_1^M)$$

$$[10] \quad G(\Delta p_2^M) = G(\Delta p_1^L)c_1^{LM}a_{12}^M + G(\Delta p_2^L)c_2^{LM}a_{22}^M +$$

$$G(\Delta p_1^M)c_1^{MM}a_{12}^M + G(\Delta p_2^M)c_2^M a_{22}^{MM} + G(\Delta U_2^M)$$

Thus, each term in the above equations is part of the area of a trapezoid of social welfare loss/gain, the meanings of which are:

[7"] Total Welfare loss for sector 1, Region L because of an increase in Δp_1^L	Welfare loss for sector 1, Region L from using some of its own product as an input	Welfare loss for sector 1, Region L from using products of sector 2, Region L as an input	Welfare loss for sector 1, Region L from using products of sector 1, Region M as an input	Welfare loss for sector 1 Region L from using products of sector 2, Region M as an input
=	+	+	+	

$$+ \quad \text{Welfare loss to final demand of sector 1, Region L's product}$$

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[8'] Total Welfare loss for sector 2, Region L because of an increase in $\triangle p_1^L$ = Welfare loss for sector 2, Region L from using products of sector 1, Region L an input + Welfare loss for sector 2, Region L from using some of its own product as an input + Welfare loss for sector 2, Region L from using products of sector 1, Region M as an input + Welfare loss for sector 2 Region L from using products of sector 2, Region M as an input

+ Welfare loss to final demand of sector 2, Region L's product

[9'] Total Welfare loss for sector 1, Region M because of an increase in $\triangle p_1^L$ = Welfare loss for sector 1, Region M from using products of sector 1, Region L an input + Welfare loss for sector 1, Region M from using products of sector 2, Region L as an input + Welfare loss for sector 1, Region M from using some of its own product as an input + Welfare loss for sector 1 Region M from using products of sector 2, Region M as an input

+ Welfare loss to final demand of sector 1, Region M's product

[10'] Total Welfare loss for sector 2, Region M because on an increase in Δp_1^L	=	Welfare loss for sector 2, Region M from using products of sector 1, Region L an input	+	Welfare loss for sector 2, Region M from using products of sector 2, Region L as an input	+	Welfare loss for sector 2, Region M from using products of sector 1, Region M as an input	+	Welfare loss for sector 2 Region M from using some of its own product as an input

$$+ \text{ Welfare loss to final demand of sector 2, Region M's product}$$

Thus, the left hand side of [7'] is the measure of welfare loss shown in the first graph. The right hand side of [7'] shows how that welfare loss is spread over the various sectors and regions. Equations [8], [9], and [10] show the secondary effects of a change in p_1^L on the prices in other sectors and regions and hence on quantities in other sectors and regions and then, in turn, how the welfare effects from their changes are spread across the various sectors and regions.

The total of the left hand side column includes all welfare losses in both sectors and both regions. The initial change in p_1^L generates, through the "truncated MRIO price model",[11] the changes in other sectors' prices both within and outside the region as well as the price of commodity 1 in other regions. The first two rows on the right hand side contain all of the distributed welfare losses across sectors in Region L. The last two rows on the right hand side contain all of the distributed welfare losses across sectors in Region M (some caused by region M price changes and some caused by region L price changes).

To give an example of the MRIO price model, consider the following situation:

	REGION L		TOTAL		REGION M		TOTAL
	PURCHASING SECTOR		DEMAND		PURCHASING SECTOR		DEMAND
	1	2			1	2	
SELLING 1	225	600	1000	SELLING 1	225	325	1200
SECTOR 2	250	125	2000	SECTOR 2	350	200	800
VALUE ADDED	525	1275		VALUE ADDED	625	275	

For example, in Region L, it takes \$600 worth of input from industry 1 to make the \$2000 worth of total output in industry 2 in Region L.

The above yields the following matrices of technical coefficients:

$$
A^L = \begin{vmatrix} a^L_{11} & a^L_{12} \\ a^L_{21} & a^L_{22} \end{vmatrix} = \begin{vmatrix} .225 & .300 \\ .250 & .063 \end{vmatrix} \qquad A^M = \begin{vmatrix} a^M_{11} & a^M_{12} \\ a^M_{21} & a^M_{22} \end{vmatrix} = \begin{vmatrix} .188 & .406 \\ .292 & .250 \end{vmatrix}.
$$

For example, it takes 30 cents of the input from industry 1 to make a dollar's worth of output of industry 2 in Region L, i.e., (600/2000)=.300 .

The trade flows between the regions for each good are as follows:

GOOD 1

FROM\ TO	L	M	TOTAL
L	800	200	1000
M	310	890	1200
TOTAL	1110	1090	2200

GOOD 2

FROM\ TO	L	M	TOTAL
L	1300	700	2000
M	300	500	800
TOTAL	1600	1200	2800

which yields the following trade coefficients:

$$C^{LL} = \begin{vmatrix} c^{LL}_1 \\ c^{LL}_2 \end{vmatrix} = \begin{vmatrix} .721 \\ .812 \end{vmatrix} \qquad C^{LM} = \begin{vmatrix} c^{LM}_1 \\ c^{LM}_2 \end{vmatrix} = \begin{vmatrix} .183 \\ .583 \end{vmatrix} \qquad C^{ML} = \begin{vmatrix} c^{ML}_1 \\ c^{ML}_2 \end{vmatrix} = \begin{vmatrix} .279 \\ .188 \end{vmatrix}$$

$$C^{MM} = \begin{vmatrix} c^{MM}_1 \\ c^{MM}_2 \end{vmatrix} = \begin{vmatrix} .817 \\ .417 \end{vmatrix}$$

e.g., $c^{LL}_1 = (800/1110) = .721$.

The trade coefficient matrix for the two good, two region example is:

RECEIVING REGION

		L		M		
SHIPPING	L	c^{LL}_1	0	c^{LM}_1	0	
		0	c^{LL}_2	0	c^{LM}_2	= C
REGION	M	c^{ML}_1	0	c^{MM}_1	0	
		0	c^{ML}_2	0	c^{MM}_2	

while the technical coefficient matrix for the two goods and two regions is:

PURCHASING REGION

$$
\begin{array}{c}
\\
\text{PRODUCING} \\
\\
\text{REGION}
\end{array}
\quad
\begin{array}{cc}
 & \quad L \quad\quad\quad\quad M \\
L &
\left|
\begin{array}{cccc}
a^{L}_{11} & a^{L}_{12} & 0 & 0 \\
a^{L}_{21} & a^{L}_{22} & 0 & 0 \\
0 & 0 & a^{M}_{11} & a^{M}_{12} \\
0 & 0 & a^{M}_{21} & a^{M}_{22}
\end{array}
\right| = \hat{A}
\end{array}
$$

The trade of commodities needed as intermediate inputs for the production of a particular commodity in a region is represented by the transpose of the matrix multiplication of the expanded trade flow matrix C times the expanded technical coefficient matrix $\hat{A}$. In matrix notation, this is written as $(C\hat{A})^{t}$. Each element in the $(C\hat{A})^{t}$ matrix is the amount of commodity i imported from region g needed to produce commodity j in region k (see Young[12]).

The $(C\hat{A})^{t}$ matrix for the two region, two good example is therefore:

$$
\begin{array}{c}
\qquad\qquad\qquad L \qquad\qquad\qquad\qquad\qquad\qquad M \\[2ex]
\text{PRODUCING REGION}\;\;L\;\;M
\left|
\begin{array}{cccc|cccc}
c_1^{LL}\,a_{11}^{L} & & c_2^{LL}\,a_{21}^{L} & & c_1^{ML}\,a_{11}^{L} & & c_2^{ML}\,a_{21}^{L} \\[2ex]
c_1^{LL}\,a_{12}^{L} & & c_2^{LL}\,a_{22}^{L} & & c_1^{ML}\,a_{12}^{L} & & c_2^{ML}\,a_{22}^{L} \\[3ex]
c_1^{LM}\,a_{11}^{M} & & c_2^{LM}\,a_{21}^{M} & & c_1^{MM}\,a_{11}^{M} & & c_2^{MM}\,a_{21}^{M} \\[2ex]
c_1^{LM}\,a_{12}^{M} & & c_2^{LM}\,a_{22}^{M} & & c_1^{MM}\,a_{12}^{M} & & c_2^{MM}\,a_{22}^{M}
\end{array}
\right|
\end{array}
$$

The matrix of value added terms and the matrix of prices for the two good, two region example is:

$$
U =
\begin{vmatrix}
u_1^{L} \\[2ex]
u_2^{L} \\[2ex]
u_1^{M} \\[2ex]
u_2^{M}
\end{vmatrix}
\qquad
P =
\begin{vmatrix}
p_1^{L} \\[2ex]
p_2^{L} \\[2ex]
p_1^{M} \\[2ex]
p_2^{M}
\end{vmatrix}
$$

To determine the value of the intermediate inputs needed to make one unit of output, each term in the $(CA)^{\hat{}\,t}$ matrix must be post multiplied by the corresponding price of commodity i imported from region g. Each term of the $(CA)^{\hat{}\,t}\,P$ vector is the sum of the value of intermediate inputs imported from all industries and all regions required for the production of one unit of a given good in a given region, i.e., the total value of all intermediate inputs

needed to produce one unit of the given good (see Young[13]).

The prices of goods are the sum of the value of the intermediate inputs imported from all industries and regions required to produce one unit of output of a particular good plus the value added per unit of output needed for that good, i.e., in matrix terms:

$$P = (C\hat{A})^t P + U$$

This yields the following four equations for the two region, two good example:

$$p_1^L = c_1^{LL} a_{11}^L p_1^L + c_2^{LL} a_{21}^L p_2^L + c_1^{ML} a_{11}^L p_1^M + c_2^{ML} a_{21}^L p_2^M + u_1^L$$

$$p_2^L = c_1^{LL} a_{12}^L p_1^L + c_2^{LL} a_{22}^L p_2^L + c_1^{ML} a_{12}^L p_1^M + c_2^{ML} a_{22}^L p_2^M + u_2^L$$

$$p_1^M = c_1^{LM} a_{11}^M p_1^L + c_2^{LM} a_{21}^M p_2^L + c_1^{MM} a_{11}^M p_1^M + c_2^{MM} a_{21}^M p_2^M + u_1^M$$

$$p_2^M = c_1^{LM} a_{12}^M p_1^L + c_2^{LM} a_{22}^M p_2^L + c_1^{MM} a_{12}^M p_1^M + c_2^{MM} a_{22}^M p_2^M + u_2^M$$

The prices are solved for with the following matrix manipulation from above:

$$P - (C\hat{A})^t P = U$$

$$[I - (C\hat{A})^t] P = U$$

$$P = [I - (C\hat{A})^t]^{-1} U$$

where I is a matrix of ones on the diagonal and zeros off the diagonal and the $[I - (C\hat{A})^t]^{-1}$ is the inverse referenced above.

In the above example, the $(\hat{CA})^t$ matrix is:

$$(\hat{CA})^t = \begin{vmatrix} .162 & .203 & .063 & .047 \\ .216 & .051 & .084 & .012 \\ .034 & .170 & .154 & .122 \\ .074 & .146 & .332 & .104 \end{vmatrix}$$

and the $[\, I - (\hat{CA})^t\,]^{-1}$ matrix is:

$$[\, I - (\hat{CA})^t\,]^{-1} = \begin{vmatrix} 1.2908 & .3328 & .1651 & .0944 \\ .3094 & 1.2170 & .1589 & .0534 \\ .1443 & .2916 & 1.2953 & .1878 \\ .2104 & .3230 & .5194 & 1.2020 \end{vmatrix}$$

The U matrix is:

$$U = \begin{vmatrix} .525 \\ .638 \\ .521 \\ .344 \end{vmatrix}$$

When the $[\, I - (\hat{CA})^t\,]^{-1}$ is postmultiplied by the U, a vector of ones is generated since the prices in the input-output model are normalized to equal one, i.e., the inputs are the cent's worth of each input required to produce a dollar's worth of output.

A truncated MRIO price model is utilized to estimate the endogenous changes in all goods' prices resulting from an exogenous change in one or more goods. In order to implement the model, the price(s) of one good(s) is exogenously changed.

Consider a 20% change in the price of p_1^L, i.e., p_1^L is now treated as 1.2 as opposed to 1. The higher price will affect goods' prices in other industries and regions because the good involved is used as an intermediate input in their production. The column (W) that corresponds to the exogenously-determined-price-changed good is now removed from the $(\hat{CA})^t$ matrix above, i.e.,

$$W = \begin{vmatrix} .162 \\ .216 \\ .034 \\ .074 \end{vmatrix}$$

as is the row in the $(\hat{CA})^t$ matrix associated with the

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exogenously-determined-price-changed good, as the exogenously determined price is assumed not to be affected by other goods' prices, i.e., [.162 .203 .063 .047] above.

Each element of the column of the $(\hat{CA})^t$ matrix that denotes the use of the exogenously-determined-price good as intermediate inputs in the production of other goods is multiplied by the exogenously determined price and added into the model. The linkages between the exogenously determined industry and other industries in the same region and in other regions are included in the model (see Young[14]).

The other commodity prices now form a 3 x 1 price vector called P^* (a truncated vector because p_1^L is eliminated), i.e.,

$$P^* = \begin{vmatrix} p_2^{L*} \\ p_1^{M*} \\ p_2^{M*} \end{vmatrix}$$

The elements of the first column of the $(\hat{CA})^t$ matrix are the trade and use of good 1 from Region L as intermediate inputs. Multiplying each element of this vector by the exogenous price of good 1 in Region L yields each term as the value of the intermediate input of good 1 from Region L required to produce one unit of the good manufactured by the particular industry, i.e., the immediate production cost effect of the exogenous increase in prices. This vector is called T and is the W vector above multiplied by the new $\hat{p}_1^L$, i.e., 1.2 in this example. The $c_1^{LL} a_{11}^L \hat{p}_1^L$ element is removed, yielding a truncated T^* vector:

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$$T^* = \begin{vmatrix} c_1^{LL}\, a_{12}^{L}\, p_1^{\wedge L} \\[4pt] c_1^{LM}\, a_{11}^{M}\, p_1^{\wedge L} \\[4pt] c_1^{LM}\, a_{12}^{M}\, p_1^{\wedge L} \end{vmatrix} = \begin{vmatrix} .260 \\ .041 \\ .089 \end{vmatrix}$$

When multiple prices are being changed, the respective rows and columns are also deleted from the $(C\hat{A}^{t})$ matrix, the P^* vector is further truncated accordingly, and the T^* vector is truncated accordingly, while the remaining elements in the T^* vector are expanded accordingly. For example, if p_2^{L} were also changed above, row 2 and column 2 would also have been deleted from the $(C\hat{A}^{t})$ matrix. The new P^* vector would be:

$$P^* = \begin{vmatrix} p_1^{M*} \\[8pt] p_2^{M*} \end{vmatrix}$$

while the new T^* vector would be:

$$T^* = \begin{vmatrix} c_1^{LM}\, a_{11}^{M}\, p_1^{\wedge L} + c_2^{LM}\, a_{21}^{M}\, p_2^{\wedge L} \\[6pt] c_1^{LM}\, a_{12}^{M}\, p_1^{\wedge L} + c_2^{LM}\, a_{22}^{M}\, p_2^{\wedge L} \end{vmatrix}$$

Where just p_1^{L} is changed, the $(C\hat{A}^{t})$ matrix is truncated by

removing the first row and the first column:

$$(\hat{CA})^{t*} = \begin{vmatrix} .051 & .084 & .012 \\ .170 & .154 & .122 \\ .146 & .332 & .104 \end{vmatrix}$$

This latter matrix is post multiplied by the P^* vector to yield the value of intermediate inputs per unit of output vector

$(\hat{CA})^{t*} P^*$. The truncated vector of valued added is:

$$U^* = \begin{vmatrix} L_u \\ \quad_2 \\ M_u \\ \quad_1 \\ M_u \\ \quad_2 \end{vmatrix} = \begin{vmatrix} .638 \\ .521 \\ .344 \end{vmatrix}$$

As above, if P^L_2 is also changed exogenously, then U^* becomes

$$U^* = \begin{vmatrix} M_u \\ \quad_1 \\ M_u \\ \quad_2 \end{vmatrix}$$

The truncated MRIO system is now:

$$P^* = (\hat{CA})^{t*} P^* + T^* + U^*$$

which, after some manipulation, yields

$$P^* = [I - (\hat{CA})^{t*}]^{-1} [T^* + U^*]$$

In the case shown here:

$$\begin{vmatrix} p_2^{L*} \\ \\ p_1^{M*} \\ \\ p_2^{M*} \end{vmatrix} = \begin{vmatrix} 1.079 & .119 & .030 \\ .256 & 1.275 & .176 \\ .270 & .491 & 1.186 \end{vmatrix} \begin{vmatrix} .897 \\ .562 \\ .433 \end{vmatrix}$$

and so $p_2^{L*} = 1.0479$, $p_1^{M*} = 1.0225$, and $p_2^{M*} = 1.0328$, i.e,

a 20% increase in p_1^{L} will increase the price of good 2 in

Region L by 4.79%, increase the price of good 1 in Region M by 2.25%, and increase the price of good 2 in Region M by 3.28%.

Young used p_1^{L} as a transportation price in his example.

Suppose that the initial set of prices is $15, $40, $20, and $60. Then the new set of prices after, p_1^{*L} increases by

20%, is approximately $18, $41.92, $20.45, and $61.97, respectively.

Suppose it is further assumed that $\underline{Q}_1^{L}$, $\underline{Q}_2^{L}$, $\underline{Q}_1^{M}$, and $\underline{Q}_2^{M}$ are

30, 45, 55, and 85, respectively. The demand equations are all

assumed to be linear with slopes of -.5. Then the values of $\overline{\overline{Q}}_1^{L}$,

$\overline{\overline{Q}}_2^{L}$, $\overline{\overline{Q}}_1^{M}$, and $\overline{\overline{Q}}_2^{M}$ will be 24, 41.16, 54.1, and 81.06,

respectively. In the general case, assume that the demand curve is linear and an estimate of point elasticity (E) exists for the

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current price $(\bar{P}^i_j)$ and the current quantity $(\bar{Q}^i_j)$. Then,

$$E = (\bar{P}^i_j / \bar{Q}^i_j)(1/|\text{slope of the demand curve}|) =$$

$$(\bar{P}^i_j / \bar{Q}^i_j)([\bar{Q}^i_j - \bar{\bar{Q}}^i_j]/[\bar{\bar{P}}^i_j - \bar{P}^i_j]) =$$

$$= (\bar{P}^i_j / \bar{Q}^i_j)([\bar{Q}^i_j - \bar{\bar{Q}}^i_j]/[(1 + x)\bar{P}^i_j - \bar{P}^i_j]) = (\bar{Q}^{-i}_j - \bar{\bar{Q}}^i_j)/x\bar{Q}^i_j$$

where x = the percentage increase of price of good j in region i divided by 100

Given the E, then $\bar{\bar{Q}}^i_j = \bar{Q}^i_j [1 - xE]$.

Then $\triangle p^L_1 = \$3$, $\triangle p^L_2 = \$1.92$, $\triangle p^M_1 = \$.45$, and $\triangle p^M_2 = \$1.97$. From above, it can be seen that $\triangle P - (CA)^{\wedge t} \triangle P = \triangle U$. Making that calculation with the above data yields,

$\triangle U^L_1 = 2.004$, $\triangle U^L_2 = 1.111$, $\triangle U^M_1 = -.288$, and $\triangle U^M_2 = 1.109$. Also

$\bar{Q}^L_1 + \bar{\bar{Q}}^L_1 = 54$, $\bar{Q}^L_2 + \bar{\bar{Q}}^L_2 = 86.16$, $\bar{Q}^M_1 + \bar{\bar{Q}}^M_1 = 109.1$, and

$\bar{Q}^M_2 + \bar{\bar{Q}}^M_2 = 166.06$.

With this information, the equation set for calculating the regional impact across sectors of a price change of 20% in section 1, Region L would appear as:

For Sector 1, Region L: $(1/2)(\triangle p_1^L)(\bar{Q}_1^L + \overset{=}{Q}_1^L) = D(\triangle p_1^L) =$

$(.5)(\$3)(54) = \$81$

so $\quad D(\triangle p_1^L)(c_1^{LL} a_{11}^L) = (\$81)(.162) \qquad = \$13.14$

$D(\triangle p_2^L)(c_2^{LL} a_{21}^L) = (\$51.84)(.203) \qquad = \$10.52$

$D(\triangle p_1^M)(c_1^{ML} a_{11}^L) = (\$12.15)(.063) \qquad = \$\ 0.77$

$D(\triangle p_2^M)(c_2^{ML} a_{21}^L) = (\$53.19)(.047) \qquad = \$\ 2.50$

$D(\triangle U_1^L) \qquad\qquad\quad = (.5)(\$2.004)(54) = \$54.11$

TOTAL $\qquad\qquad\qquad\qquad\qquad = \$81.00$

For Sector 2, Region L: $(1/2)(\triangle p_2^L)(\overline{Q}_2^L + \overset{=L}{Q}_2) = E(\triangle p_2^L) =$

$(.5)(\$1.92)(86.16) = \$82.62$

so $\qquad E(\triangle p_1^L)(c_1^{LL} a_{12}^L) = (\$129.24)(.216) \qquad = \$27.92$

$\qquad E(\triangle p_2^L)(c_2^{LL} a_{22}^L) = (\$82.62)(.051) \qquad = \$\ 4.21$

$\qquad E(\triangle p_1^M)(c_1^{ML} a_{12}^L) = (\$19.39)(.084) \qquad = \$\ 1.63$

$\qquad E(\triangle p_2^M)(c_2^{ML} a_{22}^L) = (\$84.87)(.012) \qquad = \$\ 1.02$

$\qquad E(\triangle U_2^L) \qquad\qquad\qquad = (.5)(\$1.111)(86.16) = \$47.86$

TOTAL $\qquad\qquad\qquad\qquad\qquad\qquad\qquad = \$82.62$

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For Sector 1, Region M: $(1/2)(\triangle p_1^M)(\overline{Q}_1^M + \overset{=}{Q}{}_1^M) = F(\triangle p_1^M) =$

$(.5)(\$.45)(109.1) = \$24.50$

so $\quad F(\triangle p_1^L)(c_1^{LM} a_{11}^M) = (\$163.65)(.034) \quad = \$\ 5.56$

$\quad F(\triangle p_2^L)(c_2^{LM} a_{21}^M) = (\$104.74)(.170) \quad = \$17.81$

$\quad F(\triangle p_1^M)(c_1^{MM} a_{11}^M) = (\$24.55)(.154) \quad = \$\ 3.78$

$\quad F(\triangle p_2^M)(c_2^{MM} a_{21}^M) = (\$107.46)(.122) \quad = \$13.11$

$\quad F(\triangle U_1^M) \qquad\qquad = (.5)(\$-.288)(109.1) = -\$14.33$

TOTAL $\qquad\qquad\qquad\qquad\qquad = \$24.50$

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For Sector 2, Region M: $(1/2)(\triangle p_2^M)(Q_2^{\_M} + Q_2^{=M}) = G(\triangle p_2^M) =$

$(.5)(\$1.97)(166.06) = \$163.22$

so $\quad G(\triangle p_1^L)(c_1^{LM} a_{12}^M) = (\$249.09)(.074) \quad = \$18.57$

$\quad G(\triangle p_2^L)(c_2^{LM} a_{22}^M) = (\$159.42)(.146) \quad = \$23.22$

$\quad G(\triangle p_1^M)(c_1^{MM} a_{12}^M) = (\$37.36)(.332) \quad = \$12.37$

$\quad G(\triangle p_2^M)(c_2^{MM} a_{22}^M) = (\$163.22)(.104) \quad = \$17.00$

$\quad G(\triangle U_2^M) \qquad\qquad = (.5)(\$1.109)(166.06) = \$92.08$

TOTAL $\qquad\qquad\qquad\qquad\qquad\qquad = \$163.22$

Hence, the total welfare losses distributed within region L = \$81 + \$82.62 = \$163.62. The total welfare losses distributed within region M = \$24.50 + \$163.22 = \$187.72.
The above numbers have significant policy implications.

Suppose that p_1^{*L} is the intrastate transportation price in Texas (Region L) and that intrastate regulation increases the intrastate transportation rate by 20%. This regulation can generate not only a welfare loss within the state of Texas itself but also generate an even higher welfare loss to the rest of the United States (Region M). In the example above, the loss to Region L is \$163.62, while the loss to Region M is \$187.72. The total loss is \$351.34.
Another way to present the loss is the following:

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Welfare Loss Caused By Sector 1, Region L	Welfare Loss Caused By Sector 2 Region L	Welfare Loss Caused By Sector 1 Region M	Welfare Loss Caused By Sector 2 Region M	Welfare Loss To Final Demand	Total Welfare Loss
$ 13.14	$ 10.52	$ .76	$ 2.49	$ 54.10	
$ 27.95	$ 4.20	$ 1.62	$ .99	$ 47.87	
$ 5.63	$ 17.80	$ 3.75	$ 13.03	$-15.71	
$ 18.57	$ 23.22	$ 12.37	$ 17.00	$ 92.05	
$ 65.29 +	$ 55.74 +	$ 18.50 +	$ 33.51 +	$178.31	= $351.34

It should also be noted that the analysis above can be made in terms of a welfare triangle by multiplying equation [3] by

$$Q_1^{\_L} - Q_1^{=L} \quad, \text{ etc.}$$

The empirical analysis of the interstate impacts of intrastate regulation herein is merely the generalization of the above model to all states (as aggregated) and to all economic sectors (as aggregated).

ENDNOTES FOR CHAPTER 4

1. Paul A. Samuelson, "Spatial Price Equilibrium and Linear Programming", American Economic Review, Vol. 42, 1952, pp. 283-303.

2. Richard Posner, "The Social Costs of Monopoly and Regulation", Journal of Political Economy, Vol. 83, No. 4, 1975, pp. 807-827.

3. Ronald R. Braeutigam and Roger G. Noll, "The Regulation of Surface Freight Transportation: The Welfare Effects Revisited", The Review of Economics and Statistics, Vol. 66, Feb., 1984, pp. 80-87.

4. Clifford Winston, "The Welfare Effects of ICC Rate Regulation Revisited", Bell Journal of Economics, Vol. 12, No. 1, Spring, 1981, pp. 232-244.

5. Jack Faucett Associates, Inc., Multiregional Input-Output Accounts, Volume 1, Introduction and Summary, Chevy Chase, MD, July, 1983 (see specifically, pp. 96-101 and "MRIO's Mathematical Formulation", pp. B-17 to B-29).

6. Jeffrey K. Young, "The Multiregional Input Output Price Model: Transportation Case Study", Masters of City Planning Thesis, MIT, Cambridge, MA, Sept., 1978.

7. Faucett, op. cit.

8. Ronald E. Miller and Peter D. Blair, Input Output Analysis: Foundations and Extensions, Prentice Hall, Englewood Cliffs, NJ, 1985.

9. Young, op. cit.

10. Young, op. cit.

11. Young, op. cit.

12. Young, op. cit., p. 39.

13. Young, op. cit., p. 43.

14. Young, op. cit., p. 49.

Chapter 5

THE PRACTICAL LINKING OF THE ECONOMIC IMPACT AND THE MULTIREGIONAL
INPUT-OUTPUT MODEL

The linking of the Multiregional Input-Output Model (MRIO) and the theory of regulatory impact was explained in Chapter 4. This chapter will detail the mechanics of that linkage.

The MRIO model consists of 125 economic sectors. These sectors are aggregates of industries classified on an SIC (Standard Industrial Classification) basis. These sectors, in turn, produce and use as inputs products which are shipped by truck. In order to determine what rate would be charged to the products produced by each of the MRIO sectors, it was necessary to determine the class[1] of each MRIO sector.

The National Motor Freight Traffic Association has produced a computer tape which matches the national motor freight classification item number (which is the name of a particular article/commodity) with the commodity's seven digit STCC (Standard Transportation Commodity Code). Utilizing a "bridge" produced by the US Department of Commerce, Bureau of the Census,[2] the STCC's were matched to SIC's.

The National Motor Freight Classification[3] gives the class of each item/commodity. Through the above described linkage, the motor freight class of each SIC was determined.

Since each MRIO is an aggregation of SIC's, the class of each SIC in each state was weighted by the production of each SIC in each respective state to give the weighted class for each MRIO in each state. Since this weighted class would likely fall between the actual classes, e.g., classes between 50 and 125 read 55, 60, 65, 70, 77.5, 85, 92.5, 100, and 110, a MRIO sector was assigned to its nearest class. Because of the different economic constituency of each MRIO sector in each state (although the same SIC's exist, different levels of economic activity by SIC exist by state), the class of MRIO sector i in state j may be different from the class of MRIO sector i in state k. The list of MRIO sectors by state and class for the states used in the analysis herein are given in Table 5-1 through Table 5-20. New England classes are converted to the national types of classes (those shown above) via a conversion table provided by Numerax Inc.[4]

Not only does class influence rate but so does shipment size. Using the 1977 Census of Transportation, average shipment sizes are calculated by STCC which are matched with SIC's and then weighted within each MRIO to give the MRIO's average shipment size. Since information was only available to calculate national shipment sizes, these were calculated on a national basis but then distributed across states based on a state's production level of a particular SIC. Because of the different percentage constituency

TABLE 5-1

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Alabama

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.9826	53	92.5	10000	.9824
22	77.5	10000	.9902	54	65	10000	.9992
23	77.5	10000	.9902	55	70	10000	.9961
24	65	10000	.9992	56	70	1000	.9868
25	85	5000	.9667	57	70	5000	.9783
26	77.5	10000	.9902	58	77.5	1000	.9726
27	92.5	10000	.9824	59	85	5000	.9667
28	70	1000	.9868	60	92.5	1000	.9764
29	85	1000	.9799	61	85	1000	.9799
30	92.5	1000	.9764	62	92.5	1000	.9764
31	85	5000	.9667	63	85	1000	.9799
32	100	1000	.9790	64	85	1000	.9799
33	110	1000	.9741	65	85	1000	.9799
34	100	1000	.9790	66	85	1000	.9799
35	65	10000	.9992	67	85	1000	.9799
36	70	10000	.9961	68	100	1000	.9790
37	100	10000	.9794	69	92.5	1000	.9764
38	92.5	1000	.9764	70	77.5	1000	.9726
39	92.5	1000	.9764	71	92.5	1000	.9764
40	77.5	10000	.9902	72	77.5	1000	.9726
41	92.5	1000	.9764	73	100	1000	.9790
42	70	10000	.9961	74	100	1000	.9790
43	77.5	10000	.9902	75	92.5	1000	.9764
44	70	1000	.9868	76	85	1000	.9799
45	77.5	5000	.9735	77	100	1000	.9790
46	85	5000	.9667	78	100	1000	.9790
47	85	1000	.9799	79	100	1000	.9790
48	85	1000	.9799	80	92.5	1000	.9764
49	70	1000	.9868	81	92.5	1000	.9764
50	60	10000	1	82	100	1000	.9790
51	77.5	1000	.9726	83	100	1000	.9790
52	92.5	1000	.9764	84	92.5	1000	.9764

All other rates for MRIO sectors equal 1

TABLE 5-2

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Georgia

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.9106	53	92.5	10000	.9099
22	77.5	10000	.9079	54	70	10000	.9097
23	77.5	10000	.9079	55	70	10000	.9097
24	70	10000	.9097	56	70	1000	.9023
25	92.5	5000	.9098	57	70	1000	.9023
26	77.5	10000	.9079	58	85	5000	.9115
27	70	10000	.9097	59	85	1000	.9045
28	70	1000	.9023	60	92.5	1000	.9032
29	85	1000	.9045	61	92.5	1000	.9032
30	92.5	1000	.9032	62	92.5	1000	.9032
31	92.5	5000	.9098	63	77.5	1000	.9035
32	100	1000	.9049	64	77.5	1000	.9035
33	110	1000	.9055	65	92.5	1000	.9032
34	100	1000	.9049	66	92.5	1000	.9032
35	65	10000	.9115	67	85	1000	.9045
36	70	10000	.9097	68	100	1000	.9049
37	92.5	10000	.9099	69	92.5	1000	.9032
38	92.5	1000	.9032	70	85	1000	.9045
39	92.5	1000	.9032	71	92.5	1000	.9032
40	77.5	10000	.9079	72	85	1000	.9045
41	92.5	1000	.9032	73	100	1000	.9049
42	70	10000	.9097	74	100	1000	.9049
43	70	10000	.9097	75	92.5	1000	.9032
44	70	1000	.9023	76	85	1000	.9045
45	70	1000	.9023	77	100	1000	.9049
46	77.5	5000	.9078	78	100	1000	.9049
47	85	1000	.9045	79	100	1000	.9049
48	77.5	1000	.9035	80	92.5	1000	.9032
49	70	1000	.9023	81	110	1000	.9055
50	65	10000	.9115	82	92.5	1000	.9032
51	77.5	1000	.9035	83	100	1000	.9049
52	92.5	1000	.9032	84	92.5	1000	.9032

All other rates for MRIO sectors equal 1

TABLE 5-3

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Illinois

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.7355	53	92.5	10000	.7254
22	77.5	10000	.7445	54	77.5	5000	.6618
23	70	5000	.6827	55	70	10000	.7675
24	70	10000	.7675	56	70	1000	.7146
25	92.5	5000	.6475	57	70	1000	.7146
26	77.5	10000	.7445	58	85	1000	.6996
27	77.5	10000	.7445	59	85	1000	.6996
28	70	1000	.7146	60	85	1000	.6996
29	85	5000	.6551	61	92.5	1000	.7028
30	85	1000	.6996	62	92.5	1000	.7028
31	92.5	5000	.6475	63	85	1000	.6996
32	100	1000	.7028	64	85	1000	.6996
33	110	1000	.6792	65	92.5	1000	.7028
34	100	1000	.7028	66	92.5	1000	.7028
35	70	10000	.7675	67	92.5	1000	.7028
36	85	10000	.7355	68	100	1000	.7028
37	110	10000	.7253	69	92.5	1000	.7028
38	92.5	1000	.7028	70	85	1000	.6996
39	92.5	1000	.7028	71	92.5	1000	.7028
40	77.5	5000	.6618	72	85	1000	.6996
41	92.5	1000	.7028	73	100	1000	.7028
42	70	5000	.6827	74	92.5	1000	.7028
43	77.5	10000	.7445	75	92.5	1000	.7028
44	70	1000	.7146	76	85	1000	.6996
45	70	5000	.6827	77	100	1000	.7028
46	77.5	5000	.6618	78	100	1000	.7028
47	85	1000	.6996	79	92.5	1000	.7028
48	77.5	1000	.7018	80	92.5	1000	.7028
49	70	1000	.7146	81	85	1000	.6996
50	60	10000	.7849	82	100	1000	.7028
51	77.5	1000	.7018	83	110	1000	.6792
52	92.5	1000	.7028	84	92.5	1000	.7028

All other rates for MRIO sectors equal 1

TABLE 5-4

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier
Rate Relative to Present Discounted Intrastate Motor Carrier Rate
(= 1) for each MRIO in Iowa

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.8038	53	85	10000	.8038
22	70	10000	.8264	54	65	10000	.8367
23	85	10000	.8038	55	70	10000	.8264
24	65	10000	.8367	56	70	1000	1
25	92.5	5000	.8603	57	77.5	1000	.9971
26	77.5	10000	.8137	58	85	1000	.9915
27	92.5	10000	.8007	59	85	1000	.9915
28	65	1000	1	60	92.5	1000	.9947
29	85	5000	.8619	61	92.5	1000	.9947
30	92.5	1000	.9947	62	92.5	1000	.9947
31	85	1000	.9915	63	85	1000	.9915
32	100	1000	.9886	64	85	1000	.9915
33	110	1000	1	65	92.5	1000	.9947
34	110	1000	1	66	92.5	1000	.9947
35	70	10000	.8264	67	92.5	1000	.9947
36	85	1000	.9915	68	100	1000	.9886
37	110	5000	.8545	69	92.5	1000	.9947
38	92.5	1000	.9947	70	77.5	1000	.9971
39	92.5	1000	.9947	71	92.5	1000	.9947
40	77.5	1000	.9971	72	70	1000	1
41	92.5	1000	.9947	73	100	1000	.9886
42	70	1000	1	74	100	1000	.9886
43	70	10000	.8264	75	92.5	1000	.9947
44	70	1000	1	76	77.5	1000	.9971
45	77.5	1000	.9971	77	92.5	1000	.9947
46	77.5	5000	.8712	78	100	1000	.9886
47	85	1000	.9915	79	92.5	1000	.9947
48	85	1000	.9915	80	92.5	1000	.9947
49	70	1000	1	81	85	1000	.9915
50	60	10000	.8467	82	100	1000	.9886
51	77.5	1000	.9971	83	110	1000	1
52	77.5	1000	.9971	84	92.5	1000	.9947

All other rates for MRIO sectors equal 1

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TABLE 5-5

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Kentucky

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.8147	53	92.5	1000	.8812
22	70	10000	.8370	54	70	10000	.8370
23	65	5000	.8437	55	65	10000	.8316
24	65	10000	.8316	56	70	1000	.8756
25	85	5000	.8367	57	70	5000	.8506
26	70	10000	.8370	58	85	1000	.8762
27	85	10000	.8147	59	85	1000	.8762
28	70	1000	.8756	60	85	1000	.8762
29	77.5	10000	.8255	61	92.5	1000	.8812
30	92.5	1000	.8812	62	92.5	1000	.8812
31	92.5	1000	.8812	63	85	1000	.8762
32	110	1000	.8833	64	77.5	1000	.8738
33	110	1000	.8833	65	85	1000	.8762
34	100	1000	.8763	66	92.5	1000	.8812
35	70	10000	.8370	67	92.5	1000	.8812
36	77.5	10000	.8255	68	100	1000	.8763
37	100	10000	.8009	69	92.5	1000	.8812
38	92.5	1000	.8812	70	77.5	1000	.8738
39	92.5	1000	.8812	71	92.5	1000	.8812
40	77.5	5000	.8411	72	110	1000	.8833
41	92.5	1000	.8812	73	100	1000	.8763
42	70	10000	.8370	74	100	1000	.8763
43	77.5	10000	.8255	75	100	1000	.8763
44	65	1000	.8636	76	70	1000	.8756
45	70	10000	.8370	77	92.5	1000	.8812
46	77.5	5000	.8411	78	100	1000	.8763
47	85	1000	.8762	79	92.5	1000	.8812
48	77.5	1000	.8738	80	92.5	1000	.8812
49	70	1000	.8756	81	100	1000	.8763
50	60	10000	.8377	82	92.5	1000	.8812
51	77.5	1000	.8738	83	110	1000	.8833
52	92.5	1000	.8812	84	92.5	1000	.8812

All other rates for MRIO sectors equal 1

TABLE 5-6

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Louisiana

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.7713	53	92.5	10000	.7674
22	70	10000	.7651	54	65	10000	.7623
23	77.5	10000	.7678	55	70	10000	.7651
24	60	10000	.7634	56	70	1000	.7826
25	85	5000	.7261	57	70	5000	.7222
26	60	10000	.7634	58	85	1000	.7731
27	85	10000	.7713	59	70	5000	.7222
28	77.5	5000	.7228	60	85	1000	.7731
29	85	5000	.7261	61	92.5	1000	.7716
30	92.5	1000	.7716	62	85	1000	.7731
31	92.5	1000	.7716	63	77.5	1000	.7762
32	100	1000	.7688	64	85	1000	.7731
33	110	1000	.7656	65	100	1000	.7688
34	85	1000	.7731	66	92.5	1000	.7716
35	65	10000	.7623	67	85	1000	.7731
36	70	10000	.7826	68	100	1000	.7688
37	100	10000	.7709	69	100	1000	.7688
38	85	1000	.7731	70	77.5	1000	.7762
39	92.5	1000	.7716	71	92.5	1000	.7716
40	77.5	10000	.7678	72	77.5	1000	.7762
41	92.5	1000	.7716	73	100	1000	.7688
42	70	10000	.7651	74	92.5	1000	.7716
43	70	10000	.7651	75	92.5	1000	.7716
44	70	1000	.7826	76	60	1000	.7874
45	70	10000	.7651	77	110	1000	.7656
46	77.5	5000	.7228	78	100	1000	.7688
47	85	1000	.7731	79	70	1000	.7826
48	77.5	1000	.7762	80	92.5	1000	.7716
49	70	1000	.7826	81	92.5	1000	.7716
50	60	10000	.7634	82	110	1000	.7656
51	77.5	1000	.7762	83	100	1000	.7688
52	77.5	1000	.7762	84	92.5	1000	.7716

All other rates for MRIO sectors equal 1

TABLE 5-7

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Massachusetts

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.6570	53	92.5	10000	.6473
22	77.5	10000	.6570	54	70	1000	.5976
23	85	10000	.6570	55	65	1000	.5976
24	77.5	1000	.5991	56	70	1000	.5976
25	85	5000	.6282	57	70	1000	.5976
26	70	10000	.6571	58	85	1000	.5991
27	85	10000	.6570	59	85	1000	.5991
28	70	1000	.5976	60	92.5	1000	.6001
29	85	5000	.6282	61	92.5	1000	.6001
30	92.5	1000	.6001	62	92.5	1000	.6001
31	85	1000	.5991	63	77.5	1000	.5991
32	85	1000	.5991	64	77.5	1000	.5991
33	110	1000	.6015	65	92.5	1000	.6001
34	100	1000	.6001	66	85	1000	.5991
35	70	10000	.6571	67	92.5	1000	.6001
36	85	10000	.6570	68	100	1000	.6001
37	110	10000	.6380	69	92.5	1000	.6001
38	92.5	1000	.6001	70	85	1000	.5991
39	92.5	1000	.6001	71	92.5	1000	.6001
40	70	5000	.6283	72	92.5	1000	.6001
41	92.5	1000	.6001	73	100	1000	.6001
42	70	10000	.6571	74	100	1000	.6001
43	77.5	10000	.6570	75	92.5	1000	.6001
44	70	1000	.5976	76	100	1000	.6001
45	70	1000	.5976	77	110	1000	.6015
46	77.5	5000	.6282	78	100	1000	.6001
47	85	1000	.5991	79	92.5	1000	.6001
48	77.5	1000	.5991	80	92.5	1000	.6001
49	70	1000	.5976	81	92.5	1000	.6001
50	60	10000	.6571	82	100	1000	.6001
51	77.5	1000	.5991	83	110	1000	.6015
52	85	1000	.5991	84	92.5	1000	.6001

All other rates for MRIO sectors equal 1

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TABLE 5-8

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Minnesota

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.6867	53	92.5	10000	.6847
22	77.5	10000	.6952	54	70	5000	.7526
23	85	10000	.6867	55	70	10000	.6982
24	70	10000	.6982	56	70	1000	.7407
25	85	5000	.7434	57	85	1000	.7090
26	70	10000	.6982	58	85	5000	.7434
27	77.5	10000	.6952	59	77.5	5000	.7540
28	70	1000	.7407	60	85	1000	.7090
29	85	5000	.7434	61	92.5	1000	.6985
30	92.5	1000	.6985	62	92.5	1000	.6985
31	85	1000	.7090	63	85	1000	.7090
32	85	1000	.7090	64	85	1000	.7090
33	110	1000	.6787	65	85	1000	.7090
34	100	1000	.6909	66	92.5	1000	.6985
35	65	10000	.7046	67	92.5	1000	.6985
36	77.5	5000	.7540	68	100	1000	.6909
37	100	5000	.7339	69	92.5	1000	.6985
38	100	1000	.6909	70	85	1000	.7090
39	100	1000	.6909	71	92.5	1000	.6985
40	70	5000	.7526	72	85	1000	.7090
41	92.5	1000	.6985	73	100	1000	.6909
42	70	10000	.6982	74	100	1000	.6909
43	70	10000	.6982	75	92.5	1000	.6985
44	65	1000	.7505	76	92.5	1000	.6985
45	77.5	1000	.7239	77	100	1000	.6909
46	77.5	5000	.7540	78	100	1000	.6909
47	85	1000	.7090	79	92.5	1000	.6985
48	77.5	1000	.7239	80	92.5	1000	.6985
49	70	1000	.7407	81	92.5	1000	.6985
50	60	10000	.7101	82	100	1000	.6909
51	77.5	1000	.7239	83	100	1000	.6909
52	92.5	1000	.6985	84	92.5	1000	.6985

All other rates for MRIO sectors equal 1

TABLE 5-9

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Mississippi

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.9112	53	92.5	10000	.9125
22	85	10000	.9112	54	70	10000	.9195
23	92.5	10000	.9125	55	65	10000	.9143
24	65	10000	.9143	56	70	1000	.8438
25	92.5	5000	.8841	57	77.5	1000	.8359
26	70	10000	.9195	58	85	1000	.8360
27	85	10000	.9112	59	77.5	5000	.8817
28	65	1000	.8454	60	92.5	1000	.8318
29	85	5000	.8797	61	92.5	1000	.8318
30	92.5	1000	.8318	62	100	1000	.8372
31	92.5	1000	.8318	63	77.5	1000	.8359
32	110	1000	.8332	64	77.5	1000	.8359
33	110	1000	.8332	65	85	1000	.8360
34	100	1000	.8372	66	92.5	1000	.8318
35	70	10000	.9195	67	85	1000	.8360
36	77.5	10000	.9139	68	100	1000	.8372
37	100	10000	.9078	69	92.5	1000	.8318
38	85	1000	.8360	70	77.5	1000	.8359
39	100	1000	.8372	71	92.5	1000	.8318
40	70	10000	.9195	72	92.5	1000	.8318
41	92.5	1000	.8318	73	100	1000	.8372
42	70	10000	.9195	74	100	1000	.8372
43	77.5	10000	.9139	75	92.5	1000	.8318
44	70	1000	.8438	76	77.5	1000	.8359
45	70	5000	.8936	77	85	1000	.8360
46	77.5	5000	.8817	78	100	1000	.8372
47	85	1000	.8360	79	92.5	1000	.8318
48	77.5	1000	.8359	80	92.5	1000	.8318
49	70	1000	.8438	81	92.5	1000	.8318
50	60	10000	.9148	82	100	1000	.8372
51	77.5	1000	.8359	83	100	1000	.8372
52	92.5	1000	.8318	84	92.5	1000	.8318

All other rates for MRIO sectors equal 1

TABLE 5-10

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier Rate Relative to Present Discounted Intrastate Motor Carrier Rate (= 1) for each MRIO in Nevada

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.7117	53	92.5	10000	.6980
22	70	10000	.7436	54	65	10000	.7654
23	85	10000	.7117	55	70	10000	.7436
24	77.5	10000	.7287	56	70	1000	.8516
25	92.5	5000	.7727	57	70	10000	.7436
26	70	10000	.7436	58	77.5	1000	.8356
27	92.5	10000	.6980	59	60	10000	.7961
28	70	1000	.8516	60	70	1000	.8516
29	85	5000	.7797	61	92.5	1000	.8109
30	92.5	1000	.8109	62	92.5	1000	.8109
31	92.5	1000	.8109	63	85	1000	.8233
32	100	1000	.8016	64	85	1000	.8233
33	110	1000	.8000	65	85	1000	.8233
34	100	1000	.8016	66	100	1000	.8016
35	70	10000	.7436	67	85	1000	.8233
36	92.5	1000	.8109	68	100	1000	.8016
37	100	1000	.8016	69	100	1000	.8016
38	92.5	1000	.8109	70	85	1000	.8233
39	92.5	1000	.8109	71	92.5	1000	.8109
40	77.5	10000	.7287	72	92.5	1000	.8109
41	92.5	1000	.8109	73	100	1000	.8016
42	70	10000	.7436	74	100	1000	.8016
43	77.5	10000	.7287	75	92.5	1000	.8109
44	70	1000	.8516	76	85	1000	.8233
45	70	5000	.8033	77	85	1000	.8233
46	77.5	5000	.7901	78	100	1000	.8016
47	85	1000	.8233	79	92.5	1000	.8109
48	77.5	1000	.8356	80	92.5	1000	.8109
49	70	1000	.8516	81	92.5	1000	.8109
50	60	10000	.7961	82	100	1000	.8016
51	77.5	1000	.8356	83	110	1000	.8000
52	92.5	1000	.8109	84	92.5	1000	.8109

All other rates for MRIO sectors equal 1

TABLE 5-11

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier Rate Relative to Present Discounted Intrastate Motor Carrier Rate (= 1) for each MRIO in New Hampshire

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.5845	53	92.5	10000	.5850
22	77.5	10000	.5845	54	77.5	1000	.5868
23	85	10000	.5845	55	65	10000	.5866
24	70	10000	.5866	56	70	1000	.5866
25	92.5	5000	.5850	57	77.5	1000	.5868
26	70	10000	.5866	58	85	1000	.5868
27	85	10000	.5845	59	77.5	5000	.5845
28	70	1000	.5866	60	85	1000	.5868
29	85	5000	.5845	61	92.5	1000	.5862
30	92.5	1000	.5862	62	92.5	1000	.5862
31	92.5	1000	.5862	63	77.5	1000	.5868
32	100	1000	.5862	64	85	1000	.5868
33	110	1000	.5848	65	92.5	1000	.5862
34	100	1000	.5862	66	85	1000	.5868
35	65	10000	.5866	67	85	1000	.5868
36	85	1000	.5868	68	100	1000	.5862
37	100	1000	.5862	69	92.5	1000	.5862
38	92.5	1000	.5862	70	92.5	1000	.5862
39	92.5	1000	.5862	71	92.5	1000	.5862
40	70	1000	.5866	72	85	1000	.5868
41	92.5	1000	.5862	73	100	1000	.5862
42	70	5000	.5866	74	100	1000	.5862
43	70	10000	.5866	75	92.5	1000	.5862
44	70	1000	.5866	76	92.5	1000	.5862
45	70	1000	.5866	77	100	1000	.5862
46	77.5	5000	.5845	78	100	1000	.5862
47	85	1000	.5868	79	92.5	1000	.5862
48	77.5	1000	.5868	80	92.5	1000	.5862
49	70	1000	.5866	81	92.5	1000	.5862
50	60	10000	.5866	82	110	1000	.5848
51	77.5	1000	.5868	83	110	1000	.5848
52	92.5	1000	.5862	84	100	1000	.5862

All other rates for MRIO sectors equal 1

TABLE 5-12

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier Rate Relative to Present Discounted Intrastate Motor Carrier Rate (= 1) for each MRIO in New Mexico

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.8149	53	92.5	10000	.8074
22	77.5	10000	.8254	54	70	10000	.8391
23	85	10000	.8149	55	65	10000	.8529
24	65	10000	.8529	56	70	1000	.8610
25	92.5	5000	.8212	57	77.5	5000	.8392
26	70	10000	.8391	58	85	1000	.8403
27	92.5	10000	.8074	59	65	10000	.8529
28	70	1000	.8610	60	85	1000	.8403
29	85	5000	.8272	61	92.5	1000	.8320
30	92.5	1000	.8320	62	92.5	1000	.8320
31	92.5	1000	.8320	63	77.5	1000	.8485
32	100	1000	.8239	64	85	1000	.8403
33	100	1000	.8239	65	85	1000	.8403
34	100	1000	.8239	66	92.5	1000	.8320
35	65	10000	.8529	67	92.5	1000	.8320
36	85	1000	.8403	68	100	1000	.8239
37	100	1000	.8239	69	92.5	1000	.8320
38	92.5	1000	.8320	70	85	1000	.8403
39	92.5	1000	.8320	71	92.5	1000	.8320
40	77.5	10000	.8254	72	92.5	1000	.8320
41	92.5	1000	.8320	73	100	1000	.8239
42	65	10000	.8529	74	100	1000	.8239
43	77.5	10000	.8254	75	92.5	1000	.8320
44	70	1000	.8610	76	85	1000	.8403
45	70	5000	.8521	77	100	1000	.8239
46	77.5	5000	.8392	78	100	1000	.8239
47	85	1000	.8403	79	92.5	1000	.8320
48	77.5	1000	.8485	80	92.5	1000	.8320
49	70	1000	.8610	81	92.5	1000	.8320
50	60	10000	.8687	82	100	1000	.8239
51	77.5	1000	.8485	83	110	1000	.8251
52	92.5	1000	.8320	84	100	1000	.8239

All other rates for MRIO sectors equal 1

TABLE 5-13

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in New York

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.9219	53	92.5	10000	.9263
22	77.5	10000	.9170	54	70	10000	.9102
23	77.5	10000	.9170	55	70	10000	.9102
24	70	10000	.9102	56	70	1000	.8639
25	85	5000	.9003	57	70	1000	.8639
26	65	10000	.9056	58	85	1000	.8549
27	70	10000	.9102	59	85	1000	.8549
28	70	1000	.9102	60	85	1000	.8549
29	77.5	1000	.8574	61	92.5	1000	.8509
30	92.5	1000	.8509	62	92.5	1000	.8509
31	92.5	1000	.8509	63	85	1000	.8549
32	92.5	1000	.8509	64	85	1000	.8549
33	110	1000	.8610	65	92.5	1000	.8509
34	100	1000	.8610	66	85	1000	.8549
35	70	10000	.9102	67	92.5	1000	.8509
36	85	10000	.9219	68	100	1000	.8610
37	100	10000	.9399	69	92.5	1000	.8509
38	92.5	1000	.8509	70	85	1000	.8549
39	92.5	1000	.8509	71	92.5	1000	.8509
40	77.5	5000	.8946	72	85	1000	.8549
41	92.5	1000	.8509	73	100	1000	.8610
42	65	5000	.8846	74	100	1000	.8610
43	77.5	10000	.9170	75	92.5	1000	.8509
44	65	1000	.8644	76	92.5	1000	.8509
45	70	1000	.8639	77	100	1000	.8610
46	77.5	5000	.8946	78	100	1000	.8610
47	85	1000	.8549	79	92.5	1000	.8509
48	85	1000	.8549	80	92.5	1000	.8509
49	70	1000	.8639	81	92.5	1000	.8509
50	60	10000	.8991	82	100	1000	.8610
51	77.5	1000	.8574	83	110	1000	.8610
52	85	1000	.8549	84	92.5	1000	.8509

All other rates for MRIO sectors equal 1

TABLE 5-14

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Oklahoma

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.8842	53	92.5	10000	.8789
22	77.5	10000	.8884	54	65	10000	.9002
23	85	10000	.8842	55	77.5	1000	1.
24	65	10000	.9002	56	70	1000	1.
25	85	5000	.9239	57	70	5000	.9298
26	77.5	10000	.8884	58	85	1000	1.
27	92.5	10000	.8789	59	85	1000	1.
28	70	5000	.9298	60	85	1000	1.
29	85	5000	.9239	61	92.5	1000	1.
30	92.5	1000	1.	62	92.5	1000	1.
31	100	1000	1.	63	77.5	1000	1.
32	100	1000	1.	64	92.5	1000	1.
33	110	1000	1.	65	85	1000	1.
34	100	1000	1.	66	85	1000	1.
35	70	10000	.8893	67	92.5	1000	1.
36	77.5	10000	.8884	68	100	1000	1.
37	100	10000	.8774	69	92.5	1000	1.
38	92.5	1000	1.	70	85	1000	1.
39	92.5	1000	1.	71	92.5	1000	1.
40	77.5	10000	.8884	72	77.5	1000	1.
41	92.5	1000	1.	73	100	1000	1.
42	70	10000	.8893	74	100	1000	1.
43	77.5	10000	.8884	75	92.5	1000	1.
44	70	1000	1.	76	92.5	1000	1.
45	70	5000	.9298	77	92.5	1000	1.
46	77.5	5000	.9285	78	100	1000	1.
47	85	1000	1.	79	92.5	1000	1.
48	77.5	1000	1.	80	92.5	1000	1.
49	70	1000	1.	81	92.5	1000	1.
50	60	10000	.9002	82	100	1000	1.
51	77.5	1000	1.	83	110	1000	1.
52	92.5	1000	1.	84	92.5	1000	1.

All other rates for MRIO sectors equal 1

TABLE 5-15

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Pennsylvania

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.9286	53	92.5	10000	.9280
22	77.5	10000	.9300	54	70	10000	.9380
23	77.5	10000	.9300	55	70	10000	.9380
24	70	10000	.9380	56	70	1000	.8973
25	92.5	5000	.9049	57	70	1000	.8973
26	70	10000	.9380	58	85	1000	.9051
27	77.5	10000	.9300	59	77.5	1000	.9003
28	70	1000	.8973	60	85	1000	.9051
29	85	10000	.9286	61	92.5	1000	.9121
30	92.5	1000	.9121	62	85	1000	.9051
31	92.5	1000	.9121	63	85	1000	.9051
32	92.5	1000	.9121	64	77.5	1000	.9003
33	110	1000	.9132	65	85	1000	.9051
34	100	1000	.9132	66	85	1000	.9051
35	70	10000	.9380	67	92.5	1000	.9121
36	85	10000	.9286	68	100	1000	.9132
37	100	10000	.9269	69	92.5	1000	.9121
38	100	1000	.9132	70	77.5	1000	.9003
39	92.5	1000	.9121	71	92.5	1000	.9121
40	77.5	5000	.9068	72	92.5	1000	.9121
41	92.5	1000	.9121	73	100	1000	.9132
42	70	1000	.8973	74	100	1000	.9132
43	77.5	10000	.9300	75	92.5	1000	.9121
44	70	1000	.8973	76	77.5	1000	.9003
45	77.5	5000	.9068	77	110	1000	.9132
46	85	5000	.9051	78	100	1000	.9132
47	85	1000	.9051	79	92.5	1000	.9121
48	70	1000	.8973	80	92.5	1000	.9121
49	70	1000	.8973	81	92.5	1000	.9121
50	60	10000	.9474	82	100	1000	.9132
51	77.5	1000	.9003	83	100	1000	.9132
52	92.5	1000	.9121	84	92.5	1000	.9121

All other rates for MRIO sectors equal 1

TABLE 5-16

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Rhode Island

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.7922	53	92.5	10000	.7781
22	77.5	10000	.7844	54	85	1000	.6899
23	92.5	10000	.7781	55	65	10000	.7956
24	70	10000	.8006	56	70	1000	.6860
25	85	5000	.7409	57	70	1000	.6860
26	70	10000	.8006	58	77.5	1000	.6839
27	85	10000	.7922	59	77.5	5000	.7340
28	70	1000	.6860	60	100	1000	.6903
29	85	5000	.7409	61	92.5	1000	.6852
30	85	1000	.6899	62	92.5	1000	.6852
31	92.5	1000	.6852	63	85	1000	.6899
32	85	1000	.6899	64	85	1000	.6899
33	110	1000	.6749	65	92.5	1000	.6852
34	92.5	1000	.6852	66	85	1000	.6899
35	70	10000	.8006	67	85	1000	.6899
36	85	5000	.7409	68	100	1000	.6903
37	100	5000	.7341	69	92.5	1000	.6852
38	92.5	1000	.6852	70	92.5	1000	.6852
39	92.5	1000	.6852	71	92.5	1000	.6852
40	77.5	1000	.6839	72	85	1000	.6899
41	92.5	1000	.6852	73	100	1000	.6903
42	70	10000	.8006	74	100	1000	.6903
43	70	10000	.8006	75	92.5	1000	.6852
44	70	1000	.6860	76	85	1000	.6899
45	70	5000	.7484	77	85	1000	.6899
46	77.5	5000	.7340	78	100	1000	.6903
47	85	1000	.6899	79	92.5	1000	.6852
48	85	1000	.6899	80	92.5	1000	.6852
49	70	1000	.6860	81	92.5	1000	.6852
50	60	10000	.7890	82	92.5	1000	.6903
51	77.5	1000	.6839	83	110	1000	.6749
52	92.5	1000	.6852	84	92.5	1000	.6852

All other rates for MRIO sectors equal 1

TABLE 5-17

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in South Dakota

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	1	53	92.5	10000	1
22	70	10000	1	54	77.5	1000	.9998
23	85	10000	1	55	77.5	10000	1
24	70	10000	1	56	70	1000	1
25	92.5	5000	1	57	77.5	5000	1.
26	70	10000	1	58	85	1000	.9845
27	85	10000	1	59	85	1000	.9845
28	70	1000	1	60	85	1000	.9845
29	85	5000	1.	61	92.5	1000	.9758
30	92.5	1000	.9758	62	92.5	1000	.9758
31	92.5	1000	.9758	63	85	1000	.9845
32	100	1000	.9689	64	85	1000	.9845
33	110	1000	.9569	65	92.5	1000	.9758
34	100	1000	.9689	66	85	1000	.9845
35	70	10000	1	67	85	1000	.9845
36	77.5	10000	1	68	100	1000	.9689
37	100	10000	1	69	92.5	1000	.9758
38	92.5	1000	.9758	70	85	1000	.9845
39	92.5	1000	.9758	71	92.5	1000	.9758
40	77.5	10000	1	72	92.5	1000	.9758
41	92.5	1000	.9758	73	100	1000	.9689
42	70	10000	1	74	100	1000	.9689
43	70	10000	1	75	92.5	1000	.9758
44	70	1000	1	76	85	1000	.9845
45	70	5000	1.	77	100	1000	.9689
46	77.5	5000	1.	78	100	1000	.9689
47	85	1000	.9845	79	92.5	1000	.9758
48	77.5	1000	.9998	80	92.5	1000	.9758
49	70	1000	1	81	92.5	1000	.9758
50	60	10000	1.	82	100	1000	.9689
51	77.5	1000	.9998	83	110	1000	.9569
52	92.5	1000	.9758	84	100	1000	.9689

All other rates for MRIO sectors equal 1

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TABLE 5-18

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Texas

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.5728	53	92.5	10000	.5695
22	77.5	10000	.5749	54	65	10000	.5843
23	77.5	10000	.5749	55	70	10000	.5796
24	65	10000	.5843	56	70	1000	.7600
25	92.5	5000	.6726	57	70	10000	.5796
26	65	10000	.5843	58	85	1000	.7492
27	77.5	10000	.5749	59	77.5	5000	.6787
28	70	1000	.7600	60	85	1000	.7492
29	85	5000	.6770	61	92.5	1000	.7444
30	85	1000	.7492	62	92.5	1000	.7444
31	92.5	5000	.6726	63	77.5	1000	.7534
32	100	1000	.7409	64	85	1000	.7492
33	110	1000	.7400	65	92.5	1000	.7444
34	110	1000	.7400	66	92.5	1000	.7444
35	65	10000	.5843	67	92.5	1000	.7444
36	77.5	10000	.5749	68	100	1000	.7409
37	100	10000	.5677	69	92.5	1000	.7444
38	92.5	1000	.7444	70	85	1000	.7492
39	92.5	1000	.7444	71	92.5	1000	.7444
40	77.5	5000	.6787	72	92.5	1000	.7444
41	92.5	1000	.7444	73	100	1000	.7409
42	70	10000	.5796	74	100	1000	.7409
43	70	10000	.5796	75	92.5	1000	.7444
44	70	1000	.7600	76	85	1000	.7492
45	70	1000	.7600	77	110	1000	.7400
46	77.5	5000	.6787	78	100	1000	.7409
47	85	1000	.7492	79	92.5	1000	.7444
48	77.5	1000	.7534	80	92.5	1000	.7444
49	70	1000	.7600	81	92.5	1000	.7444
50	60	10000	.5886	82	100	1000	.7409
51	77.5	1000	.7534	83	110	1000	.7400
52	92.5	1000	.7444	84	92.5	1000	.7444

All other rates for MRIO sectors equal 1

TABLE 5-19

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in Washington

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.7306	53	92.5	10000	.7222
22	77.5	10000	.7232	54	65	10000	.7276
23	85	10000	.7306	55	70	10000	.7332
24	65	10000	.7276	56	70	1000	.8236
25	92.5	5000	.7688	57	70	10000	.7332
26	77.5	10000	.7232	58	92.5	10000	.7222
27	77.5	10000	.7232	59	77.5	5000	.7694
28	70	1000	.8236	60	92.5	1000	.8125
29	85	5000	.7768	61	92.5	1000	.8125
30	110	1000	.8165	62	85	1000	.8210
31	85	1000	.8210	63	85	1000	.8210
32	100	1000	.8191	64	92.5	1000	.8125
33	110	1000	.8165	65	85	1000	.8210
34	92.5	1000	.8125	66	85	1000	.8210
35	65	10000	.7276	67	85	1000	.8210
36	77.5	10000	.7232	68	100	1000	.8191
37	100	10000	.7286	69	92.5	1000	.8125
38	92.5	1000	.8125	70	92.5	1000	.8125
39	100	1000	.8191	71	92.5	1000	.8125
40	70	10000	.7332	72	100	1000	.8191
41	92.5	1000	.8125	73	100	1000	.8191
42	70	10000	.7332	74	92.5	1000	.8125
43	77.5	10000	.7232	75	92.5	1000	.8125
44	77.5	1000	.8134	76	100	1000	.8191
45	70	5000	.7797	77	110	1000	.8165
46	77.5	5000	.7694	78	100	1000	.8191
47	85	1000	.8210	79	92.5	1000	.8125
48	77.5	1000	.8134	80	92.5	1000	.8125
49	70	1000	.8236	81	92.5	1000	.8125
50	60	10000	.7353	82	100	1000	.8191
51	77.5	1000	.8134	83	110	1000	.8165
52	85	1000	.8210	84	92.5	1000	.8125

All other rates for MRIO sectors equal 1

TABLE 5-20

Weight, Class, and Predicted Deregulated Intrastate Motor Carrier

Rate Relative to Present Discounted Intrastate Motor Carrier Rate

(= 1) for each MRIO in West Virginia

MRIO	Class	Weight	Rate	MRIO	Class	Weight	Rate
21	85	10000	.7527	53	92.5	1000	.9748
22	77.5	10000	.7646	54	70	10000	.7800
23	85	10000	.7527	55	65	10000	.7876
24	70	10000	.7800	56	70	1000	.9968
25	92.5	5000	.8141	57	77.5	1000	.9846
26	70	10000	.7800	58	85	1000	.9749
27	85	10000	.7527	59	77.5	5000	.8309
28	70	1000	.9968	60	92.5	1000	.9748
29	85	5000	.8182	61	92.5	1000	.9748
30	92.5	1000	.9748	62	92.5	1000	.9748
31	92.5	1000	.9748	63	85	1000	.9749
32	100	1000	.9662	64	85	1000	.9749
33	110	1000	.9654	65	85	1000	.9749
34	100	1000	.9662	66	92.5	1000	.9748
35	65	10000	.7876	67	85	1000	.9749
36	85	10000	.7527	68	100	1000	.9662
37	100	10000	.7410	69	92.5	1000	.9748
38	92.5	1000	.9748	70	85	1000	.9749
39	92.5	1000	.9748	71	92.5	1000	.9748
40	85	5000	.8182	72	85	1000	.9749
41	92.5	1000	.9748	73	100	1000	.9662
42	65	10000	.7876	74	100	1000	.9662
43	77.5	10000	.7646	75	92.5	1000	.9748
44	70	1000	.9968	76	85	1000	.9749
45	70	1000	.9968	77	100	1000	.9662
46	77.5	5000	.8309	78	100	1000	.9662
47	85	1000	.9749	79	92.5	1000	.9748
48	77.5	1000	.9846	80	92.5	1000	.9748
49	70	1000	.9968	81	92.5	1000	.9748
50	60	10000	.8019	82	100	1000	.9662
51	85	1000	.9749	83	110	1000	.9654
52	92.5	1000	.9748	84	92.5	1000	.9748

All other rates for MRIO sectors equal 1

of any given SIC in a MRIO sector among the states, the shipment size for MRIO sector i in state j may be different from the shipment size for MRIO sector i in state k.

Weight breaks exist in motor carrier tariffs. At the weight breaks, rates per hundredweight change. Typical breaks occur at Minimum, 500, 1000, 5000, and 10000 pounds. Weight breaks also occur above 10000 pounds but this study focussed on LTL (less than truckload) moves[5] and highlighted the 1000, 5000, and 10000 pound rates. Therefore, each MRIO in each state was assigned to one of the above weight classes based on its average shipment size. The tariff weight for each MRIO in each state is shown for each state ultimately included in the analysis herein in Table 5-1 through Table 5-20.

These rates were collected from Numerax, Inc. in the Spring of 1987 as explained below. A sample of intrastate rates between selected origin-destination pairs was collected, as was a sample of interstate origin-destination rates.

For the states of AL, CA, GA, IL, IN, KS, LA, MI, MN, MO, NC, NY, OH, PA, and TX, the rates were collected for a sample of approximately 20 triads per state. These states were chosen because of their large amount of intrastate traffic as explained in Chapter 3. The triad concept is explain below.

Consider the basic gravity model of spatial interaction described as:

$$T_{ij} = \frac{k \, P_i^{A_1} \, P_j^{A_2}}{d_{ij}^{A_{12}}}$$

where: T_{ij} = number of tons shipped between points i and j

k = a factor of proportionality to be estimated

P_i = a measure of the mass of i, e.g., the population of i

P_j = a measure of the mass of j, e.g., the population of j

d_{ij} = the distance from i to j

A_1, A_2, A_{12} are parameters to be estimated

The basic concept of the gravity model is that the level of interaction between i and j is directly proportional to the masses of i and j (e.g., the level of economic activity) and inversely proportional to the distance between i and j. The logic of the gravity model is that as the masses of i and j increase, the probability of interaction between i and j would increase as the probability of individuals knowing one another or businesses existing to interact with one another would increase. However, as the distance between i and j increases (as a proxy for transport cost and travel time), the probability of the interaction declines, because it becomes more expensive to interact and because of the likelihood of some intermediate location with which i and j will interact.

Numerous empirical tests of the gravity model have been made,[6] and although the theoretically correct doubly constrained gravity model[7] has not always been used, the non-doubly constrained model tends to yield relatively good results (measured in terms of statistical fit by R^2's). While other measures can be used as proxies for mass, e.g., manufacturing employment, manufacturing production, levels of wholesale or retail trade, etc., many gravity models use population as a proxy for overall levels of economic activity because it is readily available. The other measures of mass mentioned above are not generally (and universally) available on a municipality or small area basis. Since the analysis herein deals with general freight movements, a measure such as population is a good proxy for general economic activity. The simple non-doubly constrained gravity model depicted above will be used herein.

Consider the situation depicted in Figure 5-1.
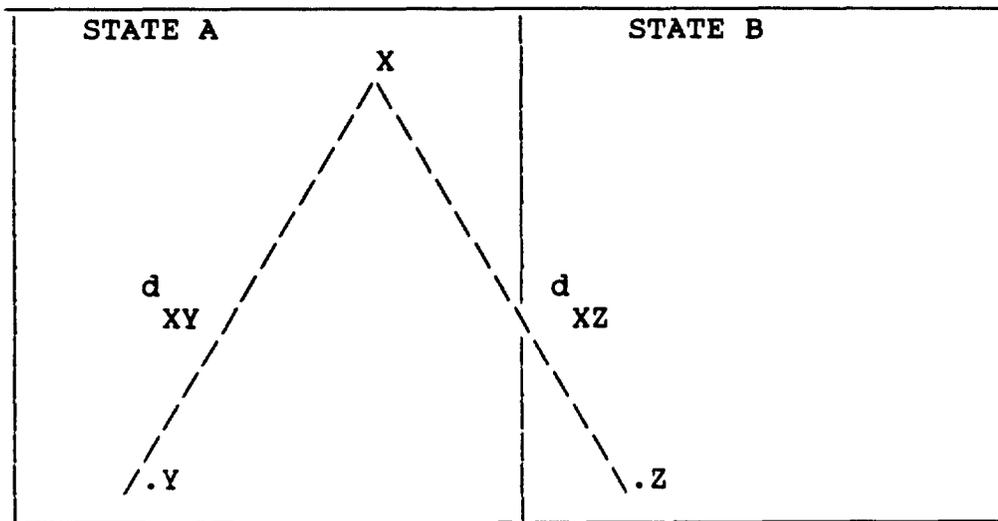
FIGURE 5-1   Hypothetical Triad Representing Intra and Interstate City Interactions

City X interacts with both city Y within its own state A and also city Z in an adjacent state of B. If the population of city Z, P_Z, is the same as the population of city Y, P_Y, and the distance from city X to city Z, d_{XZ}, is the same as the distance from city X to city Y, d_{XY}, then, from the simple gravity

$$T_{XY} = \frac{k\, P_X^{A_1}\, P_Y^{A_2}}{d_{XY}^{A_{12}}} = \frac{k\, P_X^{A_1}\, P_Z^{A_2}}{d_{XZ}^{A_{12}}} = T_{XZ}$$

i.e., the amount of interaction between cities X and Y would be predicted to be equal to the amount of interaction between cities X and Z.

Obviously, the simple gravity model would not yield a perfect fit of the data and for an individual city pair (i,j) the resultant flow may not be exactly T_{ij}. But on average, the flows will be as predicted by the T_{ij} and confidence intervals about the T_{ij} can be established.

Budget and time constraints on the authors did not allow for more sophisticated approaches to be used herein. Thus, the basic gravity model hypothesis was used to establish the sample communities for the rate analysis.

As mentioned above, the flow of goods and the rates may be influenced by nearby towns. If town C is near Z and no such town is near Y, the probability of a backhaul or another load generated is likely to be higher from the city Z area than from the city Y area. Whether such situations exist or not are empirical questions and are not utilized in this test. Again, budgetary limitations played a role in this aspect of testing the gravity hypothesis.

The transportation rate paid by the shipper/receiver is a function of many items, but a major component is distance travelled. As distance travelled increases, the costs of providing transport service should increase, because two principal components of cost, fuel and labor, are related to distance or time (which, in turn, is related to distance by the speed limit). Other components would include backhaul probability, which the gravity formulation above is designed to control for.

Because population, by itself, can not completely explain the derived demand for freight transportation (since, for example, a rich population will likely demand more of a normal good than a poor population), it would be desirable to have more proxies for the derived demand, e.g., the manufacturing employment of each city in the analysis. Also, to partially account for the effect of cities such as C above, the economic activity of the county containing the destination cities could be added. However, the triads were selected on the basis of the city population and distance alone.

With the likely spatial interaction, i.e., a demand component, and the distance, i.e., a cost component, between cities X and Y and between cities X and Z equal, it is hypothesized that, all other things equal, the rates between X and Y and between X and Z should be equal. However, as has been discussed, the states under study have different regulatory philosophies ranging from strict through moderate to loose. Thus the regulatory environment in the X to Y/ X to Z analysis is not always equal. The state regulatory structure must be compared with the interstate regulatory structure, which, at the time when the data were collected (as well as today), can be categorized as in the loose to non-existent category. While rate bureau activity existed on the interstate level, substantial rate discounting occurred (discounts in the 40% range were often quoted, with discounts up to 80% not unheard of). In addition, entry was extremely easy both for new operating authority for existing carriers and for completely new carriers. Discounting also exists on the intrastate level. In some states, discounting is not allowed, while in other states discounts comparable to those received on the federal level are found. Discounts on the intrastate level basically ranged from zero to the level found in the interstate markets.

Utilizing the above general method, comparable corridors in terms of the XYZ triads were constructed for both interstate and intrastate traffic. As shown in Figure 5-1, the XY and the XZ corridor formations are called triads and are precisely constructed as explained below.

The freight rates used for each triad were rate bureau class rates for both the interstate and the intrastate corridors. Although lower rates are many times available for the corridors (via non-bureau tariffs and independent actions), the rate bureau rates represent the chief rate filings, and approval of such tariffs by the regulatory agency was hypothesized to be a revealed expression of the regulatory authority's regulatory philosophy.

The intra and interstate rates were obtained from Numerax--a [8] computerized tariff and transportation data service. Numerax provides the current freight rates by origin-destination pair, class rates as well as commodity rates, for virtually all origin-destinations in the United States. By typing in the origin and the destination in question at a computer terminal, a matrix [9] of class rates from class 50 to class 150 and a weight range from

LTL (less than truckload) to TL (truckload) appears on the screen. A hard copy and/or computer disc of the matrix are also obtainable. Also produced is the tariff source and the number of the tariff, the effective date of the tariff, and the mileage from the origin to the destination.

Numerax has the capability of producing the above described matrix for the three previous years in addition to the current time period. The rate data collected for this analysis were collected for Spring 1987 for all states involved in the analysis.

Data were collected on shipment characteristics (freight charge, weight, and commodity class) according to the following design. The primary criterion for selecting states with X cities was the existence of significant amounts of intrastate trucking activity (as measured by ton-miles, tons, and revenue.) Access to information from the CTS tapes for general commodity intrastate flows provided a quantity ranking of the states as described in Chapter 3. These states also had the following characteristics: a variety of regulatory environments, geographical dispersion, and access to comparable interstate (XZ) and intrastate corridors (XY).

The comparable corridors for each of the state groupings were selected via the following general process. Time and dollar limitations placed an upper bound in the neighborhood of about 20 intrastate and 20 interstate corridors per state. The interstate and intrastate corridors shared a common origin city of X. Destination cities (Y and Z) represented a range of small, medium, and large populations. Origin cities, X, are sources of shipments to "equal" destinations (Y,Z), one intrastate (Y) and one interstate (Z). Destination cities (Y,Z) for an origin (X) are "equal" in population, with equality defined as a maximum population differential between Y and Z of 15%. Such a tolerance was required in order to find 20 triads per state. Destination cities are also "equal" in mileage from their common origin (X), with a maximum mileage differential of d_{XY} and d_{XZ} of 10%. Again,

such a tolerance was required in order to find 20 triads per state.

When there was either an excess or a shortage of corridor pairs (target 20 triads per state), the origins with the largest populations were selected to increase the likelihood that significant shipments of the commodities would be investigated. Consideration was also given to obtaining a balance in the distribution of corridor lengths. The range of corridor lengths for all states investigated was from 75 to 744 miles. The range was constrained by the size of the state and the availability of triads. The longer triads were from large states such as Texas and California. It is important to note that the results of the study herein should not be extrapolated outside of the range of the data. Thus no judgement should be rendered on 50 mile or 1000 mile hauls based on this analysis. However, since the study concentrated on the relationship of intrastate rates to comparable mileage interstate rates, the range of observations available should cause no problems.

After selecting the corridor pairs, freight charges were obtained for eleven commodity classes between class 50 and class 125 inclusive and three weight classes (1000, 5000, and 10000 pounds) to account for the LTL tonnage. As noted above, budget and time constraints placed a limit on the use of more weight classes.

The 20 corridor pair goal results in 1320 freight charges in every state where the goal was attained, i.e., 20 intrastate and 20 interstate corridors with thirty three charges (eleven commodity classes, three weight classes) per corridor. Some states had more than the limit of 20 corridor pairs at a starting tolerance of population and mileage of plus/minus 5% tolerance levels for both population and mileage. If fewer than 20 corridors were generated by the 5% tolerance approach, the following rules were followed to expand the sample. First, the population tolerance for the destination cities was increased to 10%. If this did not produce 20 corridor pairs, the population tolerance was increased to 15%. If this still did not produce 20 corridor pairs, the mileage tolerance was increased to 10%. If this last process did not produce 20 corridor pairs, the process was stopped and the state
10
was analyzed with fewer than 20 corridor pairs. It was judged that to increase the disparities between corridor lengths and destination populations to too large a degree would introduce too much non-comparability of shipments into the analysis. The ideal, of course, would be to have all origins, destinations, corridor lengths, and "everything else" exactly equal and test purely for differences in freight charges in different regulatory environments.

In developing the analysis, the following process was followed. A typical block of states for constructing the triad for a given state under investigation would be the origin state plus four surrounding states. The states each have an average of 15 cities that meet two conditions: (1) each city has a population exceeding 15,000 and (2) each city is listed in the Household
11
carriers mileage guide. This means that for the typical state,
12
a mileage matrix of 15 x 75 must be constructed. The populations of the block of states were grouped in the following way. For each city over 15,000 in population in the origin state, a range of plus/minus 15% of its population was created. Then all cities in bordering states with a population in this range were printed out, forming the plus/minus 15% sets. These became the interstate destination candidates.

The mileage matrix was then utilized, and each one of the plus/minus 15% population sets was searched for an origin (in the origin state) which was within plus/minus 10% mileage of both the destination candidate in the origin state (intra) and the destination in a bordering state (inter). If an origin and two relevant destinations were found, the resulting triad would have a common origin in the origin state (one of the 15 states under investigation herein), an intrastate destination, and an interstate

destination, with both destinations being within 15% population of each other and within 10% of the same mileage to the common origin. The methodology gave the comparable intra and interstate corridors to obtain freight charges for comparison.

For each interstate destination candidate (about ten for each of the 15 intrastate destination candidates), each origin candidate (the same 15 intrastate destination candidates) had to be checked to see if these two destinations were within plus/minus 10% in mileage from the common origin candidate. The process was repeated with the next interstate destination candidate. After this plus/minus 15% population set was completed, the next plus/minus 15% population set was completed and so on until the block of states was completed. If the above method produced significantly more than 20 triads, then the decision rule to limit the triads to about 20 entailed limiting the population and mileage tolerances to as low as possible and to choosing large origin cities.[13]

The sources used for data in constructing the corridor pairs and the relevant freight charges were the 1980 Census of Population and Housing-Final and Preliminary Counts for Incorporated Places-Table 2; the Household Goods Carriers' Bureau Mileage Guide; and published rate bureau rates for intra and interstate commodity-weight-corridor combinations from Numerax.

For the states of AR, CO, CT, ID, IA, KY, MD, MA, MS, NE, NV, NH, NM, ND, OK, OR, RI, SC, SD, TN, VA, WA, and WV, intrastate and interstate rate data were collected from Numerax in the following fashion. Approximately 20 intrastate origin-destination pairs were chosen for each state. Large population centers were chosen and a balance of mileages (long and short) were selected. Approximately 20 interstate origin-destination pairs were also chosen for each state. Unlike the triads, no attempt was made to match intra and interstate origins or to match intrastate populations specifically with interstate populations, although the general range of populations of the two data sets was similar. Rather, a set of intrastate origin-destination pairs with similar mileage separations to a set of interstate origin-destination pairs were chosen. In this case, differences in population and, to some extent, mileages would be controlled statistically. As above, mileages were from the Household Goods Carriers' Bureau Mileage Guide, and populations were from the 1980 Census. The situation in this case is shown in Figure 5-2.

```
STATE A          |      STATE B
    X            |
   /             |
  /      X'      |
 /        \      |
/D         \     |
/   XY      \    |
/         D   \  |
/          X'Z\  |
/              \ |
Y               \|
                 |\
                 | \Z
```

Figure 5-2: Triads in Case for Second
Set of State Rate Samples

For the deregulated states of AK, AZ, DE, FL, ME, NJ, VT, and WI, no rate data were collected. Although intrastate rates are published by the rate bureaus, e.g., the Middle Atlantic Conference (MAC) publishes intrastate New Jersey rates, it is not possible to determine the linkage between the tariff rate structure and the rate structure actually in place in the deregulated states. (Note: the author's study of intrastate New Jersey rates in the mid to late 1970's showed that the MAC's intrastate tariff was one and the same as their interstate tariff involving New Jersey points; in addition, the actual intrastate rate levels in New Jersey (from an intensive survey of New Jersey shippers) were found to be 10-15% below comparable, then regulated, interstate (MAC) rates. The time and budget constraints of this project did not allow for replicating the New Jersey study for the eight deregulated states at this time). In addition, rates were not available for MT and WY. UT had only a limited number of intrastate rates available (not enough to make a statistically valid sample). DC and HA were not included in the rate analysis.

For both the Figure 5-1 and the Figure 5-2 triad states, a regression was run for each weight and class on intrastate rates as a function of the distance from the origin to destination (the distance is part of the Numerax output) and the product of the origin-destination populations. In addition, a similar regression was run for the interstate rates in the triad.

A typical regression is shown below. It represents class 70, 5000 pounds rates for Arkansas triads.

$$\text{Intrastate Rate (cents/cwt)} = R = 48.26002605 \, (\text{Distance}^{.4055467})$$

$$x \, (\text{Population Product})^{-.00091819}$$

$$R^2 = .979566$$

Interstate Rate (cents/cwt) = R = 55.99977092 (Distance$^{.4530906}$)

$$\times \text{(Population Product)}^{-.0179656}$$

R^2 = .928119

In general, as measured by the R^2's, the fits were good. The equations show that rates increase with distance (although the distance elasticity is inelastic, i.e., $(D/R)(\partial R/\partial D)$ = .4055467, due to the distance taper present in the tariff) and that the rates decrease with the population product (perhaps due to the increased backhaul potential). Most of the contribution to explaining the variance in the rates is made by the distance variable.

The actual intrastate distances and origin and destination populations are then entered into the intrastate regression to yield an estimated intrastate rate for the triad. The assumption is now that a new analysis is taking place with hypothetical triads. The same distance and origin and destination populations are then entered into the interstate regression to yield an estimated interstate rate for a move that was exactly the same as the intrastate move in terms of distance and population product.

The concept here is that the intrastate estimated rate will be contrasted against the interstate rate estimated on the basis of the intrastate mileage and population parameters. The result will be two rates identical in mileage and population parameters but with one based on state regulation and the other essentially deregulated (based on the federal interstate system). The difference of the two rates (as discounted) would reflect the impact of deregulation on rates, i.e., in the absence of state regulation, the discounted state rate would go to the discounted interstate level.

The estimated intrastate rate is then discounted by the average discount for the state involved. These discounts were calculated by asking the regulatory agency in each state whether discounts from class rates were allowed in the state for intrastate shipments. If discounts were allowed, the official was asked to state his/her opinion of the average intrastate discount in their state. If the response was a range, the midpoint of the range was chosen as the average discount. For the large traffic states, a sample (across major commodity groups in the state and across firm sizes) of traffic managers was taken to obtain the average intrastate discount for their firm. The average discount in each state is shown in Table 5-21, and it can be seen that the traffic managers' discount and the state regulatory officials' perception of the average discount are fairly evenly matched. The estimated interstate rate is then discounted by 40%[14] as the average interstate discount. The model is set up so that both the interstate and intrastate discounts can changed and hence sensitivity analysis can be done. In this sense, the results of the

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TABLE 5-21

INTRASTATE DISCOUNTS AS REPORTED BY STATE REGULATORY OFFICIALS AND

A SAMPLE OF SHIPPERS IN SELECTED STATES

State	Intrastate Discount As Estimated By State Regulatory Official	Intrastate Discount From Shipper Survey
AK	Deregulated	
AL	Discounts Not Allowed	
AR	30%	
AZ	Deregulated	
CA	0%	14.7%
CO	47.5%	
CT	30%	
DC	Not Included In Study	
DE	Deregulated	
FL	Deregulated	
GA	30%	29.4%
HA	Not Included In Study	
ID	20%	
IA	30%	
IL	0%	
IN	40%	
KS	32.5%	
KY	30%	
LA	Discounts Not Allowed	
MA	Discounts Not Allowed	
MD	45%	
ME	Deregulated	
MI	15%	13.5%
MN	Discounts Not Allowed	
MO	25%	17.1%
MS	Discounts Not Allowed	
MT	22.5%	
NC	25%	20.8%
ND	17.5%	
NE	Discounts Not Allowed	
NH	Discounts Not Allowed	
NJ	Deregulated	
NM	Discounts Not Allowed	
NV	Discounts Not Allowed	
NY	30%	35.2%
OH	40%	35.2%
OK	Discounts Not Allowed	
OR	Discounts Not Allowed	
PA	30%	28.7%
RI	Discounts Not Allowed	
SC	20%	

TABLE 5-21 (Con't)

SD	25%	
TN	22.5%	
TX	0%	2.8%
UT	Discounts Not Allowed	
VA	20%	
VT	Deregulated	
WA	Discounts Not Allowed	7.0%
WI	Deregulated	
WV	2.5%	
WY	Discounts Not Allowed	

analysis herein must be predicated with the statement that "if the intrastate discounts were x and if the interstate discounts are y, then the following impacts would take place."

With the above discounted rates, the following calculation is made:

$$\frac{\text{old discounted intrastate} - \text{old discounted interstate}}{\text{old discounted intrastate rate}} \times 100$$

which yields the percentage increase (or decrease) that intrastate rates have over interstate rates. Another way of interpreting the equation is:

$$\frac{\text{old discounted intrastate} - \text{new discounted intrastate}}{\text{old discounted intrastate rate}} \times 100$$

since it is assumed that the new discounted intrastate rate would equal the discounted interstate rate under deregulation. For the 38 states for which rate samples were taken, 20 of these states (AL, GA, IA, IL, KY, LA, MA, MN, MS, NH, NM, NV, NY, OK, PA, RI, SD, TX, WA, and WV showed the majority of class, weight combinations where the equation above was positive, i.e., discounted intrastate rates exceeded discounted interstate rates. In the cases where discounted intrastate rates were below discounted interstate rates, it was assumed that the intrastate rates would not change (and hence the ratio of new intrastate rates to old intrastate rates would not change, i.e., equal 1). For the 20 states listed above, benefits would occur if deregulation took place. Although Oregon intrastate class rates (which are not allowed to be discounted) are substantially above discounted interstate rates, in Oregon the relevant comparison is between intrastate commodity rates and discounted interstate class
        15
rates.   As a result, Oregon is not included as one of the 20 states in this section. These states and the discounted rate ratios (expressed as the new discounted intrastate rate over the old discounted intrastate rate) are shown in Table 5-1 through Table 5-20.

In 17 of the sampled states (AR, CA, CO, CT, ID, IN, KS, MD, MI, MO, NC, ND, NE, OH, SC, TN, and VA), the above equation was positive for most (if not all) of the class, weight combinations. In these cases, discounted intrastate rates are below discounted interstate rates. It is assumed that deregulation would not change those rates in the analysis herein.

The fact that discounted intrastate rates in some states are below discounted interstate rates while some are above can be attributed to the various philosophies (potential utility functions) of regulation as exercised by the state agencies as

outlined in Figure 2-11a through Figure 2-11d in Chapter 2. Some regulatory agencies opt toward high rates with a preference function favoring the carrier. Other regulatory agencies have preference functions which favor low rates, i.e., the consumer. It should be noted that when discounted intrastate rates are below discounted interstate rates because of the actions of state regulatory agencies, social costs could arise due to carriers forced to receive an inadequate return. This issue was not pursued in this study.

As mentioned earlier in the report, the full Multiregional Input-Output (MRIO) model contains 51 states and 125 economic sectors. This leads to a total interaction matrix that is 6375 by 6375, i.e., 40,640,625 potential interactions. Given the computer and time budget allocated to the project, it was necessary to aggregate both economic sectors and states in order to make the analysis more feasible. Twenty eight regions were constructed. These are shown in Table 5-22. Basically, the 20 states where rates were predicted to fall if deregulation were to occur were kept separate as individual areas as were likely large impact states, e.g., CA.

All manufacturing sectors were kept as separate economic sectors. The rail sector, the local passenger sector, and the motor. freight sector were also kept as separate sectors. All remaining sectors, i.e., the bulk commodities, construction, and services were aggregated into five sectors, e.g., bulk, other transportation and utilities, retail trade, wholesale trade, and services. The motor carrier sector was divided into two sectors as explained below. This resulted in 73 sectors. This aggregation over space and economic activity greatly restricts the potential richness of the analysis. However, the tradeoff had to be made between richness and analytical tractability. In future runs of the model, the whole range of states and sectors will be included. The MRIO sectors are shown in Table 5-23.

The aggregation yielded a system with 28 geographic areas and 73 economic sectors. This leads to a total interaction matrix that is 2044 by 2044, e.g, 4,177,936 possible interactions or about one tenth the size of the full system. Such disaggregation allows the required matrix inversion on a Dell System 310 PC in 528 hours.

The MRIO model was initially developed by Jack Faucett Associates [16] and modified by the Social Welfare Research Institute at Boston College. [17] The MRIO was received on computer tape from Boston College in the form of a "make" matrix; a "use" matrix; a trade flows matrix; and transportation, wholesale trade, and retail trade margins, i.e., the amount that each of these three sectors has added to the "costs" of each other economic sector. The make matrix is a matrix of production outputs, i.e., commodities made by industries. The use matrix records the commodity inputs to the production process, i.e., the use of commodities by industries. The trade flows matrix is used to calculate the C matrix in Chapter 4. The relationship of the make and use matrices to the commodity

TABLE 5-22

Aggregated Regions for MRIO Analysis

Region	Constituent States
1	CT, VT, ME
2	NH
3	MA
4	RI
5	NY
6	PA
7	DC, DE, MD, NJ, VA
8	WV
9	FL, NC, SC, TN
10	GA
11	AL
12	MS
13	KY
14	IN, MI, OH, WI
15	IL
16	MN
17	IA
18	AR, KS, MO, ND, NE
19	SD
20	OK
21	TX
22	AK, AZ, CO, HA, ID, MT, UT, WY
23	NM
24	NV
25	WA
26	OR
27	CA
28	LA

TABLE 5-23

Aggregated Economic Sectors for MRIO Analysis

Aggregated MRIO Sector	MRIO Economic Sectors in Aggregated MRIO Sector	Description
1	088	Water Transportation
	089	Air Transportation
	090	Pipelines, Except Natural Gas
	091	Transportation Services
	092	Communications, Except Radio and TV
	093	Radio and TV Broadcasting
	094	Electric Utilities
	095	Gas Transmission and Distribution (Public and Private)
	096	Water and Sanitary Services (Public and Private)
2	021	Meat Products
3	022	Dairy Products
4	023	Canned and Frozen Foods
5	024	Grain Mill Products
6	025	Bakery Products
7	026	Sugar and Confectionery Products
8	027	Beverages, Extracts, and Syrups
9	028	Other Food Products
10	029	Tobacco Products
11	030	Fabric, Yarn, and Thread Mills
12	031	Floor Coverings and Misc. Textile Products
13	032	Hosiery and Knit Goods
14	033	Apparel
15	034	Other Fabricated Textile Products
16	035	Logging and Lumber
17	036	Wood Products
18	037	Pre-fabricated Buildings and Mobile Homes
19	038	Household Furniture
20	039	Other Furniture and Fixtures
21	040	Paper and Allied Products
22	041	Paperboard Containers and Boxes
23	042	Newspapers, Periodicals, and Other Printing and Publishing
24	043	Industrial Chemicals
25	044	Agricultural Chemicals
26	045	Other Chemical Products
27	046	Plastics and Synthetics
28	047	Drugs
29	048	Cosmetics and Cleaning Products
30	049	Paint and Allied Products

TABLE 5-23 (Con't)

31	050	Petroleum Refining and Allied Products
32	051	Rubber and Misc. Products
33	052	Leather and Leather Products
34	053	Glass and Glass Products
35	054	Stone and Clay Products
36	055	Iron and Steel Mills and Forging
37	056	Iron and Steel Foundries
38	057	Primary Nonferrous Metals and Products
39	058	Metal Containers and Misc. Metal Products
40	059	Structural Metal Products
41	060	Screw Machine Products and Metal Stampings
42	061	Engines and Turbines
43	062	Farm and Lawn Equipment
44	063	Construction and Mining Equipment
45	064	Materials and Handling Equipment
46	065	Metalworking Equipment
47	066	Special Industry Machinery and Equipment
48	067	General Industrial and Other Non-electrical Machinery and Equipment
49	068	Office and Computing Equipment
50	069	Service Industry Machinery and Equipment
51	070	Electrical Transmission and Electrical Industrial Equipment
52	071	Household Appliances
53	072	Electrical Lighting and Wiring Equipment
54	073	Receiving Sets, Records, and Tapes
55	074	Communications Equipment
56	075	Electronic Components
57	076	Other Electrical Equipment
58	077	Motor Vehicles and Parts
59	078	Aircraft and Parts
60	079	Missiles, Spacecraft, and Parts
61	080	Aircraft, Missile, and Spacecraft Propulsion Units
62	081	Other Transportation Equipment
63	082	Scientific and Photographic Equipment, Watches, and Clocks
64	083	Medical, Dental, and Optical Equipment
65	084	Other Manufactured Products
66	085	Railroads
67	086	Local Passenger Transportation and Intercity Bus

TABLE 5-23 (Con't)

68		087	Motor Freight
69	Retail	098	Eating and Drinking Places
		099	General Merchandise and Apparel Stores
		100	Food, Drug, and Liquor Stores (Including Government Owned Liquor Stores
		101	Automotive Dealers and Gasoline Service Stations
		102	Other Retail Stores
70		097	Wholesale Trade
71	Bulk	001	Dairy Farm Products
		002	Livestock and Poultry
		003	Cotton, Grain, and Tobacco
		004	Fruits, Nuts, Vegetables, and Misc. Crops and Services
		005	Forestry Products
		006	Commercial Fishing and Trapping
		007	Iron and Ferroalloy Ores
		008	Nonferrous Ores
		009	Coal
		010	Crude Petroleum
		011	Natural Gas and Liquids
		012	Stone, Clay, Sand, and Gravel
		013	Chemical and Fertilizer Minerals
		014	Residential Building Construction
		015	Nonresidential Building Construction
		016	Public Utility Construction
		017	Highways and Streets
		018	Other Construction
		019	Maintenance Construction
		020	Ordnance
72	Services	103	Banking, Credit Agencies, and Investment Brokers
		104	Insurance
		105	Real Estate and Rental
		106	Hotels and Lodging Places
		107	Personal and Repair Services, Except Auto
		108	Misc. Services and Advertising
		109	Misc. Professional Services
		110	Auto Rental, Repair, and Maintenance
		111	Amusements
		112	Doctors and Dentists, Including Outpatient Care Facilities
		113	Hospitals and Nursing
		114	Other Medical and Health Services
		115	Educational Services

TABLE 5-23 (Con't)

116	Nonprofit Organizations
117	Other Social Services
118	Federal Government Enterprises, Except Utilities and Transit
119	State and Local Government Enterprises, Except Utilities and Transit
120	Directly Allocated Imports
121	Scrap
122	Government Industry
123	Household Industry
124	Rest of World
125	Statistical Discrepancy

and industry production in the economy is shown in Figure 5-3 (from Miller and Blair)[18].

		Commodities A	Commodities B	Industries A	Industries B	Final Demand	Total Output
Commodities	A			Use Matrix U		E	Q
	B						
Industries	A	Make Matrix V					X
	B						
Value Added				W			
Total Inputs		Q'		X'			

FIGURE 5-3
Make and Use Matrices Related to the Economic Structure

The economy is organized by industries which, in turn, produce commodities. However, industries are sometimes multi-commodity producers, i.e., industries sometimes produce commodities which have a different name than the industry has. The make (V) and use (U) matrices account for these type of circumstances.

As shown in the theoretical chapter (Chapter 4), a matrix of the form $[I - (CA^t)^{}]$ must be constructed. Miller and Blair[19] show that many options exist to form the A matrix, given that make and use matrices exist. The "commodity by commodity industry based technology" option of constructing the A matrix (the matrix of technical coefficients in the input-output model) was chosen herein because of the interest in commodity shipments by industry.

Prior to constructing the A matrix, a final adjustment to the use matrix was necessary, because both the make and use matrices are in purchaser prices, i.e., input prices to an economic sector which include the transportation rate and the wholesale and retail markup. Therefore, the truck transportation row in any given state only represented some small use of trucking by the sector in question and not the importance of truck transportation in moving the products which would be used to produce the good in question. To obtain a truck row entry that corresponds with what a firm spends on truck transportation, i.e., an estimate of the truck

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component of a widget firm's production function, the use matrix was converted into producer prices with respect to truck transportation. In addition, the use matrix was also converted into producer prices with respect to all of the remaining transportation (e.g., rail, air) margins as well as the wholesale and retail trade margins.

The MRIO model contains motor carrier margins for all commodities and for all regions. These margins reflect the use of motor carriage by each industry in each region. As shown by Miller and Blair,[20] the transportation margin is just the transportation row when the transaction matrix is expressed in producer prices. Unfortunately, the margin matrix in the MRIO is not disaggregated (as in Miller and Blair) as to how it is distributed among all the input sectors to the widget industry (just the total transport margin to the widget industry is given).

In order to appropriately change the transaction matrix from purchaser prices to producer prices for trucking, the following procedure was utilized: Since the use matrix is in purchaser prices, it reflects transportation from all the states to the state in question. The truck margin from all the states to state X for industry Y was calculated, i.e. T_Y. This margin must now be

distributed across all 125 sectors in row Y of the input-output transactions matrix for state X. All 125 transactions, T_{Yi}, are

summed and the total, $Y_.$, noted. Transaction T_{YZ} in state X is

then reduced by $(T_{YZ}/T_{Y.})(T_Y)$, i.e., transaction YZ's share of

of the total use of input Y in state X. At the same time this amount is being taken away from transaction T_{YZ}, the same amount

is being added to the truck entry in column Z in state X. This preserves the vertical summation of the input-output table and creates a motor carrier production function for state X which reflects the cents of motor carrier input required to produce a dollar's worth of good Z in state X. In all cases, the amount taken out from the inputs, of course, is exactly equal to the amount added into the truck row. For instance, the revised transactions entries for the first column (industry 1) in state X's transaction matrix would appear in row vector form as:

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$$[\{T_{11} - (T_{11}/T_{1.})(T_{1})\}, \{(T_{21} - (T_{21}/T_{2.})(T_{2})\}, (T_{31} - (T_{31}/T_{3.})(T_{3}))$$

$$\ldots, (T_{truck1} + (T_{11}/T_{1.})(T_{1}) + (T_{21}/T_{2.})(T_{2}) + (T_{31}/T_{3.})(T_{3}) +$$

.... A new row total for intermediate transactions is also calculated. The same procedure was followed for the other transportation margins and the wholesale and retail trade margins.

The motor carrier margin matrix does not give a value for the final demand transportation margin. This value is estimated in the following manner: For each commodity i in column 134 (the final demand vector), i.e., T_{FDi}, a fraction, (G_i/H_i), of T_{FDi} is subtracted from T_{FDi}. (G_i/H_i) is the percentage of the output of i which is due to truck and is calculated as G_i as the entry in the truck row, ith column and H_i is the sum of the entry in the truck row, ith column plus the entry in the value added row, ith column. These elements which are subtracted from the final demand are added to the truck, final demand cell so that the final demand maintains its total vertically. The analogous procedure was followed for the remaining transportation margins and the wholesale and retail trade margins.

The new intermediate demands and final demands (as calculated above) are added together to yield the new total output figures for each commodity.

The MRIO model contains a motor carrier row and a motor carrier column. The row (column) is separated into two rows columns)--one representing intrastate motor carriage and one representing interstate motor carriage--in the following manner. Since the consumption of inputs used in the production of outputs in state M entails the flow of inputs into state M, the trade flow into state M from all other states (including M) is calculated from the 1977 Census of Transportation. Because the data are not available on an individual commodity basis (in hard copy), the total commodity flow for the state is used for each commodity (i.e., each commodity in the state is assumed to behave as the state in the aggregate behaves with respect to commodity flows intrastate and interstate). The percentage of all goods terminating in state M which originate in state M is denoted as state M's percent intrastate and is called y.

Since the current row (column) in the MRIO is a combination of intra and interstate, the separation of the motor carrier row (column) must still yield a balanced table (i.e., the sum of each column must be the same as before the separation and the same holds

true for the sum of each row). Each item in the motor carrier row was multiplied by y and by 1-y. The numbers formed by multiplying by y become the intrastate motor carrier row, while the numbers formed by multiplying by 1-y become the interstate motor carrier row. If the initial row entry was z, z was disaggregated to yz and (1-y)z. However, since they sum to z, the model retains its balance.

Likewise, each column entry in the motor carrier column is multiplied by y and 1-y. Again, the balance by summing across a row is maintained.

At the intersection of the motor carrier row and the motor carrier column, before disaggregation into intra and interstate, one element, w, existed. After disaggregation, four components exist as follows:

	intra	inter	Total Truck
intra	$y^2 w$	$y(1-y)w$	yw
inter	$y(1-y)w$	$(1-y)^2 w$	$(1-y)w$
Total Truck	yw	$(1-y)w$	w

The sum of these four items is $y^2 w + yw - y^2 w + yw$

$- y^2 w + w - 2yw + y^2 w = w$. Notice that the production function for both intrastate trucking and interstate trucking (the column coefficients) will be exactly the same as the aggregate trucking production function since the intrastate and the interstate columns will get divided through by the y in calculating the A matrix and the interstate column will get divided through by the 1-y.

Under these conditions, A = BD where B = $U(\hat{X})^{-1}$ [21] and

D = $V(\hat{Q})^{-1}$ [22] where U is the use matrix in Figure 5-3; $(\hat{X})^{-1}$ is a matrix formed by placing one over the elements of the total outputs (or total inputs) X of the industries on their respective position on the main diagonal, i.e., one over the first total input in cell (1,1), one over the second total input in cell (2,2), etc., with all off diagonal cells zero; V is the make matrix in Figure

5-3; and $(\hat{Q})^{-1}$ is a matrix formed by placing one over the elements of the total outputs (or total inputs) Q of the commodities on their respective position on the main diagonal with all off diagonal cells zero. The calculation BD yields the A matrix for the

MRIO. This calculation is no trivial task since U is a 6375 by 6375

matrix as is $(\hat{X})^{-1}$, V, and $(\hat{Q})^{-1}$ and hence so are B and D and, therefore, A.

The T^* vector is just the sum of all the motor carrier columns

deleted from the $(\widehat{CA})^t$ matrix with each c_{ij} a_{ij} element

multiplied by the appropriate exogenous motor carrier transportation rate change, i.e., the predicted intrastate rate under deregulation adjusted for commodity class and weight shipped for that individual state. The U^* vector is just the value added for each good in each state as calculated from the A matrix formed by multiplying the B and D matrices. Both the T^* and U^* do not contain the motor carriage sector elements from the 20 deregulation candidate states as per the analysis in Chapter 4.

Given the completion of the above tasks, the model is now ready to be empirically run.

ENDNOTES FOR CHAPTER 5

1. Motor carrier rates are generally class or commodity based. Commodity rates are specific with respect to commodity and origin-destination. Class rates basically classify all commodities shipped into a limited number of classes ranging from class 35 through class 500 (although the classes 50 through 125 are the most typical). Classification of all commodities produced and shipped in the US into a limited number of classes is based on the physical and economic characteristics of the goods and is performed by the National Motor Freight Traffic Association, Inc. of the American Trucking Associations and is published in a volume entitled "National Motor Freight Classification".

2. Computer printout of SIC/STCC bridge obtained from Larry Britt, US Department of Commerce, Bureau of the Census.

3. National Motor Freight Classification, published by National Freight Traffic Association, Inc., Alexandria, VA, Issued April 3, 1987.

4. Numerax, Inc., of Maywood, NJ, is a provider of computerized motor carrier tariffs. The conversion was as follows: New England D2 = classes 125, 110; New England D3 = classes 100, 92.5; New England D4 = classes 85, 77.5; and New England D5 = classes 70, 65, 60, 55, 50.

5. Truckload moves generally carry a lower class assignment than less than truckload moves for the same item/commodity. Generally the threshold between truckload and less than truckload is 10000 pounds, but this will vary based on the density of the commodity.

6. K. W. Ogden, "The Distribution of Truck Trips and Commodity Flows in Urban Areas: A Gravity Model Analysis", Transportation Research, Vol. 12, No. 2, 1978, pp. 127-137, and William Black, "Interregional Commodity Flows: Some Experiments with the Gravity Model", Journal of Regional Science, Vol. 12, No. 1, 1972, pp. 107-118.

7. Alan G. Wilson, Urban and Regional Models in Geography and Planning, John Wiley and Sons, London, 1974, p. 65.

8. Numerax, op. cit.

9. Class 100 is the base. For example, in general, class 50 rates are approximately one half of class 100 rates, and class 125 rates are approximately one and a quarter times class 100 rates.

10. Certain aspects of the procedure described in this paragraph were very tedious and time consuming. For each of the 20 largest states (and each of their contiguous states--a total of 46 states), the first step was to transfer US city population figures to computer disc, because the tapes from the 1980 Census of Population were not available to the authors at this time. For each of the 20 groups of origin states, a mileage matrix was constructed. Although firms have recently begun to offer on-line or print-out services for origin-destination studies, e.g., Rand McNally, they were too expensive for the analysis herein. The mileage matrix construction was particularly time consuming.

11. Household Goods Carriers' Bureau Mileage Guide.

12. Fifteen cities for home state to those fifteen cities for intrastate mileage and to the 60 cities in the four surrounding states for interstate mileage.

13. The corridor pairs selection step was about as time consuming as the creation of the mileage matrices. With 15 pairs to check for mileage for each interstate destination candidate and given ten interstate candidates, there are 150 pairs per interstate destination candidate. With 15 intrastate destination candidates per block of states and 20 blocks of states, the number of corridor pairs checked for candidacy was approximately 40,000.

14. Letter to the Editor of Traffic World from Thomas Baranski, General Traffic Manager, TBC Corporation, Memphis, TN, 9/28/87, p. 49. "Almost any shipper can secure a 40% discount just by asking for it". This number was also supported in private conversations held with shippers and with motor carriers as well as with state officials (the latter were asked to compare intra and interstate discounts).

15. Conversation with Ms. Bobbie Vranes of the Oregon Public Utility Commission, Summer, 1988.

16. Jack Faucett Associates, Inc., Multiregional Input-Output Accounts, Volume 1, Introduction and Summary, Chevy Chase, MD, July, 1983.

17. The Multiregional Input-Output Accounts for 1977: Technical Documentation, The MRPIS Project at The Social Welfare Research Institute, Boston College, Chestnut Hill, MA, February 27, 1988.

18. Ronald E. Miller and Peter D. Blair, Input-Output Analysis: Foundations and Extensions, Englewood Cliffs, NJ, 1985, P. 161.

19. Ibid., p. 171.

20. Ibid., p. 156

21. Ibid., p. 163.

22. Ibid., p. 165.

RESULTS OF THE MULTIREGIONAL INPUT-OUTPUT ANALYSIS OF THE INTERSTATE IMPACTS OF INTRASTATE MOTOR CARRIER REGULATION

As mentioned in Chapter 5, the analysis herein assumes that all states whose discounted intrastate rates are above discounted interstate rates for comparable moves (as of Spring 1987) will experience a fall in intrastate rates to the discounted interstate levels if intrastate deregulation takes place. Furthermore, because of the expense and time of running the model, it is assumed that all 20 of the states where discounted intrastate rates exceed discounted interstate rates deregulate simultaneously. Thus it is not possible to disaggregate the impact of Texas' regulation on interstate commerce from the impacts of New York's intrastate regulation from this particular run of the model (although it is possible, with a separate run of the model, to show the impact of the intrastate regulation of a single state). This run shows the collective impact of intrastate regulation of all twenty states listed in Table 5-1 through Table 5-20 on interstate and intrastate commerce.

The rate changes shown in Table 5-1 through Table 5-20 are considered exogenous to the system. These rate changes are put into a model analogous to the "price model" in Chapter 4. The resulting

$$P^* = [I - (C\hat{A}^{t*})^{-1}] [T^* + U^*] \text{ vector is the vector of}$$

endogenous price changes. Because of the aggregation to 73 MRIO sectors and 28 regions, the P^* vector is 1 by 2044. These endogenous price changes are shown for each of the 28 regions by MRIO sector in Table 6-1 through Table 6-28. Since the initial prices were all assumed to be 1, the new prices from P^* show the proportions that the new prices are of the old prices.

All of the price changes are fairly small, reflecting the small percentage overall that truck transportation costs are of final delivered prices and the fact that when transportation costs are high, goods tend to be transported short distances, i.e., intrastate. The result states that changes in truck prices in state X don't have much impact on the prices of goods in state Y. However, small price changes related to large amounts of quantity of a product can still produce major economic impacts, i.e., large welfare trapezoids.

Given the price changes of all MRIO sectors in all regions, the total output in dollars for each MRIO sector in each state was taken from the MRIO tables (adjusted as described in Chapter 5). Table 6-29 shows the own price point elasticities of demand for each MRIO sector, which were calculated based on SIC elasticities calculated by Systan.[1] In turn, the welfare trapezoid was measured

TABLE 6-1

Relative Prices of MRIO Sectors in Region 1 (ME, VT, CT) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99988856	37	Iron Foundary	.99986488
2	Meat Products	.99978834	38	NonFerr Metal	.99969832
3	Dairy Prod.	.99976608	39	Metal Contain	.99980436
4	Can/Froz Food	.99975904	40	Struct Metal	.99976683
5	Grain Mill	.99958647	41	Screw Machine	.99979988
6	Bakery Prod.	.99972644	42	Engine/Turbine	.99980918
7	Sugar & Conf.	.99946692	43	Farm Equip	.99982020
8	Beverages	.99972952	44	Constrct Equip	.99982015
9	Other Food	.99967843	45	Mat/Hand Equip	.99981625
10	Tobacco Prod	.99997513	46	Metalwkg Equip	.99985517
11	Fabric/Yarn	.99974463	47	Spec. Machine	.99980530
12	Floor Cover	.99972755	48	Other NonElec	.99985164
13	Hosiery	.99964989	49	Comput. Equip	.99984239
14	Apparel	.99985725	50	Service Mach	.99976795
15	Other Fabric	.99976822	51	Elect. Equip	.99979565
16	Log/Lumber	.99983244	52	House Applian	.99981549
17	Wood Product	.99980600	53	Elect Lighting	.99982415
18	Pre Fab Home	.99974201	54	Receiving Set	.99986836
19	House Furnit	.99981829	55	Commun Equip.	.99985076
20	Other Furnit	.99981402	56	Elect Compon	.99981410
21	Paper Prod	.99974970	57	Other Elec Eq	.99979666
22	Paper Contain	.99971621	58	Motor Vehicle	.99977289
23	Newspaper	.99982790	59	Aircraft/Parts	.99987658
24	Indust Chem	.99971400	60	Missles/Parts	.99987899
25	Agric Chem	.99970718	61	Air/Miss Prop	.99985784
26	Other Chem	.99972814	62	Other Trans Eq	.99983195
27	Plastics/Syn	.99962467	63	Sci/Photo Eq.	.99985359
28	Drugs	.99982379	64	Medical Equip.	.99985743
29	Cosmetics	.99978454	65	Other Mfg Prod	.99979910
30	Paint/Allied	.99965998	66	Railroads	.99988971
31	Petrol Refin	.99975700	67	Local Transit	.99985582
32	Rubber/Misc	.99970750	68	Mtr Frght Intra	.99990361
33	Leather Prod	.99972708	69	Mtr Frght Inter	.99990154
34	Glass Prod	.99980749	70	Retail	.99990083
35	Stone/Clay Pr	.99981647	71	Wholesale	.99991078
36	Iron Forge	.99976448	72	Bulk	.99980039
			73	Services	.99995380

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-2

Relative Prices of MRIO Sectors in Region 2 (NH) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	.99984424	37	Iron Foundary	.99952265
2	Meat Products	.99891623	38	NonFerr Metal	.99874803
3	Dairy Prod.	.99800411	39	Metal Contain	.99885908
4	Can/Froz Food	.99940841	40	Struct Metal	.99868974
5	Grain Mill	.99837759	41	Screw Machine	.99902482
6	Bakery Prod.	.99883302	42	Engine/Turbine	.99890628
7	Sugar & Conf.	.99881934	43	Farm Equip	.99860868
8	Beverages	.99809790	44	Constrct Equip	.99781605
9	Other Food	.99896880	45	Mat/Hand Equip	.99870062
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99909937
11	Fabric/Yarn	.99889780	47	Spec. Machine	.99878070
12	Floor Cover	.99912631	48	Other NonElec	.99884632
13	Hosiery	.99858569	49	Comput. Equip	.99944181
14	Apparel	.99885773	50	Service Mach	.99883112
15	Other Fabric	.99888242	51	Elect. Equip	.99947819
16	Log/Lumber	.99940651	52	House Applian	.99896972
17	Wood Product	.99914235	53	Elect Lighting	.99928310
18	Pre Fab Home	.99901404	54	Receiving Set	.99925707
19	House Furnit	.99904302	55	Commun Equip.	.99954196
20	Other Furnit	.99828716	56	Elect Compon	.99952531
21	Paper Prod	.99889486	57	Other Elec Eq	.99932385
22	Paper Contain	.99863813	58	Motor Vehicle	.99893136
23	Newspaper	.99907846	59	Aircraft/Parts	.99911961
24	Indust Chem	.99892472	60	Missles/Parts	1.00000000
25	Agric Chem	.99887501	61	Air/Miss Prop	.99947763
26	Other Chem	.99853149	62	Other Trans Eq	.99885288
27	Plastics/Syn	.99868158	63	Sci/Photo Eq.	.99941265
28	Drugs	.99897712	64	Medical Equip.	.99909475
29	Cosmetics	.99816506	65	Other Mfg Prod	.99896155
30	Paint/Allied	.99866477	66	Railroads	.99982192
31	Petrol Refin	.99863992	67	Local Transit	.99976640
32	Rubber/Misc	.99892023	68	Mtr Frght Intra	1.0000000
33	Leather Prod	.99897467	69	Mtr Frght Inter	.99982479
34	Glass Prod	.99926875	70	Retail	.99986501
35	Stone/Clay Pr	.99856185	71	Wholesale	.99987202
36	Iron Forge	.99886534	72	Bulk	.99965805
			73	Services	.99992565

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-3

Relative Prices of MRIO Sectors in Region 3 (MA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	.99979151	37	Iron Foundary	.99928548
2	Meat Products	.99379484	38	NonFerr Metal	.99883340
3	Dairy Prod.	.99853083	39	Metal Contain	.99902605
4	Can/Froz Food	.99734411	40	Struct Metal	.99862795
5	Grain Mill	.99750715	41	Screw Machine	.99903341
6	Bakery Prod.	.99779729	42	Engine/Turbine	.99910218
7	Sugar & Conf.	.99389014	43	Farm Equip	.99901779
8	Beverages	.99809538	44	Constrct Equip	.99881067
9	Other Food	.99724852	45	Mat/Hand Equip	.99886969
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99932020
11	Fabric/Yarn	.99883359	47	Spec. Machine	.99910579
12	Floor Cover	.99841990	48	Other NonElec	.99921312
13	Hosiery	.99851082	49	Comput. Equip	.99945424
14	Apparel	.99883943	50	Service Mach	.99878750
15	Other Fabric	.99859671	51	Elect. Equip	.99909573
16	Log/Lumber	.99914983	52	House Applian	.99863219
17	Wood Product	.99903317	53	Elect Lighting	.99902937
18	Pre Fab Home	.99866603	54	Receiving Set	.99808665
19	House Furnit	.99812268	55	Commun Equip.	.99937949
20	Other Furnit	.99836141	56	Elect Compon	.99923774
21	Paper Prod	.99863909	57	Other Elec Eq	.99893483
22	Paper Contain	.99835450	58	Motor Vehicle	.99836985
23	Newspaper	.99907323	59	Aircraft/Parts	.99943171
24	Indust Chem	.99917688	60	Missles/Parts	.99970804
25	Agric Chem	.99858757	61	Air/Miss Prop	.99932554
26	Other Chem	.99838678	62	Other Trans Eq	.99845937
27	Plastics/Syn	.99899307	63	Sci/Photo Eq.	.99931038
28	Drugs	.99844321	64	Medical Equip.	.99892428
29	Cosmetics	.99781007	65	Other Mfg Prod	.99882557
30	Paint/Allied	.99868301	66	Railroads	.99978373
31	Petrol Refin	.99882480	67	Local Transit	.99979591
32	Rubber/Misc	.99856508	68	Mtr Frght Intra	1.0000000
33	Leather Prod	.99759170	69	Mtr Frght Inter	.99981683
34	Glass Prod	.99897326	70	Retail	.99977573
35	Stone/Clay Pr	.99872605	71	Wholesale	.99984713
36	Iron Forge	.99898321	72	Bulk	.99966746
			73	Services	.99991234

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-4

Relative Prices of MRIO Sectors in Region 4 (RI) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	1.00001114	37	Iron Foundary	.99985286
2	Meat Products	.99922075	38	NonFerr Metal	.99971022
3	Dairy Prod.	.99970516	39	Metal Contain	.99976480
4	Can/Froz Food	.99974108	40	Struct Metal	.99969436
5	Grain Mill	.99975671	41	Screw Machine	.99973130
6	Bakery Prod.	.99971807	42	Engine/Turbine	1.00000000
7	Sugar & Conf.	.99934207	43	Farm Equip	.99983364
8	Beverages	.99966326	44	Constrct Equip	.99975240
9	Other Food	.99951170	45	Mat/Hand Equip	.99978326
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99986615
11	Fabric/Yarn	.99968272	47	Spec. Machine	.99986487
12	Floor Cover	.99971858	48	Other NonElec	.99981157
13	Hosiery	.99957005	49	Comput. Equip	1.00004818
14	Apparel	.99981813	50	Service Mach	.99979819
15	Other Fabric	.99971063	51	Elect. Equip	.99986736
16	Log/Lumber	.99973845	52	House Applian	.99976031
17	Wood Product	.99975497	53	Elect Lighting	.99980512
18	Pre Fab Home	.99974202	54	Receiving Set	.99978602
19	House Furnit	.99973899	55	Commun Equip.	1.00006175
20	Other Furnit	.99972989	56	Elect Compon	.99983040
21	Paper Prod	.99959718	57	Other Elec Eq	.99978914
22	Paper Contain	.99957150	58	Motor Vehicle	.99976923
23	Newspaper	.99977608	59	Aircraft/Parts	.99978918
24	Indust Chem	.99974286	60	Missles/Parts	1.00000000
25	Agric Chem	.99971993	61	Air/Miss Prop	1.00000000
26	Other Chem	.99970447	62	Other Trans Eq	1.00002448
27	Plastics/Syn	.99967952	63	Sci/Photo Eq.	.99985378
28	Drugs	.99978150	64	Medical Equip.	.99979729
29	Cosmetics	.99969279	65	Other Mfg Prod	.99977569
30	Paint/Allied	.99967616	66	Railroads	1.00010494
31	Petrol Refin	.99972962	67	Local Transit	.99989218
32	Rubber/Misc	.99964733	68	Mtr Frght Intral	.00000000
33	Leather Prod	.99970824	69	Mtr Frght Inter	.99988411
34	Glass Prod	.99981498	70	Retail	.99989291
35	Stone/Clay Pr	.99976517	71	Wholesale	.99992030
36	Iron Forge	.99974120	72	Bulk	.99983865
			73	Services	.99995923

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-5

Relative Prices of MRIO Sectors in Region 5 (NY) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	.99989902	37	Iron Foundary	.99963488
2	Meat Products	.99883192	38	NonFerr Metal	.99948239
3	Dairy Prod.	.99960491	39	Metal Contain	.99949152
4	Can/Froz Food	.99909571	40	Struct Metal	.99948001
5	Grain Mill	.99928794	41	Screw Machine	.99947389
6	Bakery Prod.	.99943554	42	Engine/Turbine	.99958486
7	Sugar & Conf.	.99905545	43	Farm Equip	.99945687
8	Beverages	.99917537	44	Constrct Equip	.99907535
9	Other Food	.99938921	45	Mat/Hand Equip	.99948411
10	Tobacco Prod	.99969457	46	Metalwkg Equip	.99966696
11	Fabric/Yarn	.99938760	47	Spec. Machine	.99959212
12	Floor Cover	.99920917	48	Other NonElec	.99961694
13	Hosiery	.99925014	49	Comput. Equip	.99962161
14	Apparel	.99953828	50	Service Mach	.99953087
15	Other Fabric	.99936494	51	Elect. Equip	.99960124
16	Log/Lumber	.99965174	52	House Applian	.99943528
17	Wood Product	.99962771	53	Elect Lighting	.99952265
18	Pre Fab Home	.99952554	54	Receiving Set	.99916455
19	House Furnit	.99918353	55	Commun Equip.	.99972391
20	Other Furnit	.99925751	56	Elect Compon	.99954239
21	Paper Prod	.99946275	57	Other Elec Eq	.99954446
22	Paper Contain	.99934899	58	Motor Vehicle	.99938814
23	Newspaper	.99963812	59	Aircraft/Parts	.99956663
24	Indust Chem	.99965012	60	Missles/Parts	.99955144
25	Agric Chem	.99939681	61	Air/Miss Prop	.99962070
26	Other Chem	.99930210	62	Other Trans Eq	.99931413
27	Plastics/Syn	.99948521	63	Sci/Photo Eq.	.99981624
28	Drugs	.99960077	64	Medical Equip.	.99952351
29	Cosmetics	.99927479	65	Other Mfg Prod	.99941462
30	Paint/Allied	.99934211	66	Railroads	.99988018
31	Petrol Refin	.99965308	67	Local Transit	.99986651
32	Rubber/Misc	.99931360	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99919772	69	Mtr Frght Inter	.99989861
34	Glass Prod	.99966503	70	Retail	.99986917
35	Stone/Clay Pr	.99947194	71	Wholesale	.99990179
36	Iron Forge	.99941690	72	Bulk	.99980975
			73	Services	.99994697

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-6

Relative Prices of MRIO Sectors in Region 6 (PA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	.99990112	37	Iron Foundary	.99916281
2	Meat Products	.99889267	38	NonFerr Metal	.99929359
3	Dairy Prod.	.99929733	39	Metal Contain	.99925064
4	Can/Froz Food	.99780104	40	Struct Metal	.99921626
5	Grain Mill	.99875673	41	Screw Machine	.99931454
6	Bakery Prod.	.99911180	42	Engine/Turbine	.99949292
7	Sugar & Conf.	.99834313	43	Farm Equip	.99920615
8	Beverages	.99916170	44	Constrct Equip	.99924714
9	Other Food	.99866800	45	Mat/Hand Equip	.99931326
10	Tobacco Prod	.99933096	46	Metalwkg Equip	.99952634
11	Fabric/Yarn	.99899609	47	Spec. Machine	.99941886
12	Floor Cover	.99902276	48	Other NonElec	.99952014
13	Hosiery	.99893742	49	Comput. Equip	.99946574
14	Apparel	.99941740	50	Service Mach	.99934761
15	Other Fabric	.99917848	51	Elect. Equip	.99944189
16	Log/Lumber	.99941265	52	House Applian	.99922887
17	Wood Product	.99916864	53	Elect Lighting	.99937820
18	Pre Fab Home	.99892489	54	Receiving Set	.99916704
19	House Furnit	.99898978	55	Commun Equip.	.99961780
20	Other Furnit	.99915794	56	Elect Compon	.99953455
21	Paper Prod	.99904862	57	Other Elec Eq	.99928314
22	Paper Contain	.99916361	58	Motor Vehicle	.99906735
23	Newspaper	.99937645	59	Aircraft/Parts	.99956669
24	Indust Chem	.99940390	60	Missles/Parts	.99977231
25	Agric Chem	.99887495	61	Air/Miss Prop	.99958432
26	Other Chem	.99882521	62	Other Trans Eq	.99935299
27	Plastics/Syn	.99922834	63	Sci/Photo Eq.	.99964399
28	Drugs	.99954083	64	Medical Equip.	.99935487
29	Cosmetics	.99876228	65	Other Mfg Prod	.99907169
30	Paint/Allied	.99909252	66	Railroads	.99987739
31	Petrol Refin	.99968536	67	Local Transit	.99989310
32	Rubber/Misc	.99903748	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99905705	69	Mtr Frght Inter	.99991411
34	Glass Prod	.99921323	70	Retail	.99986503
35	Stone/Clay Pr	.99826056	71	Wholesale	.99989653
36	Iron Forge	.99925343	72	Bulk	.99975415
			73	Services	.99994124

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-7

Relative Prices of MRIO Sectors in Region 7 (NJ, DE, DC, MD, VA) After Intrastate Motor Carrier Deregulation in the 20 States

(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99984204	37	Iron Foundary	.99983874
2	Meat Products	.99974001	38	NonFerr Metal	.99965682
3	Dairy Prod.	.99977427	39	Metal Contain	.99974045
4	Can/Froz Food	.99972294	40	Struct Metal	.99973559
5	Grain Mill	.99966835	41	Screw Machine	.99976266
6	Bakery Prod.	.99973162	42	Engine/Turbine	.99978149
7	Sugar & Conf.	.99953606	43	Farm Equip	.99976580
8	Beverages	.99970513	44	Constrct Equip	.99974552
9	Other Food	.99974043	45	Mat/Hand Equip	.99979292
10	Tobacco Prod	.99987754	46	Metalwkg Equip	.99982864
11	Fabric/Yarn	.99964297	47	Spec. Machine	.99980222
12	Floor Cover	.99960818	48	Other NonElec	.99981349
13	Hosiery	.99954900	49	Comput. Equip	.99983592
14	Apparel	.99982809	50	Service Mach	.99974434
15	Other Fabric	.99972890	51	Elect. Equip	.99980349
16	Log/Lumber	.99977291	52	House Applian	.99980764
17	Wood Product	.99971787	53	Elect Lighting	.99977075
18	Pre Fab Home	.99970676	54	Receiving Set	.99976669
19	House Furnit	.99977096	55	Commun Equip.	.99984728
20	Other Furnit	.99977984	56	Elect Compon	.99981898
21	Paper Prod	.99968646	57	Other Elec Eq	.99971983
22	Paper Contain	.99966493	58	Motor Vehicle	.99969976
23	Newspaper	.99980019	59	Aircraft/Parts	.99984356
24	Indust Chem	.99961175	60	Missles/Parts	.99986645
25	Agric Chem	.99963179	61	Air/Miss Prop	.99983705
26	Other Chem	.99959554	62	Other Trans Eq	.99981259
27	Plastics/Syn	.99954723	63	Sci/Photo Eq.	.99983864
28	Drugs	.99983639	64	Medical Equip.	.99981303
29	Cosmetics	.99971959	65	Other Mfg Prod	.99974400
30	Paint/Allied	.99957540	66	Railroads	.99985076
31	Petrol Refin	.99973324	67	Local Transit	.99981414
32	Rubber/Misc	.99960399	68	Mtr Frght Intra	.99985388
33	Leather Prod	.99973837	69	Mtr Frght Inter	.99985382
34	Glass Prod	.99978311	70	Retail	.99987712
35	Stone/Clay Pr	.99978355	71	Wholesale	.99989722
36	Iron Forge	.99976009	72	Bulk	.99979635
			73	Services	.99995126

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-8

Relative Prices of MRIO Sectors in Region 8 (WV) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	.99990949	37	Iron Foundary	.99981278
2	Meat Products	.99922729	38	NonFerr Metal	.99961996
3	Dairy Prod.	.99956048	39	Metal Contain	.99963405
4	Can/Froz Food	.99896557	40	Struct Metal	.99905674
5	Grain Mill	.99894598	41	Screw Machine	.99961584
6	Bakery Prod.	.99918482	42	Engine/Turbine	.99966903
7	Sugar & Conf.	1.00000000	43	Farm Equip	.99964659
8	Beverages	.99876875	44	Constrct Equip	.99965246
9	Other Food	.99967543	45	Mat/Hand Equip	.99965122
10	Tobacco Prod	.99970858	46	Metalwkg Equip	.99963910
11	Fabric/Yarn	.99952479	47	Spec. Machine	.99967017
12	Floor Cover	.99950836	48	Other NonElec	.99975923
13	Hosiery	1.00000000	49	Comput. Equip	1.00000000
14	Apparel	.99978142	50	Service Mach	.99970671
15	Other Fabric	.99968358	51	Elect. Equip	.99969130
16	Log/Lumber	.99964180	52	House Applian	.99976348
17	Wood Product	.99926089	53	Elect Lighting	.99970853
18	Pre Fab Home	1.00000000	54	Receiving Set	1.00000000
19	House Furnit	.99963167	55	Commun Equip.	.99975680
20	Other Furnit	.99969860	56	Elect Compon	.99967759
21	Paper Prod	.99907214	57	Other Elec Eq	.99966058
22	Paper Contain	.99955044	58	Motor Vehicle	.99957183
23	Newspaper	.99941690	59	Aircraft/Parts	.99993632
24	Indust Chem	.99936189	60	Missles/Parts	1.00000000
25	Agric Chem	.99965637	61	Air/Miss Prop	1.00000000
26	Other Chem	.99963109	62	Other Trans Eq	.99961089
27	Plastics/Syn	.99922242	63	Sci/Photo Eq.	.99981119
28	Drugs	.99969890	64	Medical Equip.	.99980120
29	Cosmetics	.99963789	65	Other Mfg Prod	.99966215
30	Paint/Allied	.99956719	66	Railroads	.99987240
31	Petrol Refin	.99968409	67	Local Transit	.99986299
32	Rubber/Misc	.99955759	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99972186	69	Mtr Frght Inter	.99989412
34	Glass Prod	.99981963	70	Retail	.99990324
35	Stone/Clay Pr	.99907352	71	Wholesale	.99990112
36	Iron Forge	.99903420	72	Bulk	.99984123
			73	Services	.99995644

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-9

Relative Prices of MRIO Sectors in Region 9 (TN, NC, SC, FL)
After Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99983986	37	Iron Foundary	.99983362
2	Meat Products	.99971277	38	NonFerr Metal	.99965328
3	Dairy Prod.	.99976305	39	Metal Contain	.99970066
4	Can/Froz Food	.99967858	40	Struct Metal	.99970961
5	Grain Mill	.99960587	41	Screw Machine	.99971048
6	Bakery Prod.	.99971229	42	Engine/Turbine	.99977855
7	Sugar & Conf.	.99948672	43	Farm Equip	.99976890
8	Beverages	.99965638	44	Constrct Equip	.99977929
9	Other Food	.99971864	45	Mat/Hand Equip	.99976841
10	Tobacco Prod	.99986459	46	Metalwkg Equip	.99981616
11	Fabric/Yarn	.99969762	47	Spec. Machine	.99980246
12	Floor Cover	.99964699	48	Other NonElec	.99978971
13	Hosiery	.99968736	49	Comput. Equip	.99982133
14	Apparel	.99981933	50	Service Mach	.99971781
15	Other Fabric	.99971848	51	Elect. Equip	.99977366
16	Log/Lumber	.99977081	52	House Applian	.99974539
17	Wood Product	.99973304	53	Elect Lighting	.99978054
18	Pre Fab Home	.99969118	54	Receiving Set	.99978895
19	House Furnit	.99977440	55	Commun Equip.	.99984071
20	Other Furnit	.99978742	56	Elect Compon	.99981278
21	Paper Prod	.99969793	57	Other Elec Eq	.99975352
22	Paper Contain	.99960963	58	Motor Vehicle	.99972848
23	Newspaper	.99978318	59	Aircraft/Parts	.99984174
24	Indust Chem	.99968707	60	Missles/Parts	.99994255
25	Agric Chem	.99969092	61	Air/Miss Prop	.99981768
26	Other Chem	.99960263	62	Other Trans Eq	.99974247
27	Plastics/Syn	.99957884	63	Sci/Photo Eq.	.99983233
28	Drugs	.99981290	64	Medical Equip.	.99982643
29	Cosmetics	.99970156	65	Other Mfg Prod	.99976966
30	Paint/Allied	.99955601	66	Railroads	.99983076
31	Petrol Refin	.99962938	67	Local Transit	.99979743
32	Rubber/Misc	.99968934	68	Mtr Frght Intra	.99984489
33	Leather Prod	.99974775	69	Mtr Frght Inter	.99984514
34	Glass Prod	.99979580	70	Retail	.99986358
35	Stone/Clay Pr	.99979651	71	Wholesale	.99988611
36	Iron Forge	.99972835	72	Bulk	.99977672
			73	Services	.99994389

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-10

Relative Prices of MRIO Sectors in Region 10 (GA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	All Other	.99980186	37	Iron Foundary	.99909908
2	Meat Products	.99873700	38	NonFerr Metal	.99906434
3	Dairy Prod.	.99817283	39	Metal Contain	.99884010
4	Can/Froz Food	.99803716	40	Struct Metal	.99877297
5	Grain Mill	.99817728	41	Screw Machine	.99882291
6	Bakery Prod.	.99867450	42	Engine/Turbine	.99892189
7	Sugar & Conf.	.99753147	43	Farm Equip	.99866403
8	Beverages	.99862282	44	Constrct Equip	.99884754
9	Other Food	.99707077	45	Mat/Hand Equip	.99874840
10	Tobacco Prod	.99940489	46	Metalwkg Equip	.99922620
11	Fabric/Yarn	.99921276	47	Spec. Machine	.99901971
12	Floor Cover	.99916592	48	Other NonElec	.99917743
13	Hosiery	.99900561	49	Comput. Equip	.99917859
14	Apparel	.99932491	50	Service Mach	.99900133
15	Other Fabric	.99922542	51	Elect. Equip	.99913899
16	Log/Lumber	.99948891	52	House Applian	.99853688
17	Wood Product	.99927192	53	Elect Lighting	.99883155
18	Pre Fab Home	.99844072	54	Receiving Set	.99889526
19	House Furnit	.99870329	55	Commun Equip.	.99947895
20	Other Furnit	.99880096	56	Elect Compon	.99924103
21	Paper Prod	.99907591	57	Other Elec Eq	.99913004
22	Paper Contain	.99881014	58	Motor Vehicle	.99888876
23	Newspaper	.99925441	59	Aircraft/Parts	.99946305
24	Indust Chem	.99915874	60	Missles/Parts	.99946633
25	Agric Chem	.99877624	61	Air/Miss Prop	.99925456
26	Other Chem	.99843672	62	Other Trans Eq	.99857866
27	Plastics/Syn	.99895188	63	Sci/Photo Eq.	.99898366
28	Drugs	.99917954	64	Medical Equip.	.99870080
29	Cosmetics	.99826758	65	Other Mfg Prod	.99902494
30	Paint/Allied	.99887628	66	Railroads	.99975678
31	Petrol Refin	.99853890	67	Local Transit	.99982862
32	Rubber/Misc	.99899279	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99842053	69	Mtr Frght Inter	.99982080
34	Glass Prod	.99860686	70	Retail	.99980739
35	Stone/Clay Pr	.99704830	71	Wholessale	.99984445
36	Iron Forge	.99903971	72	Bulk	.99953551
			73	Services	.99992286

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-11

Relative Prices of MRIO Sectors in Region 11 (AL) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99987710	37	Iron Foundary	.99966485
2	Meat Products	.99954677	38	NonFerr Metal	.99934079
3	Dairy Prod.	.99962771	39	Metal Contain	.99941311
4	Can/Froz Food	.99945991	40	Struct Metal	.99933954
5	Grain Mill	.99944722	41	Screw Machine	.99945931
6	Bakery Prod.	.99937424	42	Engine/Turbine	.99957069
7	Sugar & Conf.	.99927900	43	Farm Equip	.99950815
8	Beverages	.99927440	44	Constrct Equip	.99939697
9	Other Food	.99937378	45	Mat/Hand Equip	.99949725
10	Tobacco Prod	.99956114	46	Metalwkg Equip	.99962942
11	Fabric/Yarn	.99929051	47	Spec. Machine	.99953299
12	Floor Cover	.99913561	48	Other NonElec	.99959950
13	Hosiery	.99926218	49	Comput. Equip	.99972250
14	Apparel	.99965531	50	Service Mach	.99937502
15	Other Fabric	.99939364	51	Elect. Equip	.99952062
16	Log/Lumber	.99973230	52	House Applian	.99944827
17	Wood Product	.99963194	53	Elect Lighting	.99950667
18	Pre Fab Home	.99929557	54	Receiving Set	.99957687
19	House Furnit	.99947113	55	Commun Equip.	.99976753
20	Other Furnit	.99945322	56	Elect Compon	.99963319
21	Paper Prod	.99964254	57	Other Elec Eq	.99954529
22	Paper Contain	.99949940	58	Motor Vehicle	.99940204
23	Newspaper	.99971885	59	Aircraft/Parts	.99974748
24	Indust Chem	.99944296	60	Missles/Parts	.99983806
25	Agric Chem	.99937480	61	Air/Miss Prop	.99973269
26	Other Chem	.99931478	62	Other Trans Eq	.99945022
27	Plastics/Syn	.99906973	63	Sci/Photo Eq.	.99965254
28	Drugs	.99941905	64	Medical Equip.	.99959309
29	Cosmetics	.99941545	65	Other Mfg Prod	.99942211
30	Paint/Allied	.99912071	66	Railroads	.99983407
31	Petrol Refin	.99967205	67	Local Transit	.99982544
32	Rubber/Misc	.99943534	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99952543	69	Mtr Frght Inter	.99989538
34	Glass Prod	.99956696	70	Retail	.99983014
35	Stone/Clay Pr	.99969960	71	Wholesale	.99986822
36	Iron Forge	.99956240	72	Bulk	.99972938
			73	Services	.99993284

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-12

Relative Prices of MRIO Sectors in Region 12 (MS) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99979967	37	Iron Foundary	.99927934
2	Meat Products	.99923218	38	NonFerr Metal	.99832360
3	Dairy Prod.	.99917781	39	Metal Contain	.99864358
4	Can/Froz Food	.99896545	40	Struct Metal	.99881365
5	Grain Mill	.99860377	41	Screw Machine	.99855371
6	Bakery Prod.	.99869563	42	Engine/Turbine	.99876315
7	Sugar & Conf.	.99912286	43	Farm Equip	.99830790
8	Beverages	.99858601	44	Constrct Equip	.99848347
9	Other Food	.99885747	45	Mat/Hand Equip	.99883711
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99896100
11	Fabric/Yarn	.99827168	47	Spec. Machine	.99870815
12	Floor Cover	.99853405	48	Other NonElec	.99918489
13	Hosiery	.99825258	49	Comput. Equip	.99840324
14	Apparel	.99919092	50	Service Mach	.99886134
15	Other Fabric	.99870608	51	Elect. Equip	.99890459
16	Log/Lumber	.99929451	52	House Applian	.99847961
17	Wood Product	.99914683	53	Elect Lighting	.99832348
18	Pre Fab Home	.99881466	54	Receiving Set	.99857281
19	House Furnit	.99815212	55	Commun Equip.	.99913349
20	Other Furnit	.99856153	56	Elect Compon	.99878512
21	Paper Prod	.99917689	57	Other Elec Eq	.99856505
22	Paper Contain	.99837719	58	Motor Vehicle	.99812474
23	Newspaper	.99929119	59	Aircraft/Parts	.99949501
24	Indust Chem	.99899973	60	Missles/Parts	.99943407
25	Agric Chem	.99868378	61	Air/Miss Prop	.99902388
26	Other Chem	.99867134	62	Other Trans Eq	.99896977
27	Plastics/Syn	.99800216	63	Sci/Photo Eq.	.99955958
28	Drugs	.99877541	64	Medical Equip.	.99860175
29	Cosmetics	.99721895	65	Other Mfg Prod	.99871763
30	Paint/Allied	.99764593	66	Railroads	.99978412
31	Petrol Refin	.99947299	67	Local Transit	.99975957
32	Rubber/Misc	.99781673	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99860677	69	Mtr Frght Inter	.99984900
34	Glass Prod	.99894981	70	Retail	.99981658
35	Stone/Clay Pr	.99917408	71	Wholesale	.99982836
36	Iron Forge	.99891511	72	Bulk	.99957777
			73	Services	.99992220

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-13

Relative Prices of MRIO Sectors in Region 13 (KY) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99989755	37	Iron Foundary	.99944758
2	Meat Products	.99943386	38	NonFerr Metal	.99915261
3	Dairy Prod.	.99941413	39	Metal Contain	.99932313
4	Can/Froz Food	.99874732	40	Struct Metal	.99924981
5	Grain Mill	.99869244	41	Screw Machine	.99927735
6	Bakery Prod.	.99910820	42	Engine/Turbine	.99937842
7	Sugar & Conf.	.99842333	43	Farm Equip	.99946281
8	Beverages	.99885751	44	Constrct Equip	.99937801
9	Other Food	.99836456	45	Mat/Hand Equip	.99948809
10	Tobacco Prod	.99950286	46	Metalwkg Equip	.99953243
11	Fabric/Yarn	.99913088	47	Spec. Machine	.99952339
12	Floor Cover	.99895433	48	Other NonElec	.99953654
13	Hosiery	.99943926	49	Comput. Equip	.99951220
14	Apparel	.99954249	50	Service Mach	.99938318
15	Other Fabric	.99944558	51	Elect. Equip	.99942703
16	Log/Lumber	.99937589	52	House Applian	.99936448
17	Wood Product	.99917230	53	Elect Lighting	.99943031
18	Pre Fab Home	.99888641	54	Receiving Set	.99908407
19	House Furnit	.99911179	55	Commun Equip.	.99964393
20	Other Furnit	.99930888	56	Elect Compon	.99940156
21	Paper Prod	.99911797	57	Other Elec Eq	.99937811
22	Paper Contain	.99913517	58	Motor Vehicle	.99918300
23	Newspaper	.99930503	59	Aircraft/Parts	.99935533
24	Indust Chem	.99932807	60	Missles/Parts	1.00000000
25	Agric Chem	.99925076	61	Air/Miss Prop	.99936672
26	Other Chem	.99918572	62	Other Trans Eq	.99931911
27	Plastics/Syn	.99904109	63	Sci/Photo Eq.	.99958020
28	Drugs	.99936211	64	Medical Equip.	.99930965
29	Cosmetics	.99850030	65	Other Mfg Prod	.99933119
30	Paint/Allied	.99914529	66	Railroads	.99985231
31	Petrol Refin	.99965958	67	Local Transit	.99983772
32	Rubber/Misc	.99915990	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99932904	69	Mtr Frght Inter	.99987990
34	Glass Prod	.99950513	70	Retail	.99982948
35	Stone/Clay Pr	.99893858	71	Wholesale	.99986385
36	Iron Forge	.99922676	72	Bulk	.99975634
			73	Services	.99992875

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-14

Relative Prices of MRIO Sectors in Region 14 (WI, MI, IN, OH)
After Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99989922	37	Iron Foundary	.99984347
2	Meat Products	.99973396	38	NonFerr Metal	.99961737
3	Dairy Prod.	.99969975	39	Metal Contain	.99971815
4	Can/Froz Food	.99962436	40	Struct Metal	.99970224
5	Grain Mill	.99956139	41	Screw Machine	.99973137
6	Bakery Prod.	.99968757	42	Engine/Turbine	.99977892
7	Sugar & Conf.	.99958256	43	Farm Equip	.99977990
8	Beverages	.99969055	44	Constrct Equip	.99976043
9	Other Food	.99956716	45	Mat/Hand Equip	.99978031
10	Tobacco Prod	1.00002822	46	Metalwkg Equip	.99984700
11	Fabric/Yarn	.99962843	47	Spec. Machine	.99979681
12	Floor Cover	.99965669	48	Other NonElec	.99981666
13	Hosiery	.99956080	49	Comput. Equip	.99982351
14	Apparel	.99984292	50	Service Mach	.99973821
15	Other Fabric	.99972120	51	Elect. Equip	.99977360
16	Log/Lumber	.99967995	52	House Applian	.99974598
17	Wood Product	.99965492	53	Elect Lighting	.99975875
18	Pre Fab Home	.99964193	54	Receiving Set	.99966487
19	House Furnit	.99970900	55	Commun Equip.	.99980970
20	Other Furnit	.99976444	56	Elect Compon	.99978934
21	Paper Prod	.99965389	57	Other Elec Eq	.99978134
22	Paper Contain	.99962139	58	Motor Vehicle	.99972139
23	Newspaper	.99976789	59	Aircraft/Parts	.99983444
24	Indust Chem	.99972909	60	Missles/Parts	.99987734
25	Agric Chem	.99969056	61	Air/Miss Prop	.99984024
26	Other Chem	.99958670	62	Other Trans Eq	.99968472
27	Plastics/Syn	.99962700	63	Sci/Photo Eq.	.99983734
28	Drugs	.99979555	64	Medical Equip.	.99977621
29	Cosmetics	.99972127	65	Other Mfg Prod	.99974218
30	Paint/Allied	.99961937	66	Railroads	.99986769
31	Petrol Refin	.99976274	67	Local Transit	.99986660
32	Rubber/Misc	.99961852	68	Mtr Frght Intra	.99989437
33	Leather Prod	.99970379	69	Mtr Frght Inter	.99989434
34	Glass Prod	.99979065	70	Retail	.99985547
35	Stone/Clay Pr	.99980150	71	Wholesale	.99989148
36	Iron Forge	.99975501	72	Bulk	.99978139
			73	Services	.99993818

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-15

Relative Prices of MRIO Sectors in Region 15 (IL) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99978571	37	Iron Foundary	.99802028
2	Meat Products	.99677794	38	NonFerr Metal	.99828529
3	Dairy Prod.	.99734557	39	Metal Contain	.99780935
4	Can/Froz Food	.99366640	40	Struct Metal	.99760359
5	Grain Mill	.99519704	41	Screw Machine	.99785343
6	Bakery Prod.	.99688643	42	Engine/Turbine	.99828452
7	Sugar & Conf.	.99688516	43	Farm Equip	.99793776
8	Beverages	.99677241	44	Constrct Equip	.99796696
9	Other Food	.99485880	45	Mat/Hand Equip	.99783955
10	Tobacco Prod	.99793572	46	Metalwkg Equip	.99864448
11	Fabric/Yarn	.99607401	47	Spec. Machine	.99815720
12	Floor Cover	.99651254	48	Other NonElec	.99853226
13	Hosiery	.99740891	49	Comput. Equip	.99812550
14	Apparel	.99722800	50	Service Mach	.99792937
15	Other Fabric	.99702707	51	Elect. Equip	.99832090
16	Log/Lumber	.99778105	52	House Applian	.99729516
17	Wood Product	.99719408	53	Elect Lighting	.99813119
18	Pre Fab Home	.99691852	54	Receiving Set	.99691673
19	House Furnit	.99698016	55	Commun Equip.	.99887390
20	Other Furnit	.99693930	56	Elect Compon	.99845973
21	Paper Prod	.99649605	57	Other Elec Eq	.99800079
22	Paper Contain	.99674155	58	Motor Vehicle	.99703688
23	Newspaper	.99790367	59	Aircraft/Parts	.99902865
24	Indust Chem	.99797465	60	Missles/Parts	.99898060
25	Agric Chem	.99692837	61	Air/Miss Prop	.99880182
26	Other Chem	.99535480	62	Other Trans Eq	.99750932
27	Plastics/Syn	.99683548	63	Sci/Photo Eq.	.99842825
28	Drugs	.99803307	64	Medical Equip.	.99765814
29	Cosmetics	.99706346	65	Other Mfg Prod	.99724719
30	Paint/Allied	.99689111	66	Railroads	.99972861
31	Petrol Refin	.99914461	67	Local Transit	.99978831
32	Rubber/Misc	.99726563	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99618946	69	Mtr Frght Inter	.99983646
34	Glass Prod	.99639554	70	Retail	.99967401
35	Stone/Clay Pr	.99030457	71	Wholesale	.99976769
36	Iron Forge	.99756987	72	Bulk	.99931367
			73	Services	.99986920

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

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TABLE 6-16

Relative Prices of MRIO Sectors in Region 16 (MN) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99979580	37	Iron Foundary	.99771054
2	Meat Products	.99821014	38	NonFerr Metal	.99676307
3	Dairy Prod.	.99781047	39	Metal Contain	.99740398
4	Can/Froz Food	.99301772	40	Struct Metal	.99720640
5	Grain Mill	.99229172	41	Screw Machine	.99763361
6	Bakery Prod.	.99651400	42	Engine/Turbine	.99787921
7	Sugar & Conf.	.99246330	43	Farm Equip	.99744791
8	Beverages	.99321515	44	Constrct Equip	.99768921
9	Other Food	.99220742	45	Mat/Hand Equip	.99742928
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99779940
11	Fabric/Yarn	.99688554	47	Spec. Machine	.99778508
12	Floor Cover	.99624579	48	Other NonElec	.99819096
13	Hosiery	.99720794	49	Comput. Equip	.99902381
14	Apparel	.99596346	50	Service Mach	.99773822
15	Other Fabric	.99645631	51	Elect. Equip	.99769655
16	Log/Lumber	.99789264	52	House Applian	.99698603
17	Wood Product	.99775257	53	Elect Lighting	.99733718
18	Pre Fab Home	.99633184	54	Receiving Set	.99357212
19	House Furnit	.99452208	55	Commun Equip.	.99839859
20	Other Furnit	.99609788	56	Elect Compon	.99858638
21	Paper Prod	.99766025	57	Other Elec Eq	.99773854
22	Paper Contain	.99724673	58	Motor Vehicle	.99654771
23	Newspaper	.99793742	59	Aircraft/Parts	.99799837
24	Indust Chem	.99793361	60	Missles/Parts	.99845404
25	Agric Chem	.99753240	61	Air/Miss Prop	.99765971
26	Other Chem	.99620979	62	Other Trans Eq	.99650934
27	Plastics/Syn	.99824030	63	Sci/Photo Eq.	.99845287
28	Drugs	.99779321	64	Medical Equip.	.99722837
29	Cosmetics	.99592636	65	Other Mfg Prod	.99723039
30	Paint/Allied	.99713687	66	Railroads	.99968196
31	Petrol Refin	.99895176	67	Local Transit	.99974393
32	Rubber/Misc	.99715313	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99265303	69	Mtr Frght Inter	.99980238
34	Glass Prod	.99542230	70	Retail	.99966516
35	Stone/Clay Pr	.99405034	71	Wholesale	.99976525
36	Iron Forge	.99750691	72	Bulk	.99936171
			73	Services	.99987253

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-17

Relative Prices of MRIO Sectors in Region 17 (IA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99988742	37	Iron Foundary	.99974946
2	Meat Products	.99944265	38	NonFerr Metal	.99916375
3	Dairy Prod.	.99918042	39	Metal Contain	.99963661
4	Can/Froz Food	.99820048	40	Struct Metal	.99946722
5	Grain Mill	.99828627	41	Screw Machine	.99961155
6	Bakery Prod.	.99908136	42	Engine/Turbine	.99965585
7	Sugar & Conf.	.99860558	43	Farm Equip	.99970236
8	Beverages	.99794691	44	Constrct Equip	.99966393
9	Other Food	.99954258	45	Mat/Hand Equip	.99962670
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99974420
11	Fabric/Yarn	.99965195	47	Spec. Machine	.99974166
12	Floor Cover	.99957125	48	Other NonElec	.99970098
13	Hosiery	1.00000000	49	Comput. Equip	.99979301
14	Apparel	.99983980	50	Service Mach	.99960613
15	Other Fabric	.99972037	51	Elect. Equip	.99968683
16	Log/Lumber	.99921448	52	House Applian	.99958488
17	Wood Product	.99949732	53	Elect Lighting	.99966051
18	Pre Fab Home	.99909936	54	Receiving Set	.99980989
19	House Furnit	.99963684	55	Commun Equip.	.99979925
20	Other Furnit	.99967118	56	Elect Compon	.99968310
21	Paper Prod	.99943564	57	Other Elec Eq	.99958104
22	Paper Contain	.99931092	58	Motor Vehicle	.99960245
23	Newspaper	.99965053	59	Aircraft/Parts	.99965088
24	Indust Chem	.99923090	60	Missles/Parts	.99980848
25	Agric Chem	.99968284	61	Air/Miss Prop	.99975232
26	Other Chem	.99944791	62	Other Trans Eq	.99962670
27	Plastics/Syn	.99918246	63	Sci/Photo Eq.	.99975266
28	Drugs	.99971281	64	Medical Equip.	.99975959
29	Cosmetics	.99959477	65	Other Mfg Prod	.99964703
30	Paint/Allied	.99940982	66	Railroads	.99986809
31	Petrol Refin	.99860500	67	Local Transit	.99985744
32	Rubber/Misc	.99955867	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99967240	69	Mtr Frght Inter	.99990873
34	Glass Prod	.99838201	70	Retail	.99981859
35	Stone/Clay Pr	.99846996	71	Wholesale	.99986117
36	Iron Forge	.99898027	72	Bulk	.99965750
			73	Services	.99993035

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-18

Relative Prices of MRIO Sectors in Region 18 (MO, AR, NE, KS, ND)
After Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99987564	37	Iron Foundary	.99975591
2	Meat Products	.99966914	38	NonFerr Metal	.99960151
3	Dairy Prod.	.99962371	39	Metal Contain	.99957302
4	Can/Froz Food	.99950544	40	Struct Metal	.99952505
5	Grain Mill	.99954222	41	Screw Machine	.99956861
6	Bakery Prod.	.99961831	42	Engine/Turbine	.99963991
7	Sugar & Conf.	.99920909	43	Farm Equip	.99968598
8	Beverages	.99942590	44	Constrct Equip	.99966720
9	Other Food	.99953560	45	Mat/Hand Equip	.99967030
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99973713
11	Fabric/Yarn	.99962046	47	Spec. Machine	.99971430
12	Floor Cover	.99955037	48	Other NonElec	.99972240
13	Hosiery	.99947272	49	Comput. Equip	.99979039
14	Apparel	.99980922	50	Service Mach	.99965979
15	Other Fabric	.99968909	51	Elect. Equip	.99967577
16	Log/Lumber	.99977332	52	House Applian	.99962880
17	Wood Product	.99966914	53	Elect Lighting	.99963799
18	Pre Fab Home	.99959863	54	Receiving Set	.99966378
19	House Furnit	.99967026	55	Commun Equip.	.99973364
20	Other Furnit	.99965932	56	Elect Compon	.99971442
21	Paper Prod	.99956499	57	Other Elec Eq	.99960543
22	Paper Contain	.99947516	58	Motor Vehicle	.99954201
23	Newspaper	.99971724	59	Aircraft/Parts	.99978772
24	Indust Chem	.99962243	60	Missles/Parts	.99978397
25	Agric Chem	.99959247	61	Air/Miss Prop	.99974768
26	Other Chem	.99950243	62	Other Trans Eq	.99958737
27	Plastics/Syn	.99948613	63	Sci/Photo Eq.	.99975243
28	Drugs	.99972438	64	Medical Equip.	.99972075
29	Cosmetics	.99955207	65	Other Mfg Prod	.99965827
30	Paint/Allied	.99938109	66	Railroads	.99984586
31	Petrol Refin	.99970023	67	Local Transit	.99979452
32	Rubber/Misc	.99949281	68	Mtr Frght Intra	.99987385
33	Leather Prod	.99963467	69	Mtr Frght Inter	.99987372
34	Glass Prod	.99959765	70	Retail	.99982643
35	Stone/Clay Pr	.99974110	71	Wholesale	.99987010
36	Iron Forge	.99964081	72	Bulk	.99971167
			73	Services	.99993010

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-19
Relative Prices of MRIO Sectors in Region 19 (SD) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99989581	37	Iron Foundary	1.00000000
2	Meat Products	.99973344	38	NonFerr Metal	1.00000000
3	Dairy Prod.	.99967378	39	Metal Contain	.99948831
4	Can/Froz Food	.99968111	40	Struct Metal	.99938888
5	Grain Mill	.99873405	41	Screw Machine	1.00000000
6	Bakery Prod.	.99950971	42	Engine/Turbine	1.00000000
7	Sugar & Conf.	1.00000000	43	Farm Equip	.99955128
8	Beverages	.99947866	44	Constrct Equip	.99960107
9	Other Food	.99872918	45	Mat/Hand Equip	.99962577
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99970555
11	Fabric/Yarn	.99912747	47	Spec. Machine	1.00000000
12	Floor Cover	.99894892	48	Other NonElec	.99968356
13	Hosiery	1.00000000	49	Comput. Equip	.99968849
14	Apparel	.99975972	50	Service Mach	1.00000000
15	Other Fabric	.99948893	51	Elect. Equip	.99971843
16	Log/Lumber	.99975168	52	House Applian	1.00000000
17	Wood Product	.99969106	53	Elect Lighting	1.00000000
18	Pre Fab Home	.99967563	54	Receiving Set	1.00000000
19	House Furnit	1.00000000	55	Commun Equip.	1.00000000
20	Other Furnit	1.00000000	56	Elect Compon	.99962866
21	Paper Prod	.99954354	57	Other Elec Eq	1.00000000
22	Paper Contain	1.00000000	58	Motor Vehicle	.99934070
23	Newspaper	.99959232	59	Aircraft/Parts	1.00000000
24	Indust Chem	.99981609	60	Missles/Parts	1.00000000
25	Agric Chem	1.00000000	61	Air/Miss Prop	1.00000000
26	Other Chem	1.00000000	62	Other Trans Eq	.99938303
27	Plastics/Syn	1.00000000	63	Sci/Photo Eq.	.99957193
28	Drugs	1.00000000	64	Medical Equip.	.99947118
29	Cosmetics	1.00000000	65	Other Mfg Prod	.99957161
30	Paint/Allied	1.00000000	66	Railroads	.99995074
31	Petrol Refin	.99968134	67	Local Transit	.99984628
32	Rubber/Misc	.99946094	68	Mtr Frght Intra	1.00000000
33	Leather Prod	1.00000000	69	Mtr Frght Inter	.99991596
34	Glass Prod	1.00000000	70	Retail	.99982098
35	Stone/Clay Pr	.99969151	71	Wholesale	.99988012
36	Iron Forge	1.00000000	72	Bulk	.99967890
			73	Services	.99994071

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-20

Relative Prices of MRIO Sectors in Region 20 (OK) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99986885	37	Iron Foundary	.99974274
2	Meat Products	.99914472	38	NonFerr Metal	.99938273
3	Dairy Prod.	.99931425	39	Metal Contain	.99955474
4	Can/Froz Food	.99719694	40	Struct Metal	.99947700
5	Grain Mill	.99754787	41	Screw Machine	.99954965
6	Bakery Prod.	.99886246	42	Engine/Turbine	.99963754
7	Sugar & Conf.	.99715597	43	Farm Equip	.99957330
8	Beverages	.99811352	44	Constrct Equip	.99955799
9	Other Food	.99819431	45	Mat/Hand Equip	.99968848
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99963664
11	Fabric/Yarn	.99932905	47	Spec. Machine	.99966147
12	Floor Cover	.99950731	48	Other NonElec	.99967159
13	Hosiery	.99960849	49	Comput. Equip	.99974955
14	Apparel	.99978599	50	Service Mach	.99956799
15	Other Fabric	.99959739	51	Elect. Equip	.99968704
16	Log/Lumber	.99960192	52	House Applian	.99958404
17	Wood Product	.99898531	53	Elect Lighting	.99963948
18	Pre Fab Home	.99832045	54	Receiving Set	.99972698
19	House Furnit	.99954765	55	Commun Equip.	.99967055
20	Other Furnit	.99956534	56	Elect Compon	.99970013
21	Paper Prod	.99916009	57	Other Elec Eq	.99949136
22	Paper Contain	.99930471	58	Motor Vehicle	.99948713
23	Newspaper	.99905303	59	Aircraft/Parts	.99973521
24	Indust Chem	.99928468	60	Missles/Parts	.99972110
25	Agric Chem	.99963059	61	Air/Miss Prop	.99971291
26	Other Chem	.99889863	62	Other Trans Eq	.99943708
27	Plastics/Syn	.99886582	63	Sci/Photo Eq.	.99975803
28	Drugs	.99957216	64	Medical Equip.	.99968793
29	Cosmetics	.99956685	65	Other Mfg Prod	.99960653
30	Paint/Allied	.99925297	66	Railroads	.99982108
31	Petrol Refin	.99950827	67	Local Transit	.99977591
32	Rubber/Misc	.99939603	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99971395	69	Mtr Frght Inter	.99985411
34	Glass Prod	.99875724	70	Retail	.99978824
35	Stone/Clay Pr	.99866212	71	Wholesale	.99983383
36	Iron Forge	.99959715	72	Bulk	.99968404
			73	Services	.99991596

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-21

Relative Prices of MRIO Sectors in Region 21 (TX) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99970010	37	Iron Foundary	.99768901
2	Meat Products	.99591759	38	NonFerr Metal	.99703841
3	Dairy Prod.	.98858550	39	Metal Contain	.99652602
4	Can/Froz Food	.98588140	40	Struct Metal	.99558413
5	Grain Mill	.98682161	41	Screw Machine	.99718900
6	Bakery Prod.	.99419277	42	Engine/Turbine	.99674611
7	Sugar & Conf.	.98159463	43	Farm Equip	.99645762
8	Beverages	.99071463	44	Constrct Equip	.99713385
9	Other Food	.99507433	45	Mat/Hand Equip	.99579572
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99749264
11	Fabric/Yarn	.99601980	47	Spec. Machine	.99746586
12	Floor Cover	.99524740	48	Other NonElec	.99754342
13	Hosiery	.99613987	49	Comput. Equip	.99741098
14	Apparel	.99718738	50	Service Mach	.99677720
15	Other Fabric	.99630069	51	Elect. Equip	.99704893
16	Log/Lumber	.99666327	52	House Applian	.99650125
17	Wood Product	.99561504	53	Elect Lighting	.99678322
18	Pre Fab Home	.99216495	54	Receiving Set	.99298591
19	House Furnit	.99463047	55	Commun Equip.	.99815874
20	Other Furnit	.99567999	56	Elect Compon	.99827099
21	Paper Prod	.99634185	57	Other Elec Eq	.99669559
22	Paper Contain	.99559884	58	Motor Vehicle	.99597772
23	Newspaper	.99561350	59	Aircraft/Parts	.99855057
24	Indust Chem	.99676197	60	Missles/Parts	.99852513
25	Agric Chem	.99713209	61	Air/Miss Prop	.99848797
26	Other Chem	.99653040	62	Other Trans Eq	.99554012
27	Plastics/Syn	.99662168	63	Sci/Photo Eq.	.99741097
28	Drugs	.99643047	64	Medical Equip.	.99688172
29	Cosmetics	.99482556	65	Other Mfg Prod	.99662389
30	Paint/Allied	.99591083	66	Railroads	.99961456
31	Petrol Refin	.99860158	67	Local Transit	.99961785
32	Rubber/Misc	.99673181	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99502401	69	Mtr Frght Inter	.99975668
34	Glass Prod	.99337507	70	Retail	.99948320
35	Stone/Clay Pr	.98811096	71	Wholesale	.99962165
36	Iron Forge	.99585115	72	Bulk	.99912352
			73	Services	.99982477

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

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TABLE 6-22

Relative Prices of MRIO Sectors in Region 22 (MT, ID, WY, UT,
CO, AZ, AK, HI) After Intrastate Motor Carrier Deregulation
in the 20 States

(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99990279	37	Iron Foundary	.99980666
2	Meat Products	.99969029	38	NonFerr Metal	.99970320
3	Dairy Prod.	.99972578	39	Metal Contain	.99965553
4	Can/Froz Food	.99959681	40	Struct Metal	.99966095
5	Grain Mill	.99954618	41	Screw Machine	.99971427
6	Bakery Prod.	.99967792	42	Engine/Turbine	.99975521
7	Sugar & Conf.	.99962961	43	Farm Equip	.99973760
8	Beverages	.99944879	44	Constrct Equip	.99966293
9	Other Food	.99958933	45	Mat/Hand Equip	.99975944
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99974726
11	Fabric/Yarn	.99971013	47	Spec. Machine	.99976699
12	Floor Cover	.99966107	48	Other NonElec	.99977155
13	Hosiery	.99953149	49	Comput. Equip	.99981523
14	Apparel	.99982580	50	Service Mach	.99968605
15	Other Fabric	.99975076	51	Elect. Equip	.99981960
16	Log/Lumber	.99979064	52	House Applian	.99971084
17	Wood Product	.99970703	53	Elect Lighting	.99976946
18	Pre Fab Home	.99965755	54	Receiving Set	.99981356
19	House Furnit	.99971624	55	Commun Equip.	.99985077
20	Other Furnit	.99977982	56	Elect Compon	.99980014
21	Paper Prod	.99971995	57	Other Elec Eq	.99976937
22	Paper Contain	.99944914	58	Motor Vehicle	.99969024
23	Newspaper	.99973174	59	Aircraft/Parts	.99984484
24	Indust Chem	.99969965	60	Missles/Parts	.99990674
25	Agric Chem	.99961876	61	Air/Miss Prop	.99983034
26	Other Chem	.99956649	62	Other Trans Eq	.99968396
27	Plastics/Syn	.99962704	63	Sci/Photo Eq.	.99979176
28	Drugs	.99969263	64	Medical Equip.	.99976253
29	Cosmetics	.99964583	65	Other Mfg Prod	.99972649
30	Paint/Allied	.99942418	66	Railroads	.99986864
31	Petrol Refin	.99973779	67	Local Transit	.99984029
32	Rubber/Misc	.99957163	68	Mtr Frght Intra	.99990354
33	Leather Prod	.99965083	69	Mtr Frght Inter	.99990355
34	Glass Prod	.99962555	70	Retail	.99983924
35	Stone/Clay Pr	.99959210	71	Wholesale	.99988196
36	Iron Forge	.99972137	72	Bulk	.99973479
			73	Services	.99994159

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-23

Relative Prices of MRIO Sectors in Region 23 (NM) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99988013	37	Iron Foundary	1.00000000
2	Meat Products	.99949550	38	NonFerr Metal	.99970877
3	Dairy Prod.	.99960735	39	Metal Contain	.99947560
4	Can/Froz Food	.99937225	40	Struct Metal	.99925339
5	Grain Mill	.99903883	41	Screw Machine	.99947644
6	Bakery Prod.	.99909628	42	Engine/Turbine	.99957909
7	Sugar & Conf.	.99857795	43	Farm Equip	.99945504
8	Beverages	.99835690	44	Constrct Equip	.99932999
9	Other Food	.99931043	45	Mat/Hand Equip	1.00000000
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99958216
11	Fabric/Yarn	.99960161	47	Spec. Machine	.99959184
12	Floor Cover	1.00000000	48	Other NonElec	.99947606
13	Hosiery	.99945707	49	Comput. Equip	.99956365
14	Apparel	.99963454	50	Service Mach	.99949114
15	Other Fabric	.99959461	51	Elect. Equip	.99962679
16	Log/Lumber	.99962578	52	House Applian	.99951842
17	Wood Product	.99946981	53	Elect Lighting	.99954512
18	Pre Fab Home	.99944898	54	Receiving Set	1.00000000
19	House Furnit	.99873866	55	Commun Equip.	.99967755
20	Other Furnit	.99903837	56	Elect Compon	.99959143
21	Paper Prod	.99930158	57	Other Elec Eq	1.00000000
22	Paper Contain	1.00000000	58	Motor Vehicle	.99929218
23	Newspaper	.99977800	59	Aircraft/Parts	.99968045
24	Indust Chem	.99952048	60	Missles/Parts	.99985645
25	Agric Chem	.99943662	61	Air/Miss Prop	.99969197
26	Other Chem	.99913953	62	Other Trans Eq	.99964662
27	Plastics/Syn	.99939747	63	Sci/Photo Eq.	.99963743
28	Drugs	1.00000000	64	Medical Equip.	.99976676
29	Cosmetics	.99944811	65	Other Mfg Prod	.99961877
30	Paint/Allied	1.00000000	66	Railroads	.99983771
31	Petrol Refin	.99963690	67	Local Transit	.99981757
32	Rubber/Misc	.99940854	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99845501	69	Mtr Frght Inter	.99987546
34	Glass Prod	.99899770	70	Retail	.99979851
35	Stone/Clay Pr	.99861750	71	Wholesale	.99987298
36	Iron Forge	.99955920	72	Bulk	.99966864
			73	Services	.99993529

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-24

Relative Prices of MRIO Sectors in Region 24 (NV) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99993581	37	Iron Foundary	1.00000000
2	Meat Products	.99977163	38	NonFerr Metal	.99920077
3	Dairy Prod.	.99981421	39	Metal Contain	.99966230
4	Can/Froz Food	1.00000000	40	Struct Metal	.99965752
5	Grain Mill	.99940946	41	Screw Machine	1.00000000
6	Bakery Prod.	.99975032	42	Engine/Turbine	1.00000000
7	Sugar & Conf.	1.00000000	43	Farm Equip	1.00000000
8	Beverages	.99933354	44	Constrct Equip	1.00000000
9	Other Food	.99965685	45	Mat/Hand Equip	1.00000000
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	1.00000000
11	Fabric/Yarn	1.00000000	47	Spec. Machine	.99975967
12	Floor Cover	1.00000000	48	Other NonElec	.99978862
13	Hosiery	1.00000000	49	Comput. Equip	.99971195
14	Apparel	.99978589	50	Service Mach	.99972172
15	Other Fabric	.99941760	51	Elect. Equip	.99982180
16	Log/Lumber	.99975922	52	House Applian	.99967239
17	Wood Product	.99965109	53	Elect Lighting	.99962602
18	Pre Fab Home	1.00000000	54	Receiving Set	1.00000000
19	House Furnit	.99970680	55	Commun Equip.	.99969984
20	Other Furnit	1.00000000	56	Elect Compon	.99971106
21	Paper Prod	1.00000000	57	Other Elec Eq	1.00000000
22	Paper Contain	1.00000000	58	Motor Vehicle	.99971966
23	Newspaper	.99969317	59	Aircraft/Parts	.99970398
24	Indust Chem	.99965127	60	Missles/Parts	1.00000000
25	Agric Chem	.99964562	61	Air/Miss Prop	1.00000000
26	Other Chem	.99965379	62	Other Trans Eq	1.00000000
27	Plastics/Syn	.99969350	63	Sci/Photo Eq.	.99977793
28	Drugs	1.00000000	64	Medical Equip.	.99956006
29	Cosmetics	.99968694	65	Other Mfg Prod	.99963735
30	Paint/Allied	1.00000000	66	Railroads	.99993750
31	Petrol Refin	.99964614	67	Local Transit	.99992169
32	Rubber/Misc	.99970953	68	Mtr Frght Intra	1.00000000
33	Leather Prod	1.00000000	69	Mtr Frght Inter	.99995103
34	Glass Prod	.99943340	70	Retail	.99992251
35	Stone/Clay Pr	.99963458	71	Wholesale	.99994123
36	Iron Forge	.99929676	72	Bulk	.99984399
			73	Services	.99994526

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-25

Relative Prices of MRIO Sectors in Region 25 (WA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99978525	37	Iron Foundary	.99799064
2	Meat Products	.99629016	38	NonFerr Metal	.99691159
3	Dairy Prod.	.99666819	39	Metal Contain	.99693254
4	Can/Froz Food	.99209638	40	Struct Metal	.99737935
5	Grain Mill	.99179593	41	Screw Machine	.99817506
6	Bakery Prod.	.99615586	42	Engine/Turbine	.99740209
7	Sugar & Conf.	.98637775	43	Farm Equip	.99764037
8	Beverages	.99146915	44	Constrct Equip	.99710610
9	Other Food	.99580340	45	Mat/Hand Equip	.99726388
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99833221
11	Fabric/Yarn	.99708830	47	Spec. Machine	.99720605
12	Floor Cover	.99686650	48	Other NonElec	.99834760
13	Hosiery	1.00000000	49	Comput. Equip	.99571916
14	Apparel	.99753020	50	Service Mach	.99730755
15	Other Fabric	.99679605	51	Elect. Equip	.99789405
16	Log/Lumber	.99797238	52	House Applian	.99720953
17	Wood Product	.99721792	53	Elect Lighting	.99660776
18	Pre Fab Home	.99470910	54	Receiving Set	.99222720
19	House Furnit	.99455289	55	Commun Equip.	.99864508
20	Other Furnit	.99622741	56	Elect Compon	.99809807
21	Paper Prod	.99675475	57	Other Elec Eq	.99770004
22	Paper Contain	.99606974	58	Motor Vehicle	.99669914
23	Newspaper	.99729179	59	Aircraft/Parts	.99900136
24	Indust Chem	.99667538	60	Missles/Parts	.99914494
25	Agric Chem	.99709266	61	Air/Miss Prop	.99916512
26	Other Chem	.99559867	62	Other Trans Eq	.99649239
27	Plastics/Syn	.99679688	63	Sci/Photo Eq.	.99850265
28	Drugs	.99738435	64	Medical Equip.	.99797914
29	Cosmetics	.99472957	65	Other Mfg Prod	.99754330
30	Paint/Allied	.99674015	66	Railroads	.99974153
31	Petrol Refin	.99888518	67	Local Transit	.99977906
32	Rubber/Misc	.99715576	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99482774	69	Mtr Frght Inter	.99981770
34	Glass Prod	.99320727	70	Retail	.99960908
35	Stone/Clay Pr	.99059256	71	Wholesale	.99973406
36	Iron Forge	.99741597	72	Bulk	.99924098
			73	Services	.99987560

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-26

Relative Prices of MRIO Sectors in Region 26 (OR) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99989874	37	Iron Foundary	.99986119
2	Meat Products	.99954646	38	NonFerr Metal	.99940156
3	Dairy Prod.	.99969809	39	Metal Contain	.99970637
4	Can/Froz Food	.99966167	40	Struct Metal	.99960407
5	Grain Mill	.99950034	41	Screw Machine	.99967686
6	Bakery Prod.	.99963987	42	Engine/Turbine	.99975549
7	Sugar & Conf.	.99955112	43	Farm Equip	.99975904
8	Beverages	.99966403	44	Constrct Equip	.99977532
9	Other Food	.99915292	45	Mat/Hand Equip	.99980802
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99977172
11	Fabric/Yarn	.99960987	47	Spec. Machine	.99972085
12	Floor Cover	.99960362	48	Other NonElec	.99979246
13	Hosiery	1.00000000	49	Comput. Equip	.99981868
14	Apparel	.99980910	50	Service Mach	.99972140
15	Other Fabric	.99972469	51	Elect. Equip	.99983821
16	Log/Lumber	.99979300	52	House Applian	.99974761
17	Wood Product	.99976980	53	Elect Lighting	.99972049
18	Pre Fab Home	.99961590	54	Receiving Set	.99945363
19	House Furnit	.99977190	55	Commun Equip.	.99982383
20	Other Furnit	.99977416	56	Elect Compon	.99980627
21	Paper Prod	.99965185	57	Other Elec Eq	.99950381
22	Paper Contain	.99837089	58	Motor Vehicle	.99968979
23	Newspaper	.99966256	59	Aircraft/Parts	.99980077
24	Indust Chem	.99949278	60	Missles/Parts	.99980476
25	Agric Chem	.99939615	61	Air/Miss Prop	.99976833
26	Other Chem	.99941834	62	Other Trans Eq	.99968548
27	Plastics/Syn	.99925093	63	Sci/Photo Eq.	.99977271
28	Drugs	.99970409	64	Medical Equip.	.99974287
29	Cosmetics	.99959398	65	Other Mfg Prod	.99968620
30	Paint/Allied	.99921592	66	Railroads	.99985669
31	Petrol Refin	.99942979	67	Local Transit	.99986131
32	Rubber/Misc	.99943525	68	Mtr Frght Intra	.99987071
33	Leather Prod	.99949282	69	Mtr Frght Inter	.99987071
34	Glass Prod	.99963593	70	Retail	.99982252
35	Stone/Clay Pr	.99960280	71	Wholesale	.99986482
36	Iron Forge	.99970197	72	Bulk	.99968694
			73	Services	.99993334

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-27

Relative Prices of MRIO Sectors in Region 26 (CA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99994125	37	Iron Foundary	.99989161
2	Meat Products	.99975974	38	NonFerr Metal	.99964671
3	Dairy Prod.	.99983667	39	Metal Contain	.99979977
4	Can/Froz Food	.99979111	40	Struct Metal	.99979200
5	Grain Mill	.99971917	41	Screw Machine	.99984554
6	Bakery Prod.	.99981807	42	Engine/Turbine	.99978435
7	Sugar & Conf.	.99983181	43	Farm Equip	.99978970
8	Beverages	.99978018	44	Constrct Equip	.99987733
9	Other Food	.99970340	45	Mat/Hand Equip	.99983640
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99987861
11	Fabric/Yarn	.99967311	47	Spec. Machine	.99984084
12	Floor Cover	.99968409	48	Other NonElec	.99985668
13	Hosiery	.99960429	49	Comput. Equip	.99985120
14	Apparel	.99980793	50	Service Mach	.99977901
15	Other Fabric	.99977753	51	Elect. Equip	.99984791
16	Log/Lumber	.99989004	52	House Applian	.99981274
17	Wood Product	.99982729	53	Elect Lighting	.99980161
18	Pre Fab Home	.99977193	54	Receiving Set	.99977236
19	House Furnit	.99982399	55	Commun Equip.	.99989140
20	Other Furnit	.99985106	56	Elect Compon	.99985274
21	Paper Prod	.99968405	57	Other Elec Eq	.99971868
22	Paper Contain	.99957578	58	Motor Vehicle	.99977741
23	Newspaper	.99978550	59	Aircraft/Parts	.99988865
24	Indust Chem	.99964456	60	Missles/Parts	.99994253
25	Agric Chem	.99961774	61	Air/Miss Prop	.99988635
26	Other Chem	.99957916	62	Other Trans Eq	.99978814
27	Plastics/Syn	.99946006	63	Sci/Photo Eq.	.99987851
28	Drugs	.99973845	64	Medical Equip.	.99985780
29	Cosmetics	.99967290	65	Other Mfg Prod	.99979702
30	Paint/Allied	.99948068	66	Railroads	.99992145
31	Petrol Refin	.99985079	67	Local Transit	.99993122
32	Rubber/Misc	.99964842	68	Mtr Frght Intra	.99994209
33	Leather Prod	.99973650	69	Mtr Frght Inter	.99994209
34	Glass Prod	.99980586	70	Retail	.99989447
35	Stone/Clay Pr	.99986500	71	Wholesale	.99992651
36	Iron Forge	.99981361	72	Bulk	.99986009
			73	Services	.99996083

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-28

Relative Prices of MRIO Sectors in Region 28 (LA) After
Intrastate Motor Carrier Deregulation in the 20 States
(Relative to 1)

Aggregated MRIO Sector	Description	New Price	Aggregated MRIO Sector	Description	New Price
1	Other Utility	.99981071	37	Iron Foundary	.99897511
2	Meat Products	.99708708	38	NonFerr Metal	.99844620
3	Dairy Prod.	.99874419	39	Metal Contain	.99812885
4	Can/Froz Food	.99711716	40	Struct Metal	.99762831
5	Grain Mill	.99720568	41	Screw Machine	.99830707
6	Bakery Prod.	.99788400	42	Engine/Turbine	.99819439
7	Sugar & Conf.	.99694449	43	Farm Equip	.99772339
8	Beverages	.99678827	44	Constrct Equip	.99874487
9	Other Food	.99800244	45	Mat/Hand Equip	.99809350
10	Tobacco Prod	1.00000000	46	Metalwkg Equip	.99882210
11	Fabric/Yarn	.99820978	47	Spec. Machine	.99821102
12	Floor Cover	.99793762	48	Other NonElec	.99866638
13	Hosiery	.99778375	49	Comput. Equip	.99891641
14	Apparel	.99811234	50	Service Mach	.99730902
15	Other Fabric	.99800360	51	Elect. Equip	.99858450
16	Log/Lumber	.99844273	52	House Applian	.99753996
17	Wood Product	.99788800	53	Elect Lighting	.99827530
18	Pre Fab Home	.99579572	54	Receiving Set	.99863197
19	House Furnit	.99611374	55	Commun Equip.	.99895971
20	Other Furnit	.99742928	56	Elect Compon	.99879096
21	Paper Prod	.99850092	57	Other Elec Eq	.99824507
22	Paper Contain	.99763934	58	Motor Vehicle	.99806126
23	Newspaper	.99861182	59	Aircraft/Parts	.99890110
24	Indust Chem	.99841216	60	Missles/Parts	.99952682
25	Agric Chem	.99834772	61	Air/Miss Prop	.99870010
26	Other Chem	.99836087	62	Other Trans Eq	.99762208
27	Plastics/Syn	.99811396	63	Sci/Photo Eq.	.99888663
28	Drugs	.99840820	64	Medical Equip.	.99787132
29	Cosmetics	.99790991	65	Other Mfg Prod	.99776150
30	Paint/Allied	.99815325	66	Railroads	.99978173
31	Petrol Refin	.99949769	67	Local Transit	.99974971
32	Rubber/Misc	.99815302	68	Mtr Frght Intra	1.00000000
33	Leather Prod	.99779303	69	Mtr Frght Inter	.99984865
34	Glass Prod	.99826173	70	Retail	.99972483
35	Stone/Clay Pr	.99749042	71	Wholesale	.99981625
36	Iron Forge	.99785128	72	Bulk	.99971203
			73	Services	.99990992

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-29

MRIO SECTOR AND OWN PRICE POINT ELASTICITY

MRIO SECTOR	ELASTICITY	MRIO SECTOR	ELASTICITY
21	.3	53	2.55
22	.3	54	1.173
23	.3	55	1.0
24	.3	56	1.0
25	.3	57	1.0
26	.3	58	.844
27	.3	59	1.2
28	.3	60	1.0
29	1.9	61	1.0
30	.727	62	.3
31	.891	63	.3
32	.7	64	.3
33	.792	65	.3
34	.799	66	1.479
35	1.0	67	1.0
36	1.124	68	1.0
37	1.0	69	.714
38	1.0	70	.671
39	1.0	71	.634
40	.564	72	.634
41	.564	73	.634
42	.422	74	.289
43	1.0	75	.634
44	.3	76	1.111
45	1.0	77	1.0
46	1.0	78	1.0
47	3.04	79	1.0
48	.9	80	1.0
49	1.2	81	1.31
50	1.0	82	1.488
51	1.019	83	.566
52	.938	84	1.314

Calculated from Systan, Inc., Analysis of Alternative Subsidy
Programs: Impact on Regional Development, Final Report, Economic Development
Administration, US Department of Commerce, Washington, DC, Contract No. 2-36716,
August 1973, **Table IV.I.**

by a combination of the price change, the price elasticity of demand, and the total output measured in dollar terms prior to the price change. This is shown below.

Assume a linear demand curve for a product and an estimate for own price point elasticity (E_b) given in Table 6-29 above at the current price P_b^a and quantity Q_b^a. A new quantity, $Q_b'^a$, will result from the new price $P_b'^a = xP_b^a$ (where x is the fraction of the initial price remaining, i.e., the value in the P^* after the original price is reduced as per the price model). The x's are shown above in Table 6-1 through Table 6-28.

$$E_b = \frac{P_b^a}{Q_b^a} \cdot \frac{1}{|Slope|} = \frac{P_b^a}{Q_b^a} \cdot \frac{Q_b'^a - Q_b^a}{P_b^a - P_b'^a} = \frac{P_b^a}{Q_b^a} \cdot \frac{Q_b'^a - Q_b^a}{P_b^a - xP_b^a} = \frac{Q_b'^a - Q_b^a}{Q_b^a(1-x)}$$

Given E_b^a, then $Q_b'^a = Q_b^a [1 + E_b^a (1- x)]$

Since the welfare trapezoid is formally:

$$W = (1/2)(P_b^a - P_b'^a)(Q_b^a + Q_b'^a),$$ by substituting in for $P_b'^a$ and $Q_b'^a$, the welfare trapezoid can be expressed as a function of prederegulation total expenditures on the good, the point own price elasticity of demand (assuming that the price changes are small), and the price change of the product from pre to post deregulation. Therefore,

$$(1/2)P_b^a Q_b^a (1 - x_b^a) [2 + (1 - x_b^a)E_b^a]$$

where: $P_b^a Q_b^a$ is total dollar expenditures on MRIO sector b in region a from the use matrix (as adjusted for transport costs and wholesale and retail trade

margins as explained in Chapter 5).

E_b is own price elasticity of demand for MRIO sector b (same for all regions)

x_b^a is the endogenous price of MRIO sector b in region a from Table 6-1 through Table 6-28 (i.e., from the P^* vector. Since all prices were initially normalized to one, the new price from P^* shows the proportionate change in price of the sector)

The resulting welfare trapezoid is expressed in 1977 dollars. This is updated to 1986 dollars (for the manufacturing sectors) by the following formula:

$$
\begin{matrix}
\text{1986} \\
\text{Welfare} \\
\text{Trapezoid} \\
\text{for MRIO} \\
\text{Sector A}
\end{matrix}
\ =\
\frac{\text{1986 Weighted Value of Shipments for MRIO Sector A}}{\text{1977 Weighted Value of Shipments for MRIO Sector A}}
\ \times\
\begin{matrix}
\text{1977} \\
\text{Welfare} \\
\text{Trapezoid} \\
\text{for MRIO} \\
\text{Sector A}
\end{matrix}
$$

The resulting 1986 figure is then inflated to a 1988 value by multiplying it by the ratio of the 1988 GNP Implicit Price Deflator to the 1986 GNP Implicit Price Deflator. For the non-manufacturing sectors, the 1977 welfare trapezoid was inflated by the ratio of the 1988 to the 1977 GNP Implicit Price Deflator.

The value of shipments for each year are found in US Trade Data 1974-1987.[2] The value of shipments is by three and four digit SIC's. Each MRIO sector is made up of many SIC's (as shown in Table 5-23). The SIC value of shipments are weighted by employment in each SIC to yield the weighted value of shipments for each MRIO sector.

The results for each MRIO welfare trapezoid in each region, i.e., the left hand side of the equations in Chapter 4, are shown in Table 6-30 through Table 6-57. Table 6-58 shows the total results by MRIO sector across all states.

The total effect in the twenty eight impacted regions is approximately $2.863 billion. The impact by region is shown in Table 6-59. Two states have over 10% of the impacts--Texas with 26.5% and Illinois with 15.6%. Other states with 5% or more of the impact are: Washington with 5.9% and Minnesota with 5.2%. New York has 4.4%, Pennsylvania has 4.2%, Louisiana has 3.6%, and Massachusetts has 3.4%. All major impact states are states where discounted intrastate rates are much higher than discounted interstate rates. It also suggests that since trade patterns show that a state is its own largest trading partner, that intrastate

TABLE 6-30

Welfare Trapezoids of MRIO Sectors in Region 1 (ME, VT, CT)
After Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	729,706	37	Iron Foundary	25,413
2	Meat Products	347,582	38	NonFerr Metal	478,481
3	Dairy Prod.	232,672	39	Metal Contain	225,908
4	Can/Froz Food	201,918	40	Struct Metal	205,309
5	Grain Mill	294,126	41	Screw Machine	91,588
6	Bakery Prod.	158,602	42	Engine/Turbine	43,748
7	Sugar & Conf.	159,280	43	Farm Equip	14,275
8	Beverages	345,756	44	Constrct Equip	26,912
9	Other Food	251,451	45	Mat/Hand Equip	26,180
10	Tobacco Prod	15,737	46	Metalwkg Equip	82,588
11	Fabric/Yarn	135,878	47	Spec. Machine	60,719
12	Floor Cover	86,160	48	Other NonElec	164,329
13	Hosiery	52,863	49	Comput. Equip	173,318
14	Apparel	148,776	50	Service Mach	68,593
15	Other Fabric	48,688	51	Elect. Equip	156,369
16	Log/Lumber	126,910	52	House Applian	49,629
17	Wood Product	104,336	53	Elect Lighting	82,625
18	Pre Fab Home	16,947	54	Receiving Set	22,529
19	House Furnit	52,118	55	Commun Equip.	207,481
20	Other Furnit	65,713	56	Elect Compon	234,768
21	Paper Prod	546,476	57	Other Elec Eq	75,888
22	Paper Contain	145,092	58	Motor Vehicle	627,208
23	Newspaper	241,841	59	Aircraft/Parts	274,170
24	Indust Chem	259,598	60	Missles/Parts	60,607
25	Agric Chem	27,552	61	Air/Miss Prop	165,173
26	Other Chem	89,675	62	Other Trans Eq	89,403
27	Plastics/Syn	303,862	63	Sci/Photo Eq.	114,654
28	Drugs	122,705	64	Medical Equip.	63,790
29	Cosmetics	139,312	65	Other Mfg Prod	133,010
30	Paint/Allied	74,652	66	Railroads	52,086
31	Petrol Refin	649,899	67	Local Transit	38,619
32	Rubber/Misc	500,959	68	Mtr Frght Intra	38,779
33	Leather Prod	67,694	69	Mtr Frght Inter	124,572
34	Glass Prod	40,437	70	Retail	1,012,044
35	Stone/Clay Pr	147,088	71	Wholesale	511,455
36	Iron Forge	261,163	72	Bulk	2,086,306
			73	Services	1,855,683
				TOTAL	16,957,434

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-31

Welfare Trapezoids of MRIO Sectors in Region 2 (NH) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	169,609	37	Iron Foundary	15,709
2	Meat Products	393,930	38	NonFerr Metal	224,986
3	Dairy Prod.	369,757	39	Metal Contain	214,148
4	Can/Froz Food	102,261	40	Struct Metal	212,302
5	Grain Mill	162,565	41	Screw Machine	65,833
6	Bakery Prod.	133,708	42	Engine/Turbine	10,089
7	Sugar & Conf.	66,999	43	Farm Equip	16,279
8	Beverages	770,987	44	Constrct Equip	78,802
9	Other Food	122,862	45	Mat/Hand Equip	29,359
10	Tobacco Prod	0	46	Metalwkg Equip	69,200
11	Fabric/Yarn	117.097	47	Spec. Machine	79,449
12	Floor Cover	39,420	48	Other NonElec	205,037
13	Hosiery	40,558	49	Comput. Equip	141,329
14	Apparel	227,765	50	Service Mach	66,844
15	Other Fabric	41,678	51	Elect. Equip	63,140
16	Log/Lumber	104,150	52	House Applian	59,323
17	Wood Product	110,825	53	Elect Lighting	45,613
18	Pre Fab Home	29,629	54	Receiving Set	25,693
19	House Furnit	58,585	55	Commun Equip.	78,942
20	Other Furnit	118,936	56	Elect Compon	201,836
21	Paper Prod	572,277	57	Other Elec Eq	28,349
22	Paper Contain	120,918	58	Motor Vehicle	630,030
23	Newspaper	247,480	59	Aircraft/Parts	23,515
24	Indust Chem	142,156	60	Missles/Parts	0
25	Agric Chem	15,424	61	Air/Miss Prop	6,041
26	Other Chem	75,987	62	Other Trans Eq	62,194
27	Plastics/Syn	323,075	63	Sci/Photo Eq.	56,368
28	Drugs	87,723	64	Medical Equip.	67,733
29	Cosmetics	204,472	65	Other Mfg Prod	115,004
30	Paint/Allied	53,554	66	Railroads	13,399
31	Petrol Refin	721,422	67	Local Transit	12,223
32	Rubber/Misc	414,853	69	Mtr Frght Inter	42,398
33	Leather Prod	108,595	70	Retail	281,391
34	Glass Prod	37,159	71	Wholesale	133,213
35	Stone/Clay Pr	260,328	72	Bulk	737,512
36	Iron Forge	171,065	73	Services	501,069
				TOTAL	11,352,165

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-32

Welfare Trapezoids of MRIO Sectors in Region 3 (MA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,830,860	37	Iron Foundary	103,692
2	Meat Products	12,586,811	38	NonFerr Metal	1,696,665
3	Dairy Prod.	1,834,584	39	Metal Contain	1,319,424
4	Can/Froz Food	2,766,416	40	Struct Metal	975,870
5	Grain Mill	1,461,876	41	Screw Machine	576,379
6	Bakery Prod.	1,596,723	42	Engine/Turbine	210,297
7	Sugar & Conf.	2,984,553	43	Farm Equip	56,037
8	Beverages	4,247,266	44	Constrct Equip	112,224
9	Other Food	2,314,577	45	Mat/Hand Equip	161,533
10	Tobacco Prod	0	46	Metalwkg Equip	304,199
11	Fabric/Yarn	1,042,468	47	Spec. Machine	362,707
12	Floor Cover	571,590	48	Other NonElec	733,790
13	Hosiery	458,171	49	Comput. Equip	1,615,219
14	Apparel	2,059,131	50	Service Mach	418,567
15	Other Fabric	503,670	51	Elect. Equip	641,159
16	Log/Lumber	276,215	52	House Applian	414,028
17	Wood Product	429,032	53	Elect Lighting	416,792
18	Pre Fab Home	47,228	54	Receiving Set	607,959
19	House Furnit	707,987	55	Commun Equip.	946,458
20	Other Furnit	493,569	56	Elect Compon	1,703,466
21	Paper Prod	3,608,576	57	Other Elec Eq	530,932
22	Paper Contain	1,066,871	58	Motor Vehicle	5,372,903
23	Newspaper	2,168,336	59	Aircraft/Parts	162,176
24	Indust Chem	958,782	60	Missles/Parts	41,515
25	Agric Chem	98,725	61	Air/Miss Prop	153,529
26	Other Chem	628,833	62	Other Trans Eq	557,393
27	Plastics/Syn	1,147,187	63	Sci/Photo Eq.	961,641
28	Drugs	1,011,823	64	Medical Equip.	659,510
29	Cosmetics	2,130,944	65	Other Mfg Prod	1,033,884
30	Paint/Allied	335,894	66	Railroads	136,800
31	Petrol Refin	3,353,264	67	Local Transit	134,205
32	Rubber/Misc	3,294,876	69	Mtr Frght Inter	429,326
33	Leather Prod	880,986	70	Retail	2,821,659
34	Glass Prod	507,472	71	Wholesale	1,062,650
35	Stone/Clay Pr	1,078,027	72	Bulk	3,283,867
36	Iron Forge	936,172	73	Services	4,712,076
				TOTAL	96,850,022

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-33

Welfare Trapezoids of MRIO Sectors in Region 4 (RI) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	-27,641	37	Iron Foundary	3,412
2	Meat Products	247,724	38	NonFerr Metal	214,007
3	Dairy Prod.	50,279	39	Metal Contain	63,535
4	Can/Froz Food	40,416	40	Struct Metal	77,856
5	Grain Mill	21,703	41	Screw Machine	24,939
6	Bakery Prod.	28,607	42	Engine/Turbine	0
7	Sugar & Conf.	44,976	43	Farm Equip	804
8	Beverages	86,159	44	Constrct Equip	3,730
9	Other Food	92,624	45	Mat/Hand Equip	7,741
10	Tobacco Prod	0	46	Metalwkg Equip	15,128
11	Fabric/Yarn	44,958	47	Spec. Machine	20,337
12	Floor Cover	22,864	48	Other NonElec	27,191
13	Hosiery	14,314	49	Comput. Equip	-34,101
14	Apparel	31,854	50	Service Mach	53,138
15	Other Fabric	17,362	51	Elect. Equip	29,994
16	Log/Lumber	2,369	52	House Applian	9,706
17	Wood Product	23,449	53	Elect Lighting	90,648
18	Pre Fab Home	1,578	54	Receiving Set	8,657
19	House Furnit	11,308	55	Commun Equip.	-408,505
20	Other Furnit	22,367	56	Elect Compon	81,831
21	Paper Prod	140,902	57	Other Elec Eq	12,384
22	Paper Contain	52,168	58	Motor Vehicle	74,712
23	Newspaper	61,696	59	Aircraft/Parts	889,084
24	Indust Chem	66,463	60	Missles/Parts	0
25	Agric Chem	2,672	61	Air/Miss Prop	0
26	Other Chem	22,611	62	Other Trans Eq	-34,632
27	Plastics/Syn	105,587	63	Sci/Photo Eq.	70,183
28	Drugs	24,238	64	Medical Equip.	25,366
29	Cosmetics	42,402	65	Other Mfg Prod	79,643
30	Paint/Allied	16,720	66	Railroads	-4,401
31	Petrol Refin	222,107	67	Local Transit	6,441
32	Rubber/Misc	133,656	69	Mtr Frght Inter	52,040
33	Leather Prod	13,207	70	Retail	229,419
34	Glass Prod	13,976	71	Wholesale	159,682
35	Stone/Clay Pr	33,622	72	Bulk	282,324
36	Iron Forge	58,800	73	Services	364,855
				TOTAL	4,285,245

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-34

Welfare Trapezoids of MRIO Sectors in Region 5 (NY) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	3,150,169	37	Iron Foundary	217,430
2	Meat Products	6,347,438	38	NonFerr Metal	1,982,693
3	Dairy Prod.	1,356,036	39	Metal Contain	2,004,793
4	Can/Froz Food	2,723,534	40	Struct Metal	1,423,961
5	Grain Mill	1,734,795	41	Screw Machine	965,113
6	Bakery Prod.	1,170,849	42	Engine/Turbine	711,954
7	Sugar & Conf.	1,263,384	43	Farm Equip	224,549
8	Beverages	3,821,221	44	Constrct Equip	851,844
9	Other Food	1,696,223	45	Mat/Hand Equip	348,336
10	Tobacco Prod	626,743	46	Metalwkg Equip	578,940
11	Fabric/Yarn	2,377,849	47	Spec. Machine	782,948
12	Floor Cover	703,285	48	Other NonElec	1,421,984
13	Hosiery	1,282,113	49	Comput. Equip	3,512,502
14	Apparel	2,945,445	50	Service Mach	955,334
15	Other Fabric	851,903	51	Elect. Equip	1,416,349
16	Log/Lumber	163,142	52	House Applian	467,040
17	Wood Product	415,238	53	Elect Lighting	781,236
18	Pre Fab Home	69,039	54	Receiving Set	452,594
19	House Furnit	904,048	55	Commun Equip.	1,617,701
20	Other Furnit	687,818	56	Elect Compon	3,176,187
21	Paper Prod	4,322,721	57	Other Elec Eq	722,279
22	Paper Contain	1,295,601	58	Motor Vehicle	5,381,527
23	Newspaper	3,742,208	59	Aircraft/Parts	2,088,587
24	Indust Chem	1,002,296	60	Missles/Parts	42,394
25	Agric Chem	284,616	61	Air/Miss Prop	1,561,763
26	Other Chem	982,862	62	Other Trans Eq	981,909
27	Plastics/Syn	1,206,664	63	Sci/Photo Eq.	1,247,802
28	Drugs	1,477,250	64	Medical Equip.	1,042,979
29	Cosmetics	2,217,816	65	Other Mfg Prod	1,678,140
30	Paint/Allied	584,680	66	Railroads	214,998
31	Petrol Refin	2,435,019	67	Local Transit	618,491
32	Rubber/Misc	4,434,587	69	Mtr Frght Inter	620,744
33	Leather Prod	473,023	70	Retail	4,803,151
34	Glass Prod	402,444	71	Wholesale	2,432,216
35	Stone/Clay Pr	1,261,926	71	Bulk	6,223,023
36	Iron Forge	1,661,379	73	Services	10,044,779
				TOTAL	125,673,642

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-35

Welfare Trapezoids of MRIO Sectors in Region 6 (PA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,880,152	37	Iron Foundary	492,258
2	Meat Products	4,939,730	38	NonFerr Metal	2,320,653
3	Dairy Prod.	1,702,371	39	Metal Contain	2,454,053
4	Can/Froz Food	4,651,273	40	Struct Metal	2,744,899
5	Grain Mill	2,020,279	41	Screw Machine	1,047,168
6	Bakery Prod.	1,242,957	42	Engine/Turbine	388,385
7	Sugar & Conf.	2,042,596	43	Farm Equip	246,320
8	Beverages	2,806,518	44	Constrct Equip	481,056
9	Other Food	2,659,167	45	Mat/Hand Equip	373,027
10	Tobacco Prod	1,146,473	46	Metalwkg Equip	569,824
11	Fabric/Yarn	1,470,762	47	Spec. Machine	452,721
12	Floor Cover	664,384	48	Other NonElec	1,446,159
13	Hosiery	1,544,266	49	Comput. Equip	989,212
14	Apparel	2,165,533	50	Service Mach	607,482
15	Other Fabric	554,306	51	Elect. Equip	1,309,571
16	Log/Lumber	539,323	52	House Applian	589,721
17	Wood Product	1,001,215	53	Elect Lighting	561,955
18	Pre Fab Home	244,633	54	Receiving Set	289,790
19	House Furnit	839,173	55	Commun Equip.	780,856
20	Other Furnit	736,709	56	Elect Compon	1,032,206
21	Paper Prod	4,807,394	57	Other Elec Eq	636,264
22	Paper Contain	1,231,589	58	Motor Vehicle	8,841,497
23	Newspaper	2,549,742	59	Aircraft/Parts	539,635
24	Indust Chem	1,757,579	60	Missles/Parts	84,431
25	Agric Chem	449,551	61	Air/Miss Prop	101,238
26	Other Chem	1,033,574	62	Other Trans Eq	1,770,401
27	Plastics/Syn	1,329,540	63	Sci/Photo Eq.	581,460
28	Drugs	871,055	64	Medical Equip.	746,623
29	Cosmetics	2,024,448	65	Other Mfg Prod	1,574,397
30	Paint/Allied	617,237	66	Railroads	283,266
31	Petrol Refin	2,665,803	67	Local Transit	103,519
32	Rubber/Misc	4,410,515	69	Mtr Frght Inter	276,897
33	Leather Prod	512,238	70	Retail	3,203,692
34	Glass Prod	817,406	71	Wholesale	1,696,324
35	Stone/Clay Pr	4,484,234	72	Bulk	7,745,070
36	Iron Forge	3,906,662	73	Services	5,640,551
				TOTAL	121,322,965

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-36

Welfare Trapezoids of MRIO Sectors in Region 7 (NJ, DE, DC, MD, VA) After Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	4,928,011	37	Iron Foundary	97,271
2	Meat Products	1,709,540	38	NonFerr Metal	1,333,281
3	Dairy Prod.	784,392	39	Metal Contain	1,292,528
4	Can/Froz Food	953,473	40	Struct Metal	938,474
5	Grain Mill	852,682	41	Screw Machine	710,778
6	Bakery Prod.	609,109	42	Engine/Turbine	252,181
7	Sugar & Conf.	755,500	43	Farm Equip	93,828
8	Beverages	1,860,302	44	Constrct Equip	331,941
9	Other Food	983,315	45	Mat/Hand Equip	144,409
10	Tobacco Prod	705,729	46	Metalwkg Equip	229,552
11	Fabric/Yarn	904,779	47	Spec. Machine	238,906
12	Floor Cover	429,469	48	Other NonElec	515,093
13	Hosiery	377,339	49	Comput. Equip	640,861
14	Apparel	873,811	50	Service Mach	515,839
15	Other Fabric	481,357	51	Elect. Equip	546,422
16	Log/Lumber	356,418	52	House Applian	261,104
17	Wood Product	585,319	53	Elect Lighting	312,239
18	Pre Fab Home	93,317	54	Receiving Set	194,607
19	House Furnit	356,204	55	Commun Equip.	1,172,978
20	Other Furnit	290,610	56	Elect Compon	635,489
21	Paper Prod	2,322,874	57	Other Elec Eq	447,157
22	Paper Contain	738,355	58	Motor Vehicle	5,378,735
23	Newspaper	1,371,751	59	Aircraft/Parts	363,876
24	Indust Chem	2,247,352	60	Missles/Parts	64,965
25	Agric Chem	255,793	61	Air/Miss Prop	127,399
26	Other Chem	545,350	62	Other Trans Eq	413,193
27	Plastics/Syn	1,607,242	63	Sci/Photo Eq.	380,727
28	Drugs	540,141	64	Medical Equip.	313,609
29	Cosmetics	967,838	65	Other Mfg Prod	707,298
30	Paint/Allied	477,114	66	Railroads	551,581
31	Petrol Refin	3,905,333	67	Local Transit	237,039
32	Rubber/Misc	2,980,914	68	Mtr Frght Intra	375,885
33	Leather Prod	167,477	69	Mtr Frght Inter	988,955
34	Glass Prod	314,393	70	Retail	4,758,480
35	Stone/Clay Pr	758,471	71	Wholesale	2,622,804
36	Iron Forge	691,131	72	Bulk	10,027,944
			73	Services	8,883,182
				TOTAL	85,837,817

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-37

Welfare Trapezoids of MRIO Sectors in Region 8 (WV) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	296,598	37	Iron Foundary	9,731
2	Meat Products	414,201	38	NonFerr Metal	697,555
3	Dairy Prod.	142,448	39	Metal Contain	174,597
4	Can/Froz Food	293,914	40	Struct Metal	483,863
5	Grain Mill	200,839	41	Screw Machine	67,600
6	Bakery Prod.	162,055	42	Engine/Turbine	13,959
7	Sugar & Conf.	0	43	Farm Equip	9,883
8	Beverages	564,664	44	Constrct Equip	119,559
9	Other Food	67,831	45	Mat/Hand Equip	29,450
10	Tobacco Prod	68,634	46	Metalwkg Equip	45,729
11	Fabric/Yarn	40,693	47	Spec. Machine	37,480
12	Floor Cover	27,146	48	Other NonElec	75,170
13	Hosiery	0	49	Comput. Equip	0
14	Apparel	82,251	50	Service Mach	33,793
15	Other Fabric	24,395	51	Elect. Equip	65,662
16	Log/Lumber	62,154	52	House Applian	28,262
17	Wood Product	145,355	53	Elect Lighting	47,756
18	Pre Fab Home	0	54	Receiving Set	0
19	House Furnit	47,201	55	Commun Equip.	125,688
20	Other Furnit	28,882	56	Elect Compon	16,576
21	Paper Prod	383,676	57	Other Elec Eq	35,738
22	Paper Contain	61,638	58	Motor Vehicle	455,912
23	Newspaper	275,840	59	Aircraft/Parts	106,442
24	Indust Chem	910,342	60	Missles/Parts	0
25	Agric Chem	29,346	61	Air/Miss Prop	0
26	Other Chem	58,062	62	Other Trans Eq	73,275
27	Plastics/Syn	84,160	63	Sci/Photo Eq.	28,458
28	Drugs	68,055	64	Medical Equip.	20,984
29	Cosmetics	72,958	65	Other Mfg Prod	53,848
30	Paint/Allied	39,013	66	Railroads	72,455
31	Petrol Refin	556,842	67	Local Transit	15,752
32	Rubber/Misc	262,675	69	Mtr Frght Inter	57,572
33	Leather Prod	22,367	70	Retail	322,642
34	Glass Prod	23,275	71	Wholesale	235,616
35	Stone/Clay Pr	450,486	72	Bulk	1,118,375
36	Iron Forge	462,943	73	Services	543,135
				TOTAL	11,723,457

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-38

Welfare Trapezoids of MRIO Sectors in Region 9 (TN, NC, SC,
FL) After Intrastate Motor Carrier Deregulation in the 20
States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	5,252,289	37	Iron Foundary	72,264
2	Meat Products	1,929,925	38	NonFerr Metal	1,463,769
3	Dairy Prod.	839,556	39	Metal Contain	1,483,628
4	Can/Froz Food	1,196,850	40	Struct Metal	1,177,350
5	Grain Mill	1,294,032	41	Screw Machine	397,589
6	Bakery Prod.	654,507	42	Engine/Turbine	299,447
7	Sugar & Conf.	818,216	43	Farm Equip	191,774
8	Beverages	2,323,571	44	Constrct Equip	279,631
9	Other Food	1,114,275	45	Mat/Hand Equip	167,595
10	Tobacco Prod	814,610	46	Metalwkg Equip	268,960
11	Fabric/Yarn	2,340,299	47	Spec. Machine	309,319
12	Floor Cover	668,378	48	Other NonElec	590,211
13	Hosiery	604,452	49	Comput. Equip	757,764
14	Apparel	1,003,312	50	Service Mach	484,421
15	Other Fabric	424,994	51	Elect. Equip	650,327
16	Log/Lumber	729,642	52	House Applian	479,741
17	Wood Product	821,923	53	Elect Lighting	294,684
18	Pre Fab Home	231,413	54	Receiving Set	199,271
19	House Furnit	474,412	55	Commun Equip.	850,415
20	Other Furnit	345,248	56	Elect Compon	540,319
21	Paper Prod	2,327,169	57	Other Elec Eq	346,006
22	Paper Contain	980,877	58	Motor Vehicle	3,740,546
23	Newspaper	1,255,241	59	Aircraft/Parts	227,096
24	Indust Chem	2,279,463	60	Missles/Parts	43,281
25	Agric Chem	769,917	61	Air/Miss Prop	76,388
26	Other Chem	544,291	62	Other Trans Eq	423,490
27	Plastics/Syn	3,440,346	63	Sci/Photo Eq.	423,974
28	Drugs	630,630	64	Medical Equip.	312,932
29	Cosmetics	913,305	65	Other Mfg Prod	661,575
30	Paint/Allied	433,868	66	Railroads	559,507
31	Petrol Refin	5,354,153	67	Local Transit	195,549
32	Rubber/Misc	2,476,689	68	Mtr Frght Intra	696,865
33	Leather Prod	203,007	69	Mtr Frght Inter	873,323
34	Glass Prod	317,966	70	Retail	5,849,885
35	Stone/Clay Pr	742,663	71	Wholesale	3,126,610
36	Iron Forge	710,485	72	Bulk	13,425,886
			73	Services	9,451,901
				TOTAL	98,655,263

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-39

Welfare Trapezoids of MRIO Sectors in Region 10 (GA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,718,591	37	Iron Foundary	86,032
2	Meat Products	2,182,772	38	NonFerr Metal	1,234,329
3	Dairy Prod.	1,583,851	39	Metal Contain	1,322,592
4	Can/Froz Food	1,656,324	40	Struct Metal	1,153,032
5	Grain Mill	2,184,085	41	Screw Machine	667,256
6	Bakery Prod.	680,618	42	Engine/Turbine	181,533
7	Sugar & Conf.	1,675,926	43	Farm Equip	274,188
8	Beverages	2,569,985	44	Constrct Equip	286,468
9	Other Food	4,237,348	45	Mat/Hand Equip	252,807
10	Tobacco Prod	386,477	46	Metalwkg Equip	309,343
11	Fabric/Yarn	2,433,224	47	Spec. Machine	404,266
12	Floor Cover	1,200,156	48	Other NonElec	552,706
13	Hosiery	434,578	49	Comput. Equip	730,807
14	Apparel	974,105	50	Service Mach	450,992
15	Other Fabric	360,348	51	Elect. Equip	486,404
16	Log/Lumber	569,823	52	House Applian	470,150
17	Wood Product	522,301	53	Elect Lighting	386,455
18	Pre Fab Home	189,708	54	Receiving Set	158,876
19	House Furnit	542,350	55	Commun Equip.	545,316
20	Other Furnit	563,518	56	Elect Compon	209,449
21	Paper Prod	2,344,683	57	Other Elec Eq	341,445
22	Paper Contain	767,411	58	Motor Vehicle	4,701,265
23	Newspaper	1,048,648	59	Aircraft/Parts	644,165
24	Indust Chem	1,253,294	60	Missles/Parts	1,138
25	Agric Chem	592,784	61	Air/Miss Prop	201,833
26	Other Chem	775,031	62	Other Trans Eq	380,508
27	Plastics/Syn	2,345,279	63	Sci/Photo Eq.	613,368
28	Drugs	614,330	64	Medical Equip.	531,806
29	Cosmetics	1,573,051	65	Other Mfg Prod	576,810
30	Paint/Allied	295,494	66	Railroads	258,106
31	Petrol Refin	5,220,579	67	Local Transit	40,753
32	Rubber/Misc	2,071,122	69	Mtr Frght Inter	245,221
33	Leather Prod	305,368	70	Retail	1,899,434
34	Glass Prod	503,307	71	Wholesale	1,161,093
35	Stone/Clay Pr	2,795,895	72	Bulk	7,546,186
36	Iron Forge	582,466	73	Services	3,150,626
				TOTAL	82,211,589

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

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TABLE 6-40

Welfare Trapezoids of MRIO Sectors in Region 11 (AL) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	859,371	37	Iron Foundary	57,339
2	Meat Products	478,711	38	NonFerr Metal	1,038,562
3	Dairy Prod.	234,907	39	Metal Contain	546,135
4	Can/Froz Food	259,833	40	Struct Metal	707,683
5	Grain Mill	589,989	41	Screw Machine	134,430
6	Bakery Prod.	209,442	42	Engine/Turbine	63,797
7	Sugar & Conf.	207,331	43	Farm Equip	100,091
8	Beverages	694,969	44	Constrct Equip	138,895
9	Other Food	524,257	45	Mat/Hand Equip	121,369
10	Tobacco Prod	132,638	46	Metalwkg Equip	155,202
11	Fabric/Yarn	621,974	47	Spec. Machine	179,272
12	Floor Cover	341,674	48	Other NonElec	277,622
13	Hosiery	119,573	49	Comput. Equip	227,088
14	Apparel	337,786	50	Service Mach	200,867
15	Other Fabric	125,268	51	Elect. Equip	358,570
16	Log/Lumber	253,898	52	House Applian	135,928
17	Wood Product	196,648	53	Elect Lighting	136,753
18	Pre Fab Home	84,638	54	Receiving Set	88,683
19	House Furnit	158,087	55	Commun Equip.	889,720
20	Other Furnit	197,641	56	Elect Compon	157,929
21	Paper Prod	551,501	57	Other Elec Eq	125,031
22	Paper Contain	166,590	58	Motor Vehicle	1,484,589
23	Newspaper	261,945	59	Aircraft/Parts	376,937
24	Indust Chem	663,901	60	Missles/Parts	48,211
25	Agric Chem	197,463	61	Air/Miss Prop	667,991
26	Other Chem	194,555	62	Other Trans Eq	278,406
27	Plastics/Syn	984,324	63	Sci/Photo Eq.	192,055
28	Drugs	282,433	64	Medical Equip.	160,544
29	Cosmetics	255,679	65	Other Mfg Prod	263,997
30	Paint/Allied	140,682	66	Railroads	102,928
31	Petrol Refin	1,415,695	67	Local Transit	24,522
32	Rubber/Misc	693,882	69	Mtr Frght Inter	57,633
33	Leather Prod	56,523	70	Retail	1,107,397
34	Glass Prod	82,025	71	Wholesale	735,242
35	Stone/Clay Pr	231,461	72	Bulk	3,208,380
36	Iron Forge	388,687	73	Services	1,806,358
				TOTAL	29,552,141

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-41

Welfare Trapezoids of MRIO Sectors in Region 12 (MS) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	641,275	37	Iron Foundary	40,970
2	Meat Products	483,101	38	NonFerr Metal	778,974
3	Dairy Prod.	272,690	39	Metal Contain	696,247
4	Can/Froz Food	329,716	40	Struct Metal	471,306
5	Grain Mill	792,403	41	Screw Machine	266,227
6	Bakery Prod.	248,746	42	Engine/Turbine	187,241
7	Sugar & Conf.	111,459	43	Farm Equip	306,117
8	Beverages	703,408	44	Constrct Equip	115,113
9	Other Food	601,028	45	Mat/Hand Equip	122,458
10	Tobacco Prod	0	46	Metalwkg Equip	187,840
11	Fabric/Yarn	979,312	47	Spec. Machine	100,974
12	Floor Cover	243,461	48	Other NonElec	271,272
13	Hosiery	309,744	49	Comput. Equip	356,939
14	Apparel	488,587	50	Service Mach	171,704
15	Other Fabric	219,354	51	Elect. Equip	521,694
16	Log/Lumber	512,000	52	House Applian	280,341
17	Wood Product	341,908	53	Elect Lighting	306,165
18	Pre Fab Home	66,152	54	Receiving Set	121,814
19	House Furnit	296,680	55	Commun Equip.	468,563
20	Other Furnit	222,561	56	Elect Compon	200,798
21	Paper Prod	449,480	57	Other Elec Eq	168,004
22	Paper Contain	328,468	58	Motor Vehicle	2,592,078
23	Newspaper	372,722	59	Aircraft/Parts	46,980
24	Indust Chem	531,429	60	Missles/Parts	14,313
25	Agric Chem	514,394	61	Air/Miss Prop	13,033
26	Other Chem	146,300	62	Other Trans Eq	338,593
27	Plastics/Syn	668,483	63	Sci/Photo Eq.	124,943
28	Drugs	435,824	64	Medical Equip.	208,792
29	Cosmetics	700,171	65	Other Mfg Prod	345,424
30	Paint/Allied	262,743	66	Railroads	61,844
31	Petrol Refin	1,121,020	67	Local Transit	18,008
32	Rubber/Misc	1,270,145	69	Mtr Frght Inter	92,270
33	Leather Prod	107,923	70	Retail	661,140
34	Glass Prod	108,604	71	Wholesale	473,647
35	Stone/Clay Pr	391,693	72	Bulk	3,520,441
36	Iron Forge	420,552	73	Services	1,134,076
				TOTAL	31,479,881

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-42

Welfare Trapezoids of MRIO Sectors in Region 13 (KY) After Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	552,173	37	Iron Foundary	88,270
2	Meat Products	660,086	38	NonFerr Metal	1,150,489
3	Dairy Prod.	411,299	39	Metal Contain	696,844
4	Can/Froz Food	641,964	40	Struct Metal	452,961
5	Grain Mill	653,398	41	Screw Machine	564,304
6	Bakery Prod.	432,688	42	Engine/Turbine	118,666
7	Sugar & Conf.	347,583	43	Farm Equip	179,682
8	Beverages	1,583,903	44	Constrct Equip	194,743
9	Other Food	1,023,157	45	Mat/Hand Equip	91,904
10	Tobacco Prod	695,266	46	Metalwkg Equip	143,086
11	Fabric/Yarn	245,030	47	Spec. Machine	78,637
12	Floor Cover	184,517	48	Other NonElec	324,692
13	Hosiery	59,200	49	Comput. Equip	403,973
14	Apparel	318,659	50	Service Mach	277,645
15	Other Fabric	154,523	51	Elect. Equip	474,631
16	Log/Lumber	149,220	52	House Applian	290,794
17	Wood Product	306,572	53	Elect Lighting	250,763
18	Pre Fab Home	115,943	54	Receiving Set	155,878
19	House Furnit	197,933	55	Commun Equip.	524,775
20	Other Furnit	187,015	56	Elect Compon	173,750
21	Paper Prod	873,515	57	Other Elec Eq	211,567
22	Paper Contain	300,333	58	Motor Vehicle	2,862,408
23	Newspaper	664,074	59	Aircraft/Parts	405,033
24	Indust Chem	504,668	60	Missles/Parts	0
25	Agric Chem	226,581	61	Air/Miss Prop	15,041
26	Other Chem	227,149	62	Other Trans Eq	157,635
27	Plastics/Syn	571,259	63	Sci/Photo Eq.	219,198
28	Drugs	279,970	64	Medical Equip.	184,221
29	Cosmetics	623,260	65	Other Mfg Prod	244,912
30	Paint/Allied	181,460	66	Railroads	90,542
31	Petrol Refin	1,059,329	67	Local Transit	29,076
32	Rubber/Misc	1,246,612	69	Mtr Frght Inter	138,998
33	Leather Prod	76,155	70	Retail	1,062,280
34	Glass Prod	180,387	71	Wholesale	637,008
35	Stone/Clay Pr	787,040	72	Bulk	2,528,094
36	Iron Forge	677,597	73	Services	1,750,719
				TOTAL	34,573,281

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-43

Welfare Trapezoids of MRIO Sectors in Region 14 (WI, MI, IN, OH) After Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	5,143,091	37	Iron Foundary	647,610
2	Meat Products	3,073,975	38	NonFerr Metal	4,910,284
3	Dairy Prod.	2,438,899	39	Metal Contain	3,709,458
4	Can/Froz Food	2,175,904	40	Struct Metal	1,928,314
5	Grain Mill	2,243,028	41	Screw Machine	3,577,217
6	Bakery Prod.	1,072,054	42	Engine/Turbine	827,488
7	Sugar & Conf.	1,067,918	43	Farm Equip	384,361
8	Beverages	2,625,700	44	Constrct Equip	420,937
9	Other Food	2,444,009	45	Mat/Hand Equip	388,126
10	Tobacco Prod	-110,805	46	Metalwkg Equip	1,067,921
11	Fabric/Yarn	685,730	47	Spec. Machine	575,081
12	Floor Cover	889,739	48	Other NonElec	2,241,348
13	Hosiery	284,263	49	Comput. Equip	1,105,735
14	Apparel	987,912	50	Service Mach	1,253,102
15	Other Fabric	1,086,223	51	Elect. Equip	1,514,333
16	Log/Lumber	783,783	52	House Applian	710,243
17	Wood Product	1,401,964	53	Elect Lighting	781,503
18	Pre Fab Home	232,624	54	Receiving Set	673,004
19	House Furnit	718,067	55	Commun Equip.	1,112,706
20	Other Furnit	692,947	56	Elect Compon	1,020,666
21	Paper Prod	4,442,138	57	Other Elec Eq	1,324,578
22	Paper Contain	1,552,158	58	Motor Vehicle	17,490,909
23	Newspaper	2,321,823	59	Aircraft/Parts	475,402
24	Indust Chem	2,068,239	60	Missles/Parts	43,879
25	Agric Chem	688,691	61	Air/Miss Prop	316,895
26	Other Chem	1,217,048	62	Other Trans Eq	859,315
27	Plastics/Syn	2,050,460	63	Sci/Photo Eq.	748,205
28	Drugs	1,038,342	64	Medical Equip.	684,731
29	Cosmetics	1,347,983	65	Other Mfg Prod	1,054,483
30	Paint/Allied	906,879	66	Railroads	847,193
31	Petrol Refin	5,151,169	67	Local Transit	224,389
32	Rubber/Misc	6,476,648	68	Mtr Frght Intra	686,891
33	Leather Prod	315,596	69	Mtr Frght Inter	1,011,551
34	Glass Prod	731,754	70	Retail	9,174,321
35	Stone/Clay Pr	1,419,934	71	Wholesale	5,404,546
36	Iron Forge	4,472,890	72	Bulk	20,685,771
			73	Services	15,242,130
				TOTAL	171,533,406

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-44

Welfare Trapezoids of MRIO Sectors in Region 15 (IL) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	4,822,159	37	Iron Foundary	1,963,780
2	Meat Products	15,607,296	38	NonFerr Metal	7,679,331
3	Dairy Prod.	6,115,160	39	Metal Contain	8,875,403
4	Can/Froz Food	13,507,812	40	Struct Metal	6,385,109
5	Grain Mill	9,832,425	41	Screw Machine	4,110,217
6	Bakery Prod.	4,138,889	42	Engine/Turbine	2,581,802
7	Sugar & Conf.	4,940,550	43	Farm Equip	1,700,220
8	Beverages	12,681,596	44	Constrct Equip	2,307,059
9	Other Food	18,949,035	45	Mat/Hand Equip	1,296,936
10	Tobacco Prod	3,423,893	46	Metalwkg Equip	2,071,145
11	Fabric/Yarn	2,230,272	47	Spec. Machine	1,586,724
12	Floor Cover	2,480,394	48	Other NonElec	5,924,755
13	Hosiery	629,499	49	Comput. Equip	6,065,063
14	Apparel	7,973,868	50	Service Mach	2,208,752
15	Other Fabric	2,231,856	51	Elect. Equip	4,058,206
16	Log/Lumber	1,605,646	52	House Applian	3,060,751
17	Wood Product	4,636,845	53	Elect Lighting	2,104,924
18	Pre Fab Home	619,880	54	Receiving Set	2,868,522
19	House Furnit	3,320,709	55	Commun Equip.	5,383,189
20	Other Furnit	3,318,350	56	Elect Compon	5,902,573
21	Paper Prod	20,278,844	57	Other Elec Eq	2,318,049
22	Paper Contain	6,045,462	58	Motor Vehicle	26,234,137
23	Newspaper	10,665,936	59	Aircraft/Parts	460,722
24	Indust Chem	6,650,394	60	Missles/Parts	46,580
25	Agric Chem	3,536,311	61	Air/Miss Prop	249,801
26	Other Chem	5,422,623	62	Other Trans Eq	5,179,963
27	Plastics/Syn	5,738,998	63	Sci/Photo Eq.	3,446,869
28	Drugs	3,493,706	64	Medical Equip.	3,017,806
29	Cosmetics	6,905,652	65	Other Mfg Prod	5,225,435
30	Paint/Allied	2,800,002	66	Railroads	732,680
31	Petrol Refin	7,383,555	67	Local Transit	237,064
32	Rubber/Misc	15,274,458	69	Mtr Frght Inter	589,872
33	Leather Prod	2,070,331	70	Retail	8,513,916
34	Glass Prod	3,580,617	71	Wholesale	4,255,074
35	Stone/Clay Pr	27,975,101	72	Bulk	29,836,027
36	Iron Forge	12,278,456	73	Services	14,218,535
				TOTAL	445,863,576

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-45

Welfare Trapezoids of MRIO Sectors in Region 16 (MN) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,373,834	37	Iron Foundary	302,712
2	Meat Products	3,105,240	38	NonFerr Metal	1,862,515
3	Dairy Prod.	3,702,147	39	Metal Contain	2,857,708
4	Can/Froz Food	5,159,100	40	Struct Metal	2,615,823
5	Grain Mill	7,209,717	41	Screw Machine	924,431
6	Bakery Prod.	1,474,776	42	Engine/Turbine	535,733
7	Sugar & Conf.	2,982,092	43	Farm Equip	1,320,898
8	Beverages	8,144,054	44	Constrct Equip	846,221
9	Other Food	7,591,208	45	Mat/Hand Equip	348,094
10	Tobacco Prod	0	46	Metalwkg Equip	594,058
11	Fabric/Yarn	555,766	47	Spec. Machine	440,771
12	Floor Cover	646,682	48	Other NonElec	1,248,134
13	Hosiery	262,874	49	Comput. Equip	1,924,682
14	Apparel	3,453,372	50	Service Mach	864,348
15	Other Fabric	866,851	51	Elect. Equip	1,594,259
16	Log/Lumber	309,771	52	House Applian	943,644
17	Wood Product	1,345,845	53	Elect Lighting	736,989
18	Pre Fab Home	444,176	54	Receiving Set	647,654
19	House Furnit	1,621,961	55	Commun Equip.	1,857,951
20	Other Furnit	1,549,663	56	Elect Compon	1,256,706
21	Paper Prod	3,641,829	57	Other Elec Eq	679,576
22	Paper Contain	1,357,071	58	Motor Vehicle	10,254,359
23	Newspaper	2,850,956	59	Aircraft/Parts	549,959
24	Indust Chem	1,548,599	60	Missles/Parts	31,538
25	Agric Chem	1,442,649	61	Air/Miss Prop	578,821
26	Other Chem	1,002,473	62	Other Trans Eq	996,309
27	Plastics/Syn	644,415	63	Sci/Photo Eq.	1,006,013
28	Drugs	1,159,689	64	Medical Equip.	1,054,753
29	Cosmetics	2,399,719	65	Other Mfg Prod	1,500,060
30	Paint/Allied	588,242	66	Railroads	296,042
31	Petrol Refin	3,854,119	67	Local Transit	71,534
32	Rubber/Misc	4,480,664	69	Mtr Frght Inter	303,468
33	Leather Prod	981,794	70	Retail	2,899,589
34	Glass Prod	911,109	71	Wholesale	1,345,253
35	Stone/Clay Pr	7,017,655	72	Bulk	11,319,934
36	Iron Forge	1,850,754	73	Services	4,494,483
				TOTAL	148,635,886

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-46

Welfare Trapezoids of MRIO Sectors in Region 17 (IA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	510,209	37	Iron Foundary	62,862
2	Meat Products	1,302,321	38	NonFerr Metal	876,743
3	Dairy Prod.	639,274	39	Metal Contain	320,662
4	Can/Froz Food	868,154	40	Struct Metal	410,721
5	Grain Mill	2,699,029	41	Screw Machine	122,361
6	Bakery Prod.	289,583	42	Engine/Turbine	139,065
7	Sugar & Conf.	355,621	43	Farm Equip	192,289
8	Beverages	1,608,086	44	Constrct Equip	98,368
9	Other Food	577,004	45	Mat/Hand Equip	40,127
10	Tobacco Prod	0	46	Metalwkg Equip	66,294
11	Fabric/Yarn	40,030	47	Spec. Machine	53,305
12	Floor Cover	89,480	48	Other NonElec	287,682
13	Hosiery	0	49	Comput. Equip	94,350
14	Apparel	87,429	50	Service Mach	102,155
15	Other Fabric	40,624	51	Elect. Equip	162,672
16	Log/Lumber	93,661	52	House Applian	124,962
17	Wood Product	231,659	53	Elect Lighting	63,696
18	Pre Fab Home	85,919	54	Receiving Set	27,025
19	House Furnit	78,642	55	Commun Equip.	157,707
20	Other Furnit	83,125	56	Elect Compon	125,996
21	Paper Prod	553,284	57	Other Elec Eq	102,005
22	Paper Contain	279,387	58	Motor Vehicle	864,571
23	Newspaper	366,423	59	Aircraft/Parts	12,962
24	Indust Chem	468,150	60	Missles/Parts	698
25	Agric Chem	242,543	61	Air/Miss Prop	5,717
26	Other Chem	106,932	62	Other Trans Eq	81,155
27	Plastics/Syn	266,419	63	Sci/Photo Eq.	91,201
28	Drugs	152,833	64	Medical Equip.	58,847
29	Cosmetics	175,468	65	Other Mfg Prod	116,451
30	Paint/Allied	103,856	66	Railroads	74,897
31	Petrol Refin	3,315,160	67	Local Transit	24,702
32	Rubber/Misc	618,613	69	Mtr Frght Inter	128,910
33	Leather Prod	29,306	70	Retail	1,096,472
34	Glass Prod	200,146	71	Wholesale	733,698
35	Stone/Clay Pr	1,231,449	72	Bulk	7,868,472
36	Iron Forge	908,129	73	Services	1,645,210
				TOTAL	35,132,960

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-47

Welfare Trapezoids of MRIO Sectors in Region 18 (MO, AR, NE, KS, ND) After Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	2,280,225	37	Iron Foundary	105,960
2	Meat Products	1,767,272	38	NonFerr Metal	1,158,321
3	Dairy Prod.	938,359	39	Metal Contain	1,500,491
4	Can/Froz Food	936,015	40	Struct Metal	1,104,658
5	Grain Mill	1,905,677	41	Screw Machine	1,050,931
6	Bakery Prod.	448,703	42	Engine/Turbine	223,022
7	Sugar & Conf.	786,834	43	Farm Equip	541,939
8	Beverages	1,818,892	44	Constrct Equip	231,792
9	Other Food	1,403,656	45	Mat/Hand Equip	132,511
10	Tobacco Prod	0	46	Metalwkg Equip	258,059
11	Fabric/Yarn	270,761	47	Spec. Machine	160,716
12	Floor Cover	320,606	48	Other NonElec	548,219
13	Hosiery	137,969	49	Comput. Equip	525,978
14	Apparel	449,917	50	Service Mach	475,116
15	Other Fabric	352,630	51	Elect. Equip	517,625
16	Log/Lumber	259,415	52	House Applian	341,459
17	Wood Product	495,982	53	Elect Lighting	329,750
18	Pre Fab Home	140,705	54	Receiving Set	241,702
19	House Furnit	317,042	55	Commun Equip.	1,169,676
20	Other Furnit	352,806	56	Elect Compon	463,630
21	Paper Prod	1,852,155	57	Other Elec Eq	512,195
22	Paper Contain	672,677	58	Motor Vehicle	6,341,433
23	Newspaper	1,020,262	59	Aircraft/Parts	600,683
24	Indust Chem	867,649	60	Missles/Parts	21,952
25	Agric Chem	734,952	61	Air/Miss Prop	130,035
26	Other Chem	379,703	62	Other Trans Eq	564,587
27	Plastics/Syn	545,173	63	Sci/Photo Eq.	417,170
28	Drugs	512,503	64	Medical Equip.	294,773
29	Cosmetics	810,988	65	Other Mfg Prod	503,657
30	Paint/Allied	393,094	66	Railroads	389,141
31	Petrol Refin	3,086,930	67	Local Transit	121,586
32	Rubber/Misc	2,534,514	68	Mtr Frght Intra	204,761
33	Leather Prod	200,549	69	Mtr Frght Inter	642,705
34	Glass Prod	306,646	70	Retail	4,027,880
35	Stone/Clay Pr	628,863	71	Wholesale	2,393,594
36	Iron Forge	735,428	72	Bulk	16,862,688
			73	Services	6,415,701
				TOTAL	82,191,648

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-48

Welfare Trapezoids of MRIO Sectors in Region 19 (SD) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	88,412	37	Iron Foundary	0
2	Meat Products	85,760	38	NonFerr Metal	0
3	Dairy Prod.	65,230	39	Metal Contain	52,728
4	Can/Froz Food	29,968	40	Struct Metal	82,414
5	Grain Mill	299,301	41	Screw Machine	0
6	Bakery Prod.	32,517	42	Engine/Turbine	0
7	Sugar & Conf.	0	43	Farm Equip	64,589
8	Beverages	88,150	44	Constrct Equip	9,829
9	Other Food	177,573	45	Mat/Hand Equip	7,402
10	Tobacco Prod	0	46	Metalwkg Equip	7,393
11	Fabric/Yarn	15,807	47	Spec. Machine	0
12	Floor Cover	43,106	48	Other NonElec	15,387
13	Hosiery	0	49	Comput. Equip	35,819
14	Apparel	23,406	50	Service Mach	0
15	Other Fabric	14,256	51	Elect. Equip	8,223
16	Log/Lumber	9,247	52	House Applian	0
17	Wood Product	28,408	53	Elect Lighting	0
18	Pre Fab Home	11,395	54	Receiving Set	0
19	House Furnit	0	55	Commun Equip.	0
20	Other Furnit	0	56	Elect Compon	20,287
21	Paper Prod	47,037	57	Other Elec Eq	0
22	Paper Contain	0	58	Motor Vehicle	257,811
23	Newspaper	74,128	59	Aircraft/Parts	0
24	Indust Chem	11,367	60	Missles/Parts	0
25	Agric Chem	0	61	Air/Miss Prop	0
26	Other Chem	0	62	Other Trans Eq	117,205
27	Plastics/Syn	0	63	Sci/Photo Eq.	21,197
28	Drugs	0	64	Medical Equip.	23,262
29	Cosmetics	0	65	Other Mfg Prod	37,532
30	Paint/Allied	0	66	Railroads	3,279
31	Petrol Refin	237,857	67	Local Transit	4,019
32	Rubber/Misc	95,068	69	Mtr Frght Inter	13,972
33	Leather Prod	0	70	Retail	239,682
34	Glass Prod	0	71	Wholesale	62,188
35	Stone/Clay Pr	42,027	72	Bulk	1,217,964
36	Iron Forge	0	73	Services	293,710
				TOTAL	4,115,915

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-49

Welfare Trapezoids of MRIO Sectors in Region 20 (OK) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	716,398	37	Iron Foundary	25,373
2	Meat Products	788,082	38	NonFerr Metal	232,459
3	Dairy Prod.	332,730	39	Metal Contain	250,727
4	Can/Froz Food	1,208,115	40	Struct Metal	302,405
5	Grain Mill	1,542,747	41	Screw Machine	66,176
6	Bakery Prod.	330,231	42	Engine/Turbine	49,687
7	Sugar & Conf.	563,961	43	Farm Equip	98,857
8	Beverages	1,275,815	44	Constrct Equip	199,577
9	Other Food	816,020	45	Mat/Hand Equip	29,273
10	Tobacco Prod	0	46	Metalwkg Equip	65,215
11	Fabric/Yarn	138,447	47	Spec. Machine	35,319
12	Floor Cover	101,090	48	Other NonElec	166,213
13	Hosiery	23,103	49	Comput. Equip	219,348
14	Apparel	137,037	50	Service Mach	84,201
15	Other Fabric	55,424	51	Elect. Equip	133,177
16	Log/Lumber	72,705	52	House Applian	91,895
17	Wood Product	272,606	53	Elect Lighting	56,961
18	Pre Fab Home	121,638	54	Receiving Set	31,565
19	House Furnit	98,552	55	Commun Equip.	296,124
20	Other Furnit	87,389	56	Elect Compon	138,821
21	Paper Prod	440,991	57	Other Elec Eq	76,139
22	Paper Contain	120,704	58	Motor Vehicle	982,028
23	Newspaper	686,304	59	Aircraft/Parts	85,766
24	Indust Chem	282,999	60	Missles/Parts	10,028
25	Agric Chem	104,134	61	Air/Miss Prop	30,247
26	Other Chem	183,941	62	Other Trans Eq	83,526
27	Plastics/Syn	233,574	63	Sci/Photo Eq.	76,560
28	Drugs	172,597	64	Medical Equip.	54,557
29	Cosmetics	150,348	65	Other Mfg Prod	137,451
30	Paint/Allied	85,928	66	Railroads	91,630
31	Petrol Refin	1,331,833	67	Local Transit	20,334
32	Rubber/Misc	546,024	69	Mtr Frght Inter	107,079
33	Leather Prod	28,451	70	Retail	1,172,389
34	Glass Prod	126,149	71	Wholesale	598,493
35	Stone/Clay Pr	715,487	72	Bulk	4,023,874
36	Iron Forge	227,723	73	Services	1,849,038
				TOTAL	26,091,789

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-50

Welfare Trapezoids of MRIO Sectors in Region 21 (TX) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	8,908,822	37	Iron Foundary	878,960
2	Meat Products	21,383,887	38	NonFerr Metal	9,558,146
3	Dairy Prod.	26,310,975	39	Metal Contain	14,579,644
4	Can/Froz Food	30,581,899	40	Struct Metal	17,763,443
5	Grain Mill	44,518,549	41	Screw Machine	2,888,965
6	Bakery Prod.	8,598,747	42	Engine/Turbine	2,920,002
7	Sugar & Conf.	17,959,589	43	Farm Equip	2,374,464
8	Beverages	36,213,578	44	Constrct Equip	7,385,046
9	Other Food	14,878,830	45	Mat/Hand Equip	3,131,426
10	Tobacco Prod	0	46	Metalwkg Equip	3,714,695
11	Fabric/Yarn	3,700,778	47	Spec. Machine	3,809,025
12	Floor Cover	2,970,702	48	Other NonElec	8,374,990
13	Hosiery	1,268,236	49	Comput. Equip	9,535,086
14	Apparel	9,556,308	50	Service Mach	4,661,778
15	Other Fabric	2,935,003	51	Elect. Equip	7,741,542
16	Log/Lumber	4,225,302	52	House Applian	3,840,879
17	Wood Product	8,342,440	53	Elect Lighting	2,897,086
18	Pre Fab Home	4,368,498	54	Receiving Set	5,355,038
19	House Furnit	6,287,561	55	Commun Equip.	6,089,114
20	Other Furnit	6,101,165	56	Elect Compon	4,664,146
21	Paper Prod	14,484,381	57	Other Elec Eq	3,032,717
22	Paper Contain	5,038,796	58	Motor Vehicle	38,893,041
23	Newspaper	15,430,489	59	Aircraft/Parts	3,434,428
24	Indust Chem	30,344,181	60	Missles/Parts	267,494
25	Agric Chem	3,457,814	61	Air/Miss Prop	626,471
26	Other Chem	5,337,922	62	Other Trans Eq	4,853,968
27	Plastics/Syn	6,946,813	63	Sci/Photo Eq.	5,140,562
28	Drugs	6,738,527	64	Medical Equip.	4,396,768
29	Cosmetics	9,678,656	65	Other Mfg Prod	6,833,656
30	Paint/Allied	3,022,704	66	Railroads	1,220,535
31	Petrol Refin	21,840,152	67	Local Transit	228,401
32	Rubber/Misc	14,676,866	69	Mtr Frght Inter	874,362
33	Leather Prod	2,170,611	70	Retail	14,905,263
34	Glass Prod	5,587,045	71	Wholesale	8,184,277
35	Stone/Clay Pr	42,710,217	72	Bulk	65,249,105
36	Iron Forge	11,298,189	73	Services	19,778,476
				TOTAL	757,957,231

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-51

Welfare Trapezoids of MRIO Sectors in Region 22 (MT, ID, WY,
UT, CO, AZ, AK, HI) After Intrastate Motor Carrier
Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,526,039	37	Iron Foundary	41,385
2	Meat Products	1,185,521	38	NonFerr Metal	786,346
3	Dairy Prod.	551,774	39	Metal Contain	818,070
4	Can/Froz Food	975,291	40	Struct Metal	1,205,607
5	Grain Mill	839,000	41	Screw Machine	151,553
6	Bakery Prod.	363,134	42	Engine/Turbine	62,190
7	Sugar & Conf.	404,687	43	Farm Equip	168,252
8	Beverages	1,764,721	44	Constrct Equip	437,347
9	Other Food	650,142	45	Mat/Hand Equip	78,849
10	Tobacco Prod	0	46	Metalwkg Equip	141,357
11	Fabric/Yarn	108,688	47	Spec. Machine	90,492
12	Floor Cover	163,844	48	Other NonElec	268,485
13	Hosiery	66,921	49	Comput. Equip	583,736
14	Apparel	280,356	50	Service Mach	300,820
15	Other Fabric	130,663	51	Elect. Equip	204,310
16	Log/Lumber	363,211	52	House Applian	206,331
17	Wood Product	511,376	53	Elect Lighting	169,559
18	Pre Fab Home	185,333	54	Receiving Set	72,517
19	House Furnit	211,355	55	Commun Equip.	457,789
20	Other Furnit	241,175	56	Elect Compon	427,600
21	Paper Prod	601,588	57	Other Elec Eq	173,669
22	Paper Contain	354,704	58	Motor Vehicle	1,552,999
23	Newspaper	784,301	59	Aircraft/Parts	545,778
24	Indust Chem	369,678	60	Missles/Parts	96,543
25	Agric Chem	278,656	61	Air/Miss Prop	323,284
26	Other Chem	195,093	62	Other Trans Eq	268,616
27	Plastics/Syn	140,999	63	Sci/Photo Eq.	344,434
28	Drugs	376,300	64	Medical Equip.	226,844
29	Cosmetics	448,815	65	Other Mfg Prod	379,447
30	Paint/Allied	268,909	66	Railroads	229,767
31	Petrol Refin	2,433,106	67	Local Transit	94,980
32	Rubber/Misc	1,200,567	68	Mtr Frght Intra	202,707
33	Leather Prod	68,649	69	Mtr Frght Inter	321,807
34	Glass Prod	147,968	70	Retail	3,654,002
35	Stone/Clay Pr	1,218,958	71	Wholesale	1,582,615
36	Iron Forge	350,327	72	Bulk	14,562,753
			73	Services	5,264,472
				TOTAL	56,259,158

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-52

Welfare Trapezoids of MRIO Sectors in Region 23 (NM) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	225,207	37	Iron Foundary	0
2	Meat Products	206,860	38	NonFerr Metal	66,614
3	Dairy Prod.	79,209	39	Metal Contain	76,129
4	Can/Froz Food	122,670	40	Struct Metal	182,102
5	Grain Mill	235,811	41	Screw Machine	33,663
6	Bakery Prod.	112,398	42	Engine/Turbine	10,406
7	Sugar & Conf.	114,727	43	Farm Equip	22,385
8	Beverages	625,279	44	Constrct Equip	106,946
9	Other Food	122,614	45	Mat/Hand Equip	0
10	Tobacco Prod	0	46	Metalwkg Equip	10,290
11	Fabric/Yarn	23,836	47	Spec. Machine	5,227
12	Floor Cover	0	48	Other NonElec	54,679
13	Hosiery	23,783	49	Comput. Equip	68,660
14	Apparel	72,831	50	Service Mach	39,071
15	Other Fabric	22,842	51	Elect. Equip	24,315
16	Log/Lumber	48,677	52	House Applian	38,276
17	Wood Product	79,376	53	Elect Lighting	34,711
18	Pre Fab Home	36,238	54	Receiving Set	0
19	House Furnit	88,442	55	Commun Equip.	97,598
20	Other Furnit	56,886	56	Elect Compon	38,562
21	Paper Prod	99,347	57	Other Elec Eq	0
22	Paper Contain	0	58	Motor Vehicle	479,860
23	Newspaper	61,486	59	Aircraft/Parts	109,079
24	Indust Chem	50,953	60	Missles/Parts	1,443
25	Agric Chem	34,301	61	Air/Miss Prop	8,682
26	Other Chem	67,004	62	Other Trans Eq	19,923
27	Plastics/Syn	9,662	63	Sci/Photo Eq.	59,438
28	Drugs	0	64	Medical Equip.	15,350
29	Cosmetics	72,580	65	Other Mfg Prod	61,941
30	Paint/Allied	0	66	Railroads	19,397
31	Petrol Refin	373,078	67	Local Transit	8,309
32	Rubber/Misc	167,458	69	Mtr Frght Inter	55,572
33	Leather Prod	53,802	70	Retail	497,107
34	Glass Prod	32,014	71	Wholesale	164,239
35	Stone/Clay Pr	423,479	72	Bulk	2,227,023
36	Iron Forge	47,078	73	Services	620,039
				TOTAL	9,046,965

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-53

Welfare Trapezoids of MRIO Sectors in Region 24 (NV) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	87,207	37	Iron Foundary	0
2	Meat Products	80,310	38	NonFerr Metal	151,249
3	Dairy Prod.	31,891	39	Metal Contain	41,919
4	Can/Froz Food	0	40	Struct Metal	68,144
5	Grain Mill	51,143	41	Screw Machine	0
6	Bakery Prod.	28,346	42	Engine/Turbine	0
7	Sugar & Conf.	0	43	Farm Equip	0
8	Beverages	261,004	44	Constrct Equip	0
9	Other Food	48,490	45	Mat/Hand Equip	0
10	Tobacco Prod	0	46	Metalwkg Equip	0
11	Fabric/Yarn	0	47	Spec. Machine	3,457
12	Floor Cover	0	48	Other NonElec	9,464
13	Hosiery	0	49	Comput. Equip	38,168
14	Apparel	30,265	50	Service Mach	18,390
15	Other Fabric	27,304	51	Elect. Equip	6,911
16	Log/Lumber	15,304	52	House Applian	21,623
17	Wood Product	46,879	53	Elect Lighting	18,775
18	Pre Fab Home	0	54	Receiving Set	0
19	House Furnit	16,216	55	Commun Equip.	93,377
20	Other Furnit	0	56	Elect Compon	21,050
21	Paper Prod	0	57	Other Elec Eq	0
22	Paper Contain	0	58	Motor Vehicle	89,266
23	Newspaper	67,140	59	Aircraft/Parts	4,830
24	Indust Chem	16,186	60	Missles/Parts	0
25	Agric Chem	7,361	61	Air/Miss Prop	0
26	Other Chem	8,751	62	Other Trans Eq	0
27	Plastics/Syn	4,222	63	Sci/Photo Eq.	13,618
28	Drugs	0	64	Medical Equip.	23,053
29	Cosmetics	38,995	65	Other Mfg Prod	44,610
30	Paint/Allied	0	66	Railroads	4,506
31	Petrol Refin	216,710	67	Local Transit	12,762
32	Rubber/Misc	62,277	69	Mtr Frght Inter	19,104
33	Leather Prod	0	70	Retail	150,058
34	Glass Prod	15,958	71	Wholesale	51,493
35	Stone/Clay Pr	92,002	72	Bulk	585,508
36	Iron Forge	26,178	73	Services	525,565
				TOTAL	3,297,041

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-54

Welfare Trapezoids of MRIO Sectors in Region 25 (WA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,244,484	37	Iron Foundary	162,010
2	Meat Products	5,046,878	38	NonFerr Metal	4,202,212
3	Dairy Prod.	2,532,524	39	Metal Contain	3,930,066
4	Can/Froz Food	11,113,235	40	Struct Metal	2,494,820
5	Grain Mill	5,776,002	41	Screw Machine	434,958
6	Bakery Prod.	1,677,686	42	Engine/Turbine	448,827
7	Sugar & Conf.	6,027,381	43	Farm Equip	470,980
8	Beverages	11,081,902	44	Constrct Equip	1,162,250
9	Other Food	3,055,991	45	Mat/Hand Equip	496,024
10	Tobacco Prod	0	46	Metalwkg Equip	502,449
11	Fabric/Yarn	324,947	47	Spec. Machine	1,054,767
12	Floor Cover	646,399	48	Other NonElec	1,092,828
13	Hosiery	0	49	Comput. Equip	4,124,978
14	Apparel	842,219	50	Service Mach	1,023,552
15	Other Fabric	584,105	51	Elect. Equip	921,605
16	Log/Lumber	4,924,621	52	House Applian	433,074
17	Wood Product	2,532,715	53	Elect Lighting	984,730
18	Pre Fab Home	1,194,814	54	Receiving Set	585,103
19	House Furnit	1,647,857	55	Commun Equip.	2,850,292
20	Other Furnit	1,506,971	56	Elect Compon	540,218
21	Paper Prod	5,633,505	57	Other Elec Eq	510,383
22	Paper Contain	1,305,202	58	Motor Vehicle	6,594,244
23	Newspaper	3,034,332	59	Aircraft/Parts	7,406,556
24	Indust Chem	1,885,075	60	Missles/Parts	45,063
25	Agric Chem	659,300	61	Air/Miss Prop	742,096
26	Other Chem	833,041	62	Other Trans Eq	6,276,034
27	Plastics/Syn	514,076	63	Sci/Photo Eq.	701,628
28	Drugs	1,227,482	64	Medical Equip.	602,227
29	Cosmetics	2,453,117	65	Other Mfg Prod	832,790
30	Paint/Allied	846,538	66	Railroads	250,256
31	Petrol Refin	3,241,834	67	Local Transit	46,615
32	Rubber/Misc	2,658,137	69	Mtr Frght Inter	158,957
33	Leather Prod	629,446	70	Retail	3,480,940
34	Glass Prod	1,362,714	71	Wholesale	1,619,193
35	Stone/Clay Pr	7,959,522	72	Bulk	10,978,894
36	Iron Forge	931,594	73	Services	4,584,758
				TOTAL	169,682,023

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-55

Welfare Trapezoids of MRIO Sectors in Region 26 (OR) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	366,538	37	Iron Foundary	10,588
2	Meat Products	495,746	38	NonFerr Metal	267,002
3	Dairy Prod.	169,874	39	Metal Contain	255,596
4	Can/Froz Food	383,182	40	Struct Metal	221,647
5	Grain Mill	202,899	41	Screw Machine	67,172
6	Bakery Prod.	113,683	42	Engine/Turbine	16,883
7	Sugar & Conf.	90,273	43	Farm Equip	23,916
8	Beverages	274,901	44	Constrct Equip	32,436
9	Other Food	437,568	45	Mat/Hand Equip	31,337
10	Tobacco Prod	0	46	Metalwkg Equip	51,861
11	Fabric/Yarn	35,548	47	Spec. Machine	55,808
12	Floor Cover	54,269	48	Other NonElec	77,667
13	Hosiery	0	49	Comput. Equip	113,144
14	Apparel	77,697	50	Service Mach	68,333
15	Other Fabric	42,433	51	Elect. Equip	48,426
16	Log/Lumber	700,972	52	House Applian	47,750
17	Wood Product	343,899	53	Elect Lighting	40,431
18	Pre Fab Home	77,649	54	Receiving Set	7,455
19	House Furnit	45,850	55	Commun Equip.	481,661
20	Other Furnit	45,357	56	Elect Compon	62,615
21	Paper Prod	371,934	57	Other Elec Eq	101,554
22	Paper Contain	138,813	58	Motor Vehicle	454,771
23	Newspaper	252,068	59	Aircraft/Parts	330,187
24	Indust Chem	169,267	60	Missles/Parts	17,146
25	Agric Chem	84,625	61	Air/Miss Prop	13,254
26	Other Chem	146,544	62	Other Trans Eq	228,738
27	Plastics/Syn	128,538	63	Sci/Photo Eq.	83,152
28	Drugs	109,357	64	Medical Equip.	59,157
29	Cosmetics	120,090	65	Other Mfg Prod	88,153
30	Paint/Allied	156,489	66	Railroads	84,419
31	Petrol Refin	991,933	67	Local Transit	21,163
32	Rubber/Misc	431,547	68	Mtr Frght Intra	114,858
33	Leather Prod	15,109	69	Mtr Frght Inter	105,219
34	Glass Prod	31,106	70	Retail	1,088,029
35	Stone/Clay Pr	233,317	71	Wholesale	594,794
36	Iron Forge	72,980	72	Bulk	2,929,346
			73	Services	1,451,383
				TOTAL	17,159,104

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-56

Welfare Trapezoids of MRIO Sectors in Region 27 (CA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	2,378,685	37	Iron Foundary	66,265
2	Meat Products	2,112,347	38	NonFerr Metal	1,511,394
3	Dairy Prod.	807,772	39	Metal Contain	1,226,823
4	Can/Froz Food	1,594,104	40	Struct Metal	924,634
5	Grain Mill	1,195,436	41	Screw Machine	348,354
6	Bakery Prod.	512,485	42	Engine/Turbine	163,549
7	Sugar & Conf.	362,732	43	Farm Equip	148,033
8	Beverages	1,976,213	44	Constrct Equip	195,400
9	Other Food	1,447,708	45	Mat/Hand Equip	99,291
10	Tobacco Prod	0	46	Metalwkg Equip	189,945
11	Fabric/Yarn	573,205	47	Spec. Machine	224,370
12	Floor Cover	577,019	48	Other NonElec	505,737
13	Hosiery	265,232	49	Comput. Equip	1,343,647
14	Apparel	834,533	50	Service Mach	471,287
15	Other Fabric	317,656	51	Elect. Equip	387,230
16	Log/Lumber	363,157	52	House Applian	281,813
17	Wood Product	643,301	53	Elect Lighting	283,684
18	Pre Fab Home	231,598	54	Receiving Set	207,303
19	House Furnit	387,791	55	Commun Equip.	707,024
20	Other Furnit	303,822	56	Elect Compon	1,393,129
21	Paper Prod	2,439,269	57	Other Elec Eq	472,182
22	Paper Contain	1,071,811	58	Motor Vehicle	3,051,253
23	Newspaper	1,681,772	59	Aircraft/Parts	865,899
24	Indust Chem	1,521,580	60	Missles/Parts	451,796
25	Agric Chem	485,202	61	Air/Miss Prop	185,632
26	Other Chem	605,063	62	Other Trans Eq	331,457
27	Plastics/Syn	1,261,334	63	Sci/Photo Eq.	371,902
28	Drugs	1,012,889	64	Medical Equip.	289,427
29	Cosmetics	1,204,000	65	Other Mfg Prod	562,080
30	Paint/Allied	668,334	66	Railroads	272,543
31	Petrol Refin	2,705,867	67	Local Transit	107,373
32	Rubber/Misc	2,741,449	68	Mtr Frght Intra	685,724
33	Leather Prod	164,655	69	Mtr Frght Inter	152,123
34	Glass Prod	289,909	70	Retail	5,664,023
35	Stone/Clay Pr	637,597	71	Wholesale	2,295,162
36	Iron Forge	560,743	72	Bulk	10,637,965
			73	Services	9,667,106
				TOTAL	82,699,828

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-57

Welfare Trapezoids of MRIO Sectors in Region 28 (LA) After
Intrastate Motor Carrier Deregulation in the 20 States

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	1,725,866	37	Iron Foundary	60,020
2	Meat Products	3,119,842	38	NonFerr Metal	1,365,401
3	Dairy Prod.	820,860	39	Metal Contain	1,994,070
4	Can/Froz Food	1,883,368	40	Struct Metal	2,821,784
5	Grain Mill	3,892,762	41	Screw Machine	291,246
6	Bakery Prod.	880,514	42	Engine/Turbine	364,474
7	Sugar & Conf.	2,325,405	43	Farm Equip	403,007
8	Beverages	3,605,013	44	Constrct Equip	1,598,514
9	Other Food	5,991,841	45	Mat/Hand Equip	622,494
10	Tobacco Prod	0	46	Metalwkg Equip	541,085
11	Fabric/Yarn	325,563	47	Spec. Machine	1,121,702
12	Floor Cover	267,003	48	Other NonElec	1,352,161
13	Hosiery	213,627	49	Comput. Equip	1,009,251
14	Apparel	1,585,292	50	Service Mach	1,173,823
15	Other Fabric	377,359	51	Elect. Equip	1,101,593
16	Log/Lumber	1,181,584	52	House Applian	709,397
17	Wood Product	1,054,712	53	Elect Lighting	547,404
18	Pre Fab Home	581,399	54	Receiving Set	122,300
19	House Furnit	1,216,574	55	Commun Equip.	1,365,397
20	Other Furnit	1,101,959	56	Elect Compon	251,531
21	Paper Prod	2,439,681	57	Other Elec Eq	513,098
22	Paper Contain	698,400	58	Motor Vehicle	3,926,497
23	Newspaper	1,340,160	59	Aircraft/Parts	896,346
24	Indust Chem	5,547,462	60	Missles/Parts	259,134
25	Agric Chem	1,325,099	61	Air/Miss Prop	461,438
26	Other Chem	963,566	62	Other Trans Eq	1,522,940
27	Plastics/Syn	832,582	63	Sci/Photo Eq.	532,824
28	Drugs	754,050	64	Medical Equip.	791,898
29	Cosmetics	1,042,067	65	Other Mfg Prod	1,026,755
30	Paint/Allied	433,619	66	Railroads	174,260
31	Petrol Refin	3,469,491	67	Local Transit	62,544
32	Rubber/Misc	2,065,204	69	Mtr Frght Inter	203,323
33	Leather Prod	191,109	70	Retail	2,174,513
34	Glass Prod	305,947	71	Wholesale	1,527,424
35	Stone/Clay Pr	2,614,209	72	Bulk	9,064,646
36	Iron Forge	1,669,497	73	Services	2,931,160
				TOTAL	102,728,141

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

TABLE 6-58

Welfare Trapezoids of MRIO Sectors in the United States After
Intrastate Motor Carrier Deregulation in the 20 States
(Aggregation of Tables 6-30 Through 6-57)

Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $	Aggregated MRIO Sector	Description	Welfare Trapezoid 1988 $
1	Other Utility	53,378,339	37	Iron Foundary	5,637,316
2	Meat Products	92,082,888	38	NonFerr Metal	49,242,461
3	Dairy Prod.	55,351,520	39	Metal Contain	52,983,926
4	Can/Froz Food	86,356,709	40	Struct Metal	49,536,491
5	Grain Mill	94,706,298	41	Screw Machine	19,646,448
6	Bakery Prod.	27,402,357	42	Engine/Turbine	10,824,425
7	Sugar & Conf.	48,459,573	43	Farm Equip	9,628,017
8	Beverages	106,423,613	44	Constrct Equip	18,052,640
9	Other Food	74,264,804	45	Mat/Hand Equip	8,578,058
10	Tobacco Prod	7,905,395	46	Metalwkg Equip	12,241,358
11	Fabric/Yarn	21,783,701	47	Spec. Machine	12,324,499
12	Floor Cover	14,432,837	48	Other NonElec	28,773,005
13	Hosiery	8,472,678	49	Comput. Equip	36,302,556
14	Apparel	38,049,457	50	Service Mach	17,049,947
15	Other Fabric	12,893,075	51	Elect. Equip	25,144,719
16	Log/Lumber	18,802,320	52	House Applian	14,387,864
17	Wood Product	26,963,128	53	Elect Lighting	12,763,887
18	Pre Fab Home	9,522,091	54	Receiving Set	13,165,539
19	House Furnit	20,702,705	55	Commun Equip.	29,919,993
20	Other Furnit	19,402,202	56	Elect Compon	24,692,134
21	Paper Prod	80,577,227	57	Other Elec Eq	13,497,189
22	Paper Contain	25,891,096	58	Motor Vehicle	159,610,589
23	Newspaper	54,899,104	59	Aircraft/Parts	21,926,293
24	Indust Chem	64,379,102	60	Missles/Parts	1,694,149
25	Agric Chem	16,546,456	61	Air/Miss Prop	6,761,802
26	Other Chem	21,793,984	62	Other Trans Eq	26,875,504
27	Plastics/Syn	33,434,273	63	Sci/Photo Eq.	18,069,604
28	Drugs	23,194,452	64	Medical Equip.	15,932,342
29	Cosmetics	38,714,134	65	Other Mfg Prod	25,872,443
30	Paint/Allied	13,787,705	66	Railroads	7,083,656
31	Petrol Refin	88,313,259	67	Local Transit	2,759,972
32	Rubber/Misc	78,220,979	68	Mtr Frght Intra	3,006,470
33	Leather Prod	9,913,971	69	Mtr Frght Inter	8,687,973
34	Glass Prod	16,977,933	70	Retail	86,751,338
35	Stone/Clay Pr	108,342,751	71	Wholesale	45,799,603
36	Iron Forge	46,629,068	72	Bulk	269,853,378
			73	Services	138,820,776
				TOTAL	2,862,869,573

FOR FULL DEFINITION OF THE AGGREGATED MRIO SECTORS, SEE TABLE 5-23

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TABLE 6-59

WELFARE TRAPEZOID IMPACT ON THE TWENTY EIGHT US REGIONS BY REGION

REGION NUMBER	REGION STATES	IMPACT IN DOLLARS
1	ME, VT, CT	16,957,434
2	NH	11,352,165
3	MA	96,850,022
4	RI	4,285,245
5	NY	125,673,642
6	PA	121,322,965
7	NJ, DE, DC, MD, VA	85,837,817
8	WV	11,723,457
9	TN, NC, SC, FL	98,655,263
10	GA	82,211,589
11	AL	29,552,141
12	MS	31,479,881
13	KY	34,573,281
14	WI, MI, IN, OH	171,533,406
15	IL	445,863,576
16	MN	148,635,886
17	IA	35,132,960
18	MO, AR, NE, KS, ND	82,191,648
19	SD	4,115,915
20	OK	26,091,789
21	TX	757,957,231
22	MT, ID, WY, UT, CO, AZ, AK, HI	56,259,158
23	NM	9,046,965
24	NV	3,297,041
25	WA	169,682,023
26	OR	17,159,104
27	CA	82,699,828
28	LA	102,728,141
TOTAL		2,862,869,573

regulation tends to impact greatly on the regulating state. The twenty regulated states where discounted intrastate rates exceed discounted interstate rates have 78.6% of the impacts.

The intrastate impacts of the exogenous price changes in intrastate motor carrier transportation on the intrastate motor carrier industry in each of the twenty states in which the motor carrier rates were lowered are calculated in the manner described below.

The motor carrier rate changes are shown in Tables 5-1 through 5-20. These are expressed as the discounted deregulated rates as a fraction of discounted regulated rates prior to intrastate deregulation (as described above). Thus if the before deregulation rate in state b was T_b, the after deregulation rate is expressed as xT_b, where $(1 - x)(100)$ is the percentage that rates are predicted to fall as the state moves from its current regulatory environment to a federally comparable deregulated environment. The amount of money spent on intrastate motor carriage in each state (before deregulation) is given in the MRIO data set (as $T_b Q_b$ where Q_b the amount of intrastate motor carrier traffic as calculated by the method in Chapter 5).

Assume that the demand curve for motor carrier transportation is one of unitary elasticity. Then $T_b Q_b = xT_b Q'_b$ where Q'_b is the new quantity demanded to be transported by motor carriage at the new price, $T' = xT_b$, after deregulation. Therefore,

$Q'_b = (Q_b/x)$. The welfare trapezoid becomes:

$$W = (1/2)(T_b - xT_b)(Q_b + [Q_b/x]) = (.5/x)(T_b Q_b)(1 - x^2),$$

i.e., it can expressed as a function of the amount transportation rates will fall under deregulation and the amount spent on transportation under regulation. Since separate amounts by MRIO sector spent on intrastate truck transportation are not available, a weighted average x was determined for each of the twenty states. This yields twenty welfare trapezoids reflecting the exogenous rate changes in intrastate motor carriage. These 1977 trapezoids were updated to represent 1988 values by the GNP Implicit Price Deflator in the same manner described above. They are presented in Table 6-60.

TABLE 6-60

WELFARE TRAPEZOID IMPACT CAUSED BY THE EXOGENOUS RATE CHANGES FOR
INTRASTATE MOTOR CARRIAGE ON THE 20 REGULATED STATES

REGION NUMBER	STATE	IMPACT IN DOLLARS
2	NH	3,291,785
3	MA	30,745,870
4	RI	280,571
5	NY	36,557,468
6	PA	50,623,831
8	WV	4,490,401
10	GA	20,370,360
11	AL	2,807,555
12	MS	5,647,765
13	KY	7,499,183
15	IL	208,530,923
16	MN	45,508,065
17	IA	4,457,247
19	SD	76,049
20	OK	3,293,297
21	TX	280,885,134
23	NM	427,850
24	NV	93,252
25	WA	58,069,017
28	LA	26,206,302
TOTAL		789,861,925

These motor carriage trapezoids are exogenous to the MRIO model (since the motor carrier rate changes are exogenous to the model). They represent the part of Table 6-59 impacts that are directly attributable to the exogenous transportation rate changes. The remainder of the Table 6-59 impacts are caused by the subsequent price changes induced in the economy by the non-transport price changes (which, in turn, were induced by the transport price changes as well as other price changes, e.g., the transport changes lowered the price of steel, which, in turn, lowered the price of automobiles, since steel is used in the production of autos, etc.). These secondary impacts are shown in Table 6-61 for the 20 regulated states and in Table 6-62 for the remaining eight regions. The sum of the totals in Tables 6-60, 6-61, and 6-62 equals the total in Table 6-59.

As can be seen from the analysis herein, significant interstate impacts of intrastate motor carrier regulation exist. Particularly impacted are the states of Texas, Illinois, Washington, Minnesota, New York, Pennsylvania, Louisiana, and Massachusetts. The meat products, canned and frozen foods, grain mill products, beverages, other food products, paper products, industrial chemicals, petroleum refining, rubber and miscellaneous products, stone and clay products, motor vehicles and parts, retail, bulk, and service sectors of the economy all have over $64 million dollars of impact each over the US economy.

ENDNOTES FOR CHAPTER 6

1. Systan, Inc., Analysis of Alternative Subsidy Programs: Impact on Regional Development, Final Report, Economic Development Administration, US Department of Commerce, Washington, DC., Contract No. 2-36716, August 1973, Table IV.I.

2. Industry Statistics Division, Office of the Industry Assistant, Trade Information and Analysis, Trade Development, ITA, US Department of Commerce, April, 1988.

TABLE 6-61

WELFARE TRAPEZOID IMPACT CAUSED BY THE ENDOGENOUS RATE CHANGES IN THE 20 REGULATED STATES

REGION NUMBER	STATE	IMPACT IN DOLLARS
2	NH	8,060,380
3	MA	66,104,152
4	RI	4,004,674
5	NY	89,116,174
6	PA	70,699,134
8	WV	7,233,056
10	GA	61,841,229
11	AL	26,744,586
12	MS	25,832,116
13	KY	27,074,098
15	IL	237,332,653
16	MN	103,127,821
17	IA	30,675,713
19	SD	4,039,866
20	OK	22,798,492
21	TX	477,072,097
23	NM	8,619,115
24	NV	3,203,789
25	WA	111,613,006
28	LA	76,521,839
TOTAL		1,461,713,990

TABLE 6-62

WELFARE TRAPEZOID IMPACT CAUSED BY THE ENDOGENOUS RATE CHANGES IN
THE EIGHT REGIONS

REGION NUMBER	REGION/STATE	IMPACT IN DOLLARS
1	ME, VT, CT	16,957,434
7	NJ, DE, DC, MD, VA	85,837,817
9	TN, NC, SC, FL	98,655,263
14	WI, MI, IN, OH	171,533,406
18	MO, AR, NE, KS, ND	82,191,648
22	MT, ID, WY, UT, CO, AZ, AK, HI	56,259,158
26	OR	17,159,104
27	CA	82,699,828
TOTAL		611,293,658

CHAPTER 7

THE ISSUE OF FEDERAL PREEMPTION OF INTRASTATE MOTOR CARRIER
REGULATION

Introduction:

   The ease of entry into the interstate motor carrier industry
in the United States since the MCA-1980 (both de jure and de
facto), has moved the industry closer to a competitive framework.
However, some have argued that the breaking down of federal
barriers will do no good until state barriers are also broken down.
As shown in Chapters 1 and 3, a large amount of truck traffic moves
strictly intrastate. Thus, state regulation may have a substantial
impact on interstate commerce. Given these volumes of intrastate
traffic, carriers who can easily obtain interstate authority may
find that it does not pay to serve particular regions if intrastate
authority can not also be obtained. The reason for this will be
elaborated on below. A related factor is that states may increase
their regulation when the federal regulation disappears, thereby
filling the federal "void". An increase in state regulation,
given the magnitudes of intrastate traffic, may further frustrate
interstate commerce.

Federal Preemption of State Regulatory Authority:

   The above issues, in turn, lead to the question of preemption.
Should the federal government preempt the state governments from
coming in and filling the federal void? Such preemption occurred
in intrastate airline service as a result of the federal passage
of the Airline Deregulation Act of 1978. The Bus Regulatory Reform
Act of 1982 stripped the states of most of their control over
intrastate bus routes and rates. The Staggers Act and other federal
rail actions have left the states with very little control over
intrastate rail activities.
   The motor carriers have thus far not been affected by
preemption. Part of the reason for no preemption was a general
feeling that perhaps the traffic levels were not too great; that
has been dispelled herein. Another reason is that the impact of
state regulation on interstate commerce has not been formally
examined.
                                                            1
   While the ICC and USDOT did issue the Section 19 Report
in 1982 (as mandated by the MCA-1980), only five pages [Chapter X]
of the 127 pages of main text were devoted to the question of
intrastate economic regulation, while the rest of the report
concentrated on taxes and vehicle registration and the economic
impacts of non-economic regulation. In fact, the study participants
argued among themselves whether the Section 19 mandate allowed them
to venture into the area of intrastate economic regulation.

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Ultimately, the joint DOT-ICC study team decided to include a chapter on intrastate economic regulation, despite the ambiguity of Congressional intent, under the thesis that they should report on all potential state impediments to interstate motor carrier operations. The study report suggested that Congress ignore Chapter X should Congress determine that the Section 19 Report had overstepped its bounds. The Section 19 Report examined 12 states which represented substantial amounts of intrastate traffic (California, Colorado, Georgia, Illinois, Iowa, Kansas, Massachusetts, New York, North Carolina, Ohio, Texas, and Washington) and summarized these states' regulatory policies.

The report concluded that "most state regulatory commissioners appear anxious to cooperate with the federal government to assure efficient interstate motor carrier operations."[2] However, the regulatory commissioners express concern about the impacts of federal deregulation on shippers, carriers, and small communities, and felt that more time was needed to evaluate the impact of the federal deregulation. A survey of motor carriers taken in each of the 12 states found that "the vast majority of motor carriers of property, including household goods carriers, preferred continuance of state economic regulation in its present form."[3] This is probably not surprising if current carriers were interviewed. Current carriers generally favored the continuation of the MCA-1935 prior to the passage of the MCA-1980. Carriers with a protected vested interest, i.e., current carriers, are not likely to wish that protection to disappear. The relevant carriers to survey would include prospective carriers, i.e., carriers who would like to enter the market but cannot because of existing regulatory standards. Although the Report mentions some carriers with the above complaint, it is clear that a survey of existing carriers is not likely to fault the system which generates monopoly profits for them, as is argued in Chapter 2.

The Section 19 report sees three options with respect to intrastate economic regulation:

1. maintain the status quo

2. maintain the present jurisdictional division between the federal government and the states, but encourage the states to voluntarily seek uniformity between the federal and state laws

3. preempt state jurisdiction in whole or in part

The report concludes that "some mechanism should be adopted to achieve a level of uniformity. Otherwise, confusion and complexity for both carriers and shippers are likely to result."[4] The Report recommends, therefore, the second option above. The concept is that such an option is a compromise between the new flexibility of the

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MCA-1980 and the right of a state to control commerce within its own boundaries. The Report offered the services of DOT and the ICC to facilitate the move toward uniformity. There was no alternative strategy (except to potentially report back after three years) if the states made no move toward uniformity. NARUC, in fact, drafted a model state bill incorporating some of the reforms, but thus far
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states have not adopted it.

Some proposed motor carrier deregulation bills (Packwood and Moody-DeLay) have taken a strong stand on preemption. The 1987 Administration's bill included total preemption.

Senator Robert Packwood (R-OR) believes that the trucking industry has to have reasonable uniformity in state regulation and said has that he is willing to consider wide preemption of state authority in exchange for the industry's cooperation in a final
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deregulation bill. Without the industry's cooperation, preemption
7
was added to Packwood's bill.

Thomas DeLay (R-TX), co-sponsor of the National Motor Carrier Productivity and Safety Improvement Act, noted that his bill would create a class of national carriers that are exempt from state laws (if the carrier serves three or more contiguous states). DeLay claims that the bill would not preempt state law. "The intrastate regulations are still in effect, we do not touch them, except that we allow the free flow of interstate commerce to happen. Right now,
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that is not happening." DeLay views interstate commerce in the following way: "we're just saying that we want open commerce and movement of goods from the shipper all the way to the end receiver. That to me is interstate commerce, and, therefore, we are on very
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firm ground constitutionally to do what we are trying to do", i.e., the Armstrong Case discussed in Chapter 1.

Three other major participants in motor carriage have advocated preemption: the National American Wholesale Grocers' Association, the National Industrial Transportation League, and two organizations (now one) representing the nation's private carriers.

The National American Wholesale Grocers' Association advocates that "state regulations that are inconsistent with federal motor carrier regulations be preempted, that trip leasing be allowed at the state level, and that the private carrier-for hire carrier definition at the state level be made more consistent with the
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definition at the federal level."

The National Industrial Transportation League (NITL) "sees little value in pursuing federal deregulation unless the states are clearly and unequivocally prohibited from having any control over the interstate trucking industry. In addition, we would urge the subcommittee to consider ending state control over intrastate trucking operations except for safety and insurance. At minimum, we urge that state regulation of trucking matters conform to

federal standards as was done in the 1980 Staggers Rail Act."

In the NITL's policy statement, they advocate complete deregulation of motor carriage (except for safety and insurance), and they support legislation to prevent the states from regulating deregulated motor carriers and legislation to deregulate intrastate

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motor carriage.

The Private Carrier Conference (PCC), then of the ATA, testified before a Senate subcommittee on the benefits to private carriers of deregulation on the intrastate level. "It is accurate to state that the members of the Conference (PCC) as private carriers and as shippers have benefitted greatly from the reforms enacted at the federal level. Consequently, ...the Conference... greatly favors further trucking industry reform at the federal level and the initiation of meaningful reform at the state

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level."

Specifically, the PCC advocated:

(1) Supporting the elimination of economic entry and rate regulation of the trucking industry at both the state and federal levels

(2) Supporting the elimination, at both the state and federal levels, of the remnants of antitrust immunity for collective ratemaking

The PCC states that the entry and rate regulation of intrastate motor carriage is adversely affecting private carriers in multiple ways. While the ease of obtaining operating authority on the federal level (both common and contract) has greatly reduced empty backhauls, the difficulty of entry in the 42 states which still regulate has not enabled the same economies to be obtained intrastate. Since 77% of all private tonnage is intrastate (see Table 1-3 in Chapter 1), it is obvious that many vehicles are available within a state but are not able to be utilized because of entry restrictions. This problem is defined by the PCC as acute. The intrastate authority they seek is either not being granted by the state regulatory authorities or the cost, the time delay, or the controversy engendered in attempting to obtain such authority discourages private carriers from even attempting to get such authority. The PCC would like federal preemption, so that the federal entry provisions would apply on the state level.

The PCC points out that commodities which are exempt on the federal level are not exempt on the state level in many states, further reducing the probability of acceptable load factors. In addition, many states do not allow intrastate trip leasing (as is allowed on the federal level), further reducing load factors. Furthermore, a number of states regulate private carriage, which the private carriers find restrictive (i.e., to move their own materials requires state permission.)

The call for preemption by the PCC is strong. They fear that the states will take over regulation in areas where the federal government has vacated. The state motor carrier regulatory bodies are characterized as having a "strong, almost instinctive bias toward limiting competition by maintaining a heavy hand of entry regulation over common and contract carriage."[14] The PCC recommends that "great care will have to be taken in drafting any further federal motor carrier reform legislation so as to prevent the states from undermining competitive freedoms achieved at the federal level."[15]

In a "Statement of Policy", the PCC states that it "fully supports and encourages freedom of choice in transportation and believes that any carrier should be free to haul any commodity for any shipper at rates and terms mutually agreed upon by the shipper and the carrier. It is the conviction of the PCC that the needs of the shipping public, the carriers, and the nation are all best served by a free market in truck transportation which has no economic restrictions, no barriers to entry or exit from the motor carrier industry, and that no segment of such industry should be granted antitrust immunity for purposes of collective ratemaking or wage and benefit agreements that are not permitted in all other unregulated industries."[16]

Federal preemption of state regulatory authority over the trucking industry should go hand in hand with further deregulation of the trucking industry, advocates the PCC. Herman Granberry, a past PCC president, is concerned that if the desired federal deregulation is obtained, then the states might step in to fill the federal void. Under such circumstances, "we'll be fighting 48 tigers rather than one."[17] Granberry feels that the deregulatory debate reduces to two basic issues: antitrust immunity for collective ratemaking and preemption of state regulation.

The PCC has stated that it is very concerned about achieving uniformity (and hence flexibility) at the state level for motor carriers, particularly the private carriers which operate on a dual basis (both intra and interstate) with the same proprietary fleet.[18]

The Private Truck Council of America (PCTA) has stated that it desires federal deregulation of trucking to preempt state laws. The PCTA advocates the supremacy of the Commerce Clause of the Constitution over states' rights.[19] The PCC and the PCTA recently merged to form the National Private Truck Council (NPTC); however, their philosophy has not changed from that expressed above.

Daniel Baker of the State Regulatory Study Committee of the Transportation Lawyers Association states the fervor with which preemption is viewed on the state level. "Hopefully, the unaffected intrastate systems will continue their freedom from federal

preemption and the states will somehow regain control over their transportation systems which is so essential to their people and economies. Intrastate transportation is vital to the states; these local governments, manifestly, are the proper judges of the character of services and types of regulation that are in the best interest of and required by their citizens."[20] Baker feels that the federal government will attempt to preempt state regulation in 1989, backed by the Americans for Safe and Competitive Trucking (a group of trade associations representing manufacturers and large manufacturers themselves).[21]

Baker's feelings are also echoed by the National Governors' Association by their Working Group on State Motor Carrier Procedures. While the Association is searching for more uniformity on a voluntary basis for motor carrier regulations, they made it clear that federal preemption "is something we governors don't want".[22]

The Board of Governors of the RCCC of the ATA has made a policy statement to support state economic regulation.[23] NARUC also does not want preemption; they advocate states' rights.[24] In addition, the Coalition for Sound General Freight Trucking (CSGFT) feels that state regulation is an issue "of federalism and the preservation of a state's right to regulate activity within its borders, regardless of federal policy."[25] The CSGFT feels that an attempt to preempt the states' rights would be inconsistent with the states' historic role.

Horn has recently investigated the question of preemption.[26] The issue of preemption hinges on two major issues:

(1) what does interstate commerce entail

(2) under what circumstances does regulation of intrastate motor carrier transportation inhibit interstate commerce?

To one degree or another, the federal government has decided that state regulation of the intrastate operations of interstate airlines, interstate railroads, and interstate passenger motor carriers inhibits interstate commerce. In all cases, there was resistance from the states with respect to preemption.

The Airline Deregulation Act of 1978 encompassed a section entitled "Federal Preemption". It states: "No state or political subdivision thereof and no interstate agency or other political agency or two or more States shall enact or enforce any law, rule, regulation, standard, or other provisions having the force and effect of law relating to rates, routes, or services of any air carrier having authority under Title 14 of this Act to provide

interstate air transportation." In addition, if a previously completely intrastate carrier commences interstate service, then the carrier's whole route structure (including the past intrastate routes) shall be part of the carrier's authority. From a de facto

policy point of view, the Civil Aeronautics Board (CAB) concluded that any federally certificated carrier is exempted from any state
economic regulation. Unless an air carrier handles only intrastate traffic, state economic regulation is completely preempted.

Federal preemption over certain circumstances of intrastate rail rates has been in force since the Minnesota and the Shreveport rate cases in the early 1910's. Federal control spread to abandonment of lines in 1920 and to passenger service (including commuter service) in 1958. The 4R Act in 1976 gave some rate power back to the states.

Rail interests argued for preemption, stating that the rail system was national in scope and that only 9% of rail revenues were intrastate and, therefore, adhering to 50 regulatory authorities could be like the tail wagging the dog. As was shown in Chapters 1 and 3, such level of traffic arguments would not hold for motor freight carriage.

The Staggers Rail Act of 1980 allows state regulatory agencies whose standards and procedures were certified by the ICC to have jurisdiction over intrastate rail rates. Without such ICC certification, the ICC would have jurisdiction over the rail rates within the state. The states must limit their authority to administering the provisions of the Interstate Commerce Act (not the provisions of any state laws). Thus, in the rail area, the states are not totally preempted, but they must end up behaving like mini ICC's and hence acting out the federal policy anyway.

In practice, the ICC found it difficult to certify states, because they found that the states did not understand the federal law which they were now supposed to enforce. The ICC has overruled several states in their actions with respect to state regulation of railroads since the passage of the Staggers Act.

In the motor carrier area, the situation toward preemption is different historically and only recently has changed. The MCA-1935 prohibited any federal regulation of intrastate motor transportation for the purpose of removing discrimination against
interstate commerce. Therefore, there was complete sovereignty in the area of state regulation of intrastate motor carrier transportation.

The Section 19 Report by USDOT/ICC concluded that three different treatments of state motor carrier regulation could be appropriate, as stated above. Freight motor carriers favor the status quo, according to Horn, while passenger motor carriers
advocated preemption.

The Bus Regulatory Reform Act of 1982 allows preemption of state regulation when the goals of national transportation policy can only be achieved by a national system of regulation. The ICC can issue a certificate to an interstate carrier licensed in one state that will result in ICC jurisdiction over intrastate rates (analogous to the air situation described above). The ICC can also prescribe intrastate rates if they find that such rates are a burden on interstate commerce. The ICC can also authorize intrastate abandonment. Thus, the ICC has significant powers when dealing with the intrastate movement of passengers by motor carrier. While the states maintain power, the states must basically do what the ICC would have done under the same circumstances.

As mentioned in Chapters 1 and 3, the operations of motor carriers of freight may be strongly influenced by state regulation because of the large amounts of intrastate traffic. Some carriers' interstate and intrastate operations are extremely interdependent and intertwined. The Private Carrier Conference of the ATA strongly argues that many private carriers can now freely enter the interstate market, but may be precluded from doing so by strict entry restrictions on the intrastate market.

However, the exact level of impact on interstate commerce and operations is difficult to discern because of joint and common costs. This author could find no studies attempting to make such measurements (aside from his own), nor did Horn report any such studies.

Aside from the concept of imposition of costs per se, a second argument given for preemption is for uniformity of burden. This approach does not attempt to measure the impact of state regulation, but merely notes that 50 different systems must impose some costs of compliance on the carriers and that uniformity makes the burden of regulation (deregulation) simpler.

Horn lists the conditions under which preemption would likely be desireable:[31]

(1) regulation would be administered at lower cost on the federal level.

(2) uniform regulation is more efficient with respect to administrative costs of compliance.

(3) state regulation necessitates cross subsidization of uneconomic services or leads to depressed revenues of carriers.

(4) federal decontrol objectives could not be realized unless state decontrol was simultaneously accomplished.

Horn then proceeds to suggest that none of the above four conditions seems reasonable. No evidence exists that regulation is less costly to administer at the federal level. However, it may be the case that state budgets are understated because of low pay, low

relative skills, and low levels of staffing. It would seem that some scale economies would exist on a federal level vis a vis a state level, in terms of a larger amount of regulation justifying expertise at such a level that is non-sustainable on the state level, etc.

Horn also asserts that no support exists for the condition that uniform regulation is less costly. He notes that many states have similar standards (so that 50 totally different ones do not exist) and that not all carriers operate in 50 states (and hence are not subject to all 50 jurisdictions.) In addition, federal standards and regulations are not always uniform. However, it is difficult to imagine one practical standard to be more costly to adhere to than multiple standards.

Likewise, Horn argues that no evidence has been introduced to suggest that state regulation has supported cross subsidization (where some rates, usually rural, are kept at artificially low levels, supported by some rates, usually in busy traffic lanes, held at artificially high levels. While Horn talks of depressed intrastate rates (often suggested to be indicative of cross subsidization), this report demonstrates that many intrastate rates exceed comparable interstate rates. Thus, cross subsidization on a state level does not seem to be evident. (See Chapter 5).

The fourth condition is the one most likely to apply given the current deregulation. In fact, Horn makes the same flavor of argument that is given herein in Chapter 2, i.e., if a compelling argument can be made to deregulate at the federal level, then similar changes at the state level should also provide economic benefits. "Preemption under these circumstances would appear to be a pragmatic response to maximize public policy objectives of
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deregulation".

A tradeoff exists between the costs of preemption and the costs of non-uniformity (since non-uniformity is the most likely result without preemption). If everyone is in favor of preemption, then the costs are likely to be small. But when the opposition to preemption is strong, then the costs are likely to be high in terms of litigation and in terms of political fighting. An example of little cost would be air preemption, while an example of large cost would be rail preemption.

Horn judges that federal preemption of state regulation of
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freight motor carriers "does not appear likely or desirable."
He characterizes the situation as one of little pressure for federal preemption of freight motor carrier regulation (except for new entrants or private carriers in states which have tight regulation). As mentioned above, the Section 19 Report recommended maintaining the status quo and encouraging the states, on a voluntary basis, to move toward uniformity with the MCA-1980.

While Horn made the above statements in the body of his text, his concluding statement sounds somewhat different. "Federal dominance of transportation regulation is too pervasive to tolerate increased state participation. Through preemption, federal

deregulation provided a convenient arena in which to redress examples of unenlightened state regulation to promote
uniformity."[34] In addition, Horn concludes that "truly independent state economic regulation of transportation no longer exists."[35]

In 1985, the Supreme Court rendered two important decisions from an intrastate motor carrier regulation perspective. The first, the SMCRC decision discussed at length above (in Chapter 2), is seen as a victory for states' rights and the principles of federalism. The second, Garcia versus San Antonio Metropolitan Transit Authority, 83 L Ed.2d 1016 (1985) goes in the other direction. This case expands the power of Congress to preempt state authority under the Constitution's commerce clause. The court, in a 5 to 4 decision, overturned a 1976 Supreme Court case (National League of Cities versus Usery, 426 US 833) that had held that the tenth amendment to the Constitution (due process) stood as a barrier to the Congressional use of the commerce clause to impose regulatory requirements on the states and their agencies.[36] The court held that limitations of the federal government's power over the states through litigation under the tenth amendment should be abandoned. Rather, any such limitations on the federal government over the states ought to be political , i.e., the states can influence what the federal government does through the electoral and legislative process.

A Preliminary Study of the Impact of Intrastate Economic Regulation on Interstate Commerce:

Section 61 (g)(1) of the DOT bill "The Trucking Deregulation Act of 1985" states that "no state or political subdivision thereof and no interstate agency or other political agency of two or more states shall enact or enforce any law, rule, regulation or standard, or other provision having the force and effect of law relating to interstate rates, interstate routes, or interstate services of any motor carrier of property or motor private carrier."[37] This section prevents enactment by non-federal authorities of any laws, rules, etc., that cover areas that were subject to ICC jurisdiction prior to the enactment of the bill. The section is intended to prevent non-federal governments from directly or indirectly regulating the trucking industry in areas from which they are presently precluded from regulation by the Interstate Commerce Act.

Section 61 (g)(1) does not, therefore, preempt anything that the states are currently doing. Rather, it is exclusionary, in the sense that it preempts the states and localities from filling the

void left by federal deregulation.

Section 61 (g)(2) does, however, direct the Secretary of Transportation to conduct a full investigation of the economic regulation of trucking as conducted by the various state regulatory bodies and the extent, if any, to which such state regulation creates burdens on interstate commerce.

If the response to the above query is negative, then public policy will be determined by market forces, i.e., whether entry occurs in the interstate market will be determined by carriers' judgments as to the desirability of providing service and not, in major fashion, by the judgments of a regulatory agency. If, however, the answer is positive, then the question arises as to how federal policy should react to a state policy which negates a federal intent. Preemption would then be one of the options. Purely positive and purely negative responses represent, of course, two polar cases; obviously, results could occur along the entire spectrum of impact.

While the proposed legislation, if it had been approved, would have produced such a study by law two years after the passage of the law (by mid-1988 at the earliest), a minor test of the impact was conducted by the author several years ago.

Consider the following scenario: After the passage of the MCA-1980, carrier A (a new or existing carrier), recognizing that entry into the interstate market is now easier (if not certain), contemplates entering the market from state 1 to state 2. In planning this activity, carrier A recognizes that terminals may have to be constructed in state 1 and/or in state 2 (the carrier may already have facilities available in one or both states due to other operations, e.g., current operating authority between state 1 and state 3 and between state 2 and state 4, or the carrier may be a truckload operator requiring no terminals). The carrier also recognizes the spatial and temporal dimensions of the process and the fact that, for traffic balance purposes, places that terminate loads do not necessarily originate loads ; if they do originate loads, they may not occur at the appropriate times.

These considerations are of concern to the carrier, because low load factors and deadheading (running without a load) likely mean low or non-existent profits. Thus, although a carrier can now go freely from state 1 to state 2 and vice versa, operating realities may require that movements also take place within a state, and economies of utilization and density may require high throughput at terminals, etc. It should be noted that some of these objectives may be able to be accomplished by feeder arrangements with carriers with intrastate authority, shared terminals, trip leasing one's vehicles to a carrier with intrastate authority, etc.

Consider the following simple hypothetical example. Carrier A contemplates Texas-Pennsylvania authority. Suppose that loads in Pennsylvania tend to originate in Philadelphia and tend to terminate in Dallas, 1452 miles away. Loads in Texas, however, tend to originate in Houston and terminate in Pittsburgh, 1313 miles away. One operating possibility entails deadheading between Dallas

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and Houston (243 miles) and between Pittsburgh and Philadelphia (228 miles). This lowers the average load factor and hence raises the average cost per unit handled. Another possibility is to apply to the Texas Railroad Commission for intrastate Texas authority between Dallas and Houston and to apply to the Pennsylvania Public Utility Commission for intrastate Pennsylvania authority between Philadelphia and Pittsburgh.

Suppose that the Texas Railroad Commission and/or the Pennsylvania Public Utility Commission did not grant the intrastate authority to carrier A. In reality, it is very difficult to gain entry in both Texas and Pennsylvania. United Parcel Service recently was allowed to enter the intrastate Texas market after 20 years of trying).[38] These negative state decisions might influence carrier A to decide not to enter the interstate markets, as the result of lowering the expected load factor of the potential applicant.

Beilock and Freeman give an example where intrastate non-conformity with federal motor carrier operations may cause inefficiency problems analogous to those argued above. Suppose that the Navy holds out for bidding a contract for the movement of household goods in its Jacksonville (FL) Naval District, which encompasses portions of Florida and Georgia. The interstate portion is no problem because of the federal loosening of regulation under the MCA-1980 and the Household Goods Transportation Act (1980), and Florida is no problem because of its total deregulation. However, until very recently, Georgia was very strictly regulated. The Navy might not grant the contract to a Florida based carrier, because the carrier could not obtain intrastate Georgia authority. On the other hand, a Georgia carrier (with intrastate Georgia authority) automatically has intrastate Florida authority. Thus "regulatory problems and constraints may still interfere with the smooth and efficient functioning of the nation's transportation system and may prevent shippers from utilizing their expertise to secure the most favorable and efficient transportation services from the available carriers."[39]

Alternatively, a carrier potentially entering the state 1 to state 2 market might wish to use intrastate runs as part of a backhaul. For example, a carrier entering the Philadelphia, PA to Toledo, OH market would likely find Toledo to Youngstown, OH authority worthwhile, as well as Pittsburgh, PA to Philadelphia authority.

Another consideration would be utilization of a terminal facility built for the interstate markets to also handle intrastate movements. The same utilization (density) type of argument holds for pick-up and delivery runs or runs between breakbulk terminals in the same state, which can just as easily handle intrastate or interstate cargo.

Examples, such as those above, can be couched in terms of long haul (Texas to Pennsylvania) or short haul (Ohio to Pennsylvania), LTL or truckload. The key question being asked relates to terminal

and vehicle utilization.

Given the above question and utilizing the hypothetical scenarios proposed above, information was solicited from a subset of carriers which were members of a professional transportation/
logistics group (Council of Logistics Management).[40]   In addition to these carriers, carriers making up the top 20 revenue carriers as described in TRINCS Blue Book[41]   were also questioned. Finally, some other carriers where personal contacts had been made were also included. The sample of carriers is not, therefore, random. It merely represents the views of a small subset of the approximately 40,000 federally regulated US motor carriers. However, given the concentration of revenues in the industry and that many of the large carriers are included in the final respondents, the results do, therefore, yield some clues as to what types of carriers may or may not be influenced by state regulatory policies.

Over 130 carriers were contacted. Some individuals spoke for more than one company because of the conglomerate nature of the business. Eighty one carriers responded to the questions (which were posed in 1982, two years after the passage of the MCA-1980). Forty two carriers stated that intrastate economic regulation had an impact on their decisions to enter interstate markets, while 39 stated that there was no impact. Long haul carriers were more likely (64%) to state no impact. These long haul carriers (in this sample) tended to be disproportionately represented by truckload carriers. Short haul carriers were more likely (58%) to state that intrastate regulation did influence their interstate behavior. Short haul carriers in the sample included both truckload and less than truckload operators. Regular route carriers were more likely (62%) to state that intrastate regulation did influence their interstate behavior. Regular route carriers were both short haul and long haul and tended to be LTL in nature.

The above represented a binary classification. The degree of impact, where one existed, is also important. While no carrier stated that the existence of intrastate economic regulatory barriers kept them from entering the interstate market, some reported significant negative operating and profit impacts of the intrastate economic regulation. Others reported only minor problems. Of those who reported no impact, many stated that they had not thought about the issue, and hence it had no impact on them (at the time of the interviewing, many carriers were reacting to deregulation on the federal level and had not formulated their interstate/intrastate strategies). If they subsequently contemplated new entry, then such intrastate regulation might influence their decisions. Thus, some of the yes decisions are not very significant and some of the no responses could become yes responses if the carrier's entry strategy changes in the future. Given that the survey was taken only two years after the MCA-1980 in the midst of a deep recession, it is likely the case that a number of carriers were more concerned with survival than with expansion plans, given the historic non-strategic planning nature

of the motor carrier industry--although it was clear that a non-trivial number of carriers were concerned with growth and market positioning strategies.

The long haul truckload carriers in the above sample tended to want to return home as rapidly as possible. Intrastate business was regarded by such carriers as short haul, and they did not consider such business to be in their domain. However, 36% of the long haul carriers did state that there was an impact. Not surprisingly, large states with strict entry standards were cited as problems, e.g., Texas, Washington, Oregon, Kansas, Pennsylvania, Georgia, Illinois, Michigan, Missouri, and Tennessee (especially Texas and Pennsylvania). One large national carrier cited a Texas entry situation where it had calculated that intrastate entry would lead to a 2 to 3 point operating ratio improvement on the carrier's runs to and from Texas. Some carriers had obviously thought about the problem and had done some analysis (such as the carrier above), while others had more general statements about the impacts. The carrier above ultimately "solved" its Texas problem by purchasing an intrastate Texas carrier.

Since intrastate hauls are more likely to be shorter hauls, short haul carriers should consider them as part of their domain. However, 42% of the short haul carriers stated that there was no impact. In some cases, they already had the intrastate authority and hence would see no inhibiting impact. In fact, in this case, they might rather see their competition kept out of the intrastate market and hence see intrastate regulation as a positive element. Some carriers stated that they could not compete with Central Freight Lines in Texas (the largest intrastate carrier in Texas with an extensive network) and hence they did not want intrastate Texas authority. One carrier served Lancaster, PA from Camden, NJ, taking advantage of the fact that Philadelphia, PA is in Camden's commercial zone, because they could not obtain intrastate Pennsylvania authority to serve the Philadelphia-Lancaster corridor.

Carriers operating an LTL system desired high terminal utilization and pickup and delivery load factors as hypothesized and, therefore, desired to have the intrastate authority. In some cases, the carriers purchased existing authority or merged with a carrier possessing intrastate authority in order to obtain the desired entry. In many cases, the carriers were able to find ways to satisfy their intrastate objectives, even though it took more effort and money than a free entry policy would have required. These expenditures of effort and money represent social costs of regulation.

Regular route carriers are mostly LTL. Thus one would expect that the utilization impacts of intrastate authority would be positive. While this was true, 38% did report that they found no impact of intrastate economic regulation on their interstate activities. Some carriers stated that their freight flow pattern did not require intrastate traffic. Others, however, did complain about entry in several states, most notably, Texas and Pennsylvania.

Another question asked the carriers related to intrastate rate policy. Only four carriers indicated that state rate policy impacted them in a negative way. Two complained that state levels were too low. Another complained that they wished to install a simplified tariff structure which would save them substantial amounts of paperwork and clerical time, but that state regulatory authorities would not allow the implementation. The last carrier had a customer with a series of drop points which crossed the state boundary from state 1 into adjacent state 2. State 1 would not allow a drop rate structure desired by the shipper which the carrier could implement for the drops in state 2 because of the interstate nature of the state 2 moves. The carrier was able to get around the problem be becoming a contract carrier in state 1--an administrative move made necessary by state 1's regulation.

It was hypothesized that rate regulation by the states could deter interstate entry. If the intrastate rates were too high, then carriers might not wish to enter the intrastate market, because not enough traffic would move at such rates to sustain a reasonable load factor. Thus the carrier might not enter the interstate market because the overall load factor would be too low. On the other hand, if intrastate rates were too low, then carriers might not wish to enter the intrastate market because it is unprofitable. If it was unprofitable, then they might not enter the interstate market because the unprofitable nature of the intrastate rates might make the overall route cycle (Philadelphia-Dallas-Houston-Pittsburgh-Philadelphia in the hypothetical example) unprofitable. However, while the impact of entry controls were recognized by a number of carriers, the impact of state rate regulation was not perceived as a problem.

From this nonscientific sample, certain tentative conclusions can be drawn for the 1982 scenario. Verification of these tentative conclusions would await a scientific sample. Long distance truckload carriers do not seem to be greatly inconvenienced by intrastate entry policies. In most cases, they regard intrastate business as short haul and thus not in their area of specialization. In cases where there has been an impact, carriers have been resourceful and found solutions on their own by purchasing intrastate operating rights or intrastate carriers. This is a solution less available to smaller and less sophisticated carriers, as the costs and complexities of purchases and dealing with lawyers could deter them. Short haul truckload carriers are more negatively impacted by state entry policy, since intrastate business is likely to be short haul and, therefore, in their area of specialization.

Both long haul and short haul LTL carriers tend to be impacted by intrastate entry policy. These carriers wish to maximize freight passing through their terminals. If the terminal and pickup and delivery are established for the interstate business, intrastate business can be treated as a by-product and each unit of traffic that more than covers the marginal costs of handling contributes to the carrier's overhead.

In all cases, however, the carriers contacted had not been

kept out of the interstate market because of the behavior of the state regulatory agency. Rather, the state agencies were an impediment to be overcome but not a total barrier. Some operations were less efficient than they would have been were intrastate operations available, i.e., some carriers entered interstate markets despite the fact that they could not operate intrastate and hence had lower load factors, lower terminal utilization, etc. But these situations were apparently not enough to outweigh the benefits of interstate entry. Carriers with the scarce intrastate authority saw no problems with intrastate entry restrictions, as they preferred their monopoly status.

The above survey and study could be scientifically structured and redone. While there is still a shakeout in the industry, the industry has gone through one equipment cycle since deregulation, and clearly many more carriers have begun to plan strategically.

Conclusion:

Thus, given the results available at the present time, federal entry policy does not appear to be significantly frustrated by intrastate economic regulation—especially rate regulation. Carriers can figure a way around entry barriers if they are so inclined and if the profits of their desired entry can cover these costs of overcoming the state regulations. However, social inefficiencies are created for society as a result of this regulation, in addition to its effect on the 50% of the carriers that expressed specific impact. The carrier's main complaint as of late 1982 related to the economic effects of non-economic regulation, e.g., the level and non-uniformity of state taxes on motor carriers, licensing, registration regulations, etc. These issues are documented in the Section 19 Report referenced above.

However, given the results of Chapter 6, state economic regulatory policy clearly has significant impacts on states other than the state enacting and enforcing the regulation. It is this interference with interstate commerce which suggests that federal preemption, as described in this Chapter, be considered.

ENDNOTES TO CHAPTER 7

1. Uniform State Regulations, Motor Carrier Act of 1980, Section 19, Report to Congress, Department of Transportation, Interstate Commerce Commission, Washington, D.C., January, 1982.

2. op. cit. p. 106.

3. op. cit. p. 107.

4. op. cit. p. 125.

5. op. cit. p. 125.

6. "Packwood Suggests Tradeoff Over State Uniformity, Decontrol",
Transport Topics, No. 2590, Alexandria, VA, January 1, 1985, p. 1.

7. "DOT Supports Idea, Not Details Of Packwood Bill", Transport
Topics, No. 2650, Alexandria, VA, 1986, p. 1-3.

8. "New Coalition Is Formed To Advocate Complete Motor Carrier
Deregulation", Traffic World, March 3, 1986, p. 15.

9. "PCTA Foresees 'New Era For Trucking' As Group Gathers For
Dallas Meeting", Traffic World, April 21, 1986, p. 24.

10. "Wholesale Grocers See Benefits In More Trucking Deregulation",
Traffic World, March 31, 1986, pp. 15-17.

11. Letter to US Senator Robert Packwood from James E. Bartley,
Executive Vice President, National Industrial Transportation
League, Washington, DC, January 27, 1986.

12. Policy Statement of the National Industrial Transportation
League. National Industrial Transportation League, Washington, DC,
circa, 1985-86.

13. Testimony of Herman Granberry, President of the Private
Carrier Conference, Inc. of the American Trucking Associations,
Inc. before the Subcommittee of Surface Transportation, Senate
Committee on Commerce, Science, and Transportation, Washington, DC,
September 9, 1985, p. 4.

14. Ibid. p. 15.

15. Ibid. p. 16.

16. Ibid. Attachment to Granberry statement.

17. "PCC President Granberry Airs Views On Deregulation",
Transport Topics, No. 2618, Alexandria, VA, October, 14, 1985,
p. 5.

18. "PCC Asks NARUC Task Force To Study Three More Private Carrier
Issues", Traffic World, March 10, 1986, pp. 71-72.

19. "NARUC And PCTA Debate Deregulation Problems: States' Rights

At Issue", Traffic World, January 1, 1986, p. 82.
----

20. Daniel W. Baker, "General Survey of the Status of State Regulation of Transportation", University of Denver and the Transportation Lawyers Association, 17th Annual Transportation Law Institute, Breckenridge, CO, July 25-27, 1984, pp. 6-7.

21. Daniel W. Baker, "State Regulatory Activity and Federal Preemption", 21st Transportation Law Institute, The Transportation Lawyers Association, The Association of Transportation Practitioners, and The University of Denver College of Law, Washington, DC, October 26, 1988, pp. 83-96.

22. "First State Truck Uniformity Policies Given Green Light By Heads Of States", Traffic World, March 7, 1986, p. 64.
----

23. "RCCC Petitions ICC To Intervene In The 'Armstrong' Case", Highway Common Carrier Newsletter, Alexandria, VA, No. 926, July 14, 1986, p. 1.

24. "NARUC and PCTA Debate Deregulation Problems: States' Rights At Issue", Traffic World, January 1, 1986, p. 82.
----

25. "Rationale For Trucking Regulation Espoused By New, Informal Coalition", Traffic World, March 24, 1986, pp. 35-37.
----

26. Kevin H. Horn, "Federal Preemption of State Transportation Economic Regulation", Transportation Journal, Winter, 1983,
----
pp. 28-46.

27. Airline Deregulation Act of 1978, Public Law 95-502, Section 105, (a) (1) and Section 105 (c).

28. Horn, op. cit., p. 32.

29. Ibid., p. 37.

30. Ibid., p. 38.

31. Ibid., p. 40.

32. Ibid., p. 41.

33. Ibid., p. 42.

34. Ibid., p. 43.

35. Ibid., p. 43.

36. Charles D. Gray, "Intrastate Regulation", Transportation
Practitioners' Journal, Volume 52, No. 4, 1984, p. 546.

37. Enclosure B, Secretary Elizabeth Dole letter to the Honorable
George Bush, President of the Senate, Washington, D.C.,
September 12, 1985, pp.23-24.

38. "Eyes of Texas Finally Smile on UPS", Handling and Shipping
Management, April, 1986, p. 33.

39. Richard Beilock and James Freeman, "State Responses To Federal
Motor Carrier Regulatory Reform: Efficiency and Effectiveness
Implications", Defense Transportation Journal, Vol. 39, No. 4,
August, 1983, pp. 15-19.

40. Study independently undertaken by author in 1982.

41. Trinc's Transportation Consultants, Trinc's Blue Book of the
Trucking Industry, Washington, DC, 1981.

CHAPTER 8

CONCLUSION

The results reported in Chapter 6 show that the aggregate impact of state economic motor carrier regulation in NH, MA, RI, NY, PA, WV, GA, AL, MS, KY, IL, MN, IA, SD, OK, TX, NM, NV, WA, and LA is $2.863 billion per year. Much of that impact ($2.252 billion) is impact on these 20 states (the 20 states where discounted intrastate rates were higher than discounted interstate rates), while the remaining $.611 billion is impact on the remaining 31 states in the analysis. The $2.863 billion includes each states' impact on its own state, each states' impact on the other 19 of the 20 states investigated in depth, the impact on the other 31 states in the analysis (which were not investigated in depth), as well as the indirect effect of the impacts of state deregulation as it ripples through the economy of the nation. Because the analysis was run assuming all 20 states deregulated simultaneously, the impact of each state deregulating on its own intrastate economy is not available from this run.

The collective impact of all 20 states deregulating on the other 31 states (including DC) is $.611 billion. Thus, it is the case that regulated states bear most of the brunt of the regulation (either from their own state's regulation or by another regulated state) and that deregulated states (and states whose regulatory agencies allow state rates to fall to the levels of interstate rates) bear about 21.4% of the burden of state motor carrier regulation. This amount ($.611 billion) plus a portion of the $2.252 billion above is burden imposed on state X by the policies initiated by the laws and/or administrative actions of state Y. Interstate commerce is indeed impacted by these state regulatory actions.

Such impact dictates that the federal government should investigate the cost side of federal preemption. The benefits of such preemption are at least $.611 billion/year. Only if the costs can be shown to be significantly greater than $.611 billion should preemption not be introduced.

The above analysis requires more research to refine the results. A full analysis would run all 51 geographic regions and allow each state input-output table and trade matrix to contain the full 125 economic sectors. The contraction to 28 regions and 73 economic sectors enabled the inversion to run much faster, since only 10% of the number of cells are involved in the latter case. A full analysis should be run to show the impacts on individual sectors and individual states.

In addition, the model should be run on individual regulated states one at a time. Texas and Illinois (with 26.5% and 15.6% of the impact respectively) are particular candidates to be run separately. These individual state impacts would show how much of the impact is on the home state and how the impact travels through adjacent states to more distant states.

None of the above described runs can be made unless ample

funds are available to pay for computer time.

Now that the model is debugged, the rate analysis can be undertaken again with new (1990) rate data. Again, if funds were available to obtain the rate analysis with on-line capabilities, the timeliness of the analysis would be greatly improved.

In addition, the 1977 MRIO requires updating. This can be done with a modified RAS method developed by Allen and Szyrmer.[1] Required as part of this analysis would be an updated interstate and intrastate trade matrix. This can be obtained from Reebie Associates, but the price is in the multiple tens of thousands of dollars. The RAS update would allow structural changes in the economy since 1977 (e.g., the second Arab oil embargo, transportation deregulation on the interstate level, the Pacific Rim import invasion, the continued growth of services, etc.) to be better reflected in the analysis.

The analysis herein follows the input-output assumptions of constant technology and constant returns to scale. It also assumes a perfectly competitive model, in that all cost reductions are passed forward through the system as price reductions. More work should be done to show the ability of scale economies and monopoly power to influence the results reported herein.

This analysis represents a sophisticated first approximation of the impact of intrastate economic regulation of motor carriage on interstate commerce. However, a rich research agenda exists. This agenda would not only update the analysis herein but also exploit this rich model from which other policy and economic questions which have regional impacts can be asked. For example, what is the impact of state taxation of motor carriers in state X on economic activity in state Y? What impact would a growth rate of z in state X have on the economy of state Y? What impact would a federal tax increase of a% have on each state or on industry B across all states? etc.

Given the above caveats, the impacts of intrastate motor carrier regulation are substantial. While the largest impacts are on the regulated states themselves, a substantial impact (approximately $.611 billion) is imposed by the 20 regulating states investigated herein on the remaining 30 states and DC. This impact argues strongly for the serious consideration of federal preemption of state motor carrier regulation.

ENDNOTE TO CHAPTER 8

1. W. Bruce Allen and Janusz Szyrmer, "Commodity Flow Estimation", Research and Special Programs Administration, Office of University Research, US Department of Transportation, Contract DTRS-5680-C, February, 1984.

A TEST OF THE EFFECT OF UNEVEN INTRASTATE TRUCKING REGULATION ON
LOCATION OF TRUCKING EMPLOYMENT

Introduction:

This appendix looks at trucking industry (SIC 42) employment growth in counties from 1970 through 1986. In light of the Motor Carrier Act of 1980 (MCA-1980) and its subsequent deregulatory interpretation by the ICC, state regulation has come into much greater prominence. This should make the presence or absence of strict state regulation a consideration of trucking terminal and warehouse location. The location effect is hypothesized since hauls can be classified as interstate, and therefore deregulated, if they are carried across state lines or warehoused in a state other than the state of origin and destination. Even if a firm cannot take advantage of this classification, locating at the state border may enable the firm to attract more interstate (deregulated) hauls. In either case, there would be a locational effect of differential regulation. With data spanning periods before and after the 1980 deregulation, an econometric test of shifts in county trucking industry employment is performed.

Motivation:

The passage of the Motor Carrier Act of 1980 and its interpretation by the ICC have virtually deregulated the interstate trucking industry. For purposes of exposition below, the interstate motor carrier industry will be referred to as deregulated. Interstate freight hauling by truck has become more competitive. Prices are generally lower, and firms continue to compete in the quality of the service they offer. The general level of efficiency has risen. Federal deregulation only covers a portion of the freight hauled in the United States, however. Products hauled by truck completely within a single state account for a significant amount of freight being hauled on the roadways. This intrastate trucking is subject to the regulatory control of the individual states. The states have complete discretion on how much or little they wish to impose regulatory constraints on firms. For example, Delaware and New Jersey have never regulated intrastate trucking. Alaska, Arizona, Florida, Maine, Vermont, and Wisconsin have deregulated their intrastate industry in the past few years. Some states have enacted some reforms, but have not deregulated intrastate trucking. Most notably, of the large traffic states, Illinois, Pennsylvania, Texas and Washington state continue to impose strict regulation of intrastate shipments by truck.

There are two extensive economic literatures which shed light on expected behavior in this situation. One literature is that of general regulation and constraints on firms. The generally accepted result is that efficient firms would prefer fewer regulatory constraints in order to freely react to changes in the marketplace. It is the inefficient firms which welcome the protection from market forces which regulation often provides.

The other literature was initiated in the 1950's by Tiebout,[1]
as discussed in Inman.[2] The result that households take local public
policies into consideration when deciding where to locate has been
extended to location decisions by firms. For example, Carlino and
Mills[3,4] raise the question of the connection between policy driven
economic conditions in counties, and county growth. Their conclusion
is that county characteristics measured by variables which depend on
public policies such as taxes, crime rates and Industrial Development
Bonds have little impact on total employment growth. They did find that
a demographic variable, educational level, was correlated with county
growth.

When characteristics of employers' and households' current
locations become less attractive relative to other areas'
characteristics, firms and households "vote with their feet". That is,
they will redistribute themselves to areas with preferable
characteristics. This paper investigates whether trucking firms have
"voted with their feet" in order to avoid the restrictions of strict
state regulation.

The Context:

One of the largest states for intrastate trucking is Texas. This
state also has one of the most strictly regulated intrastate trucking
industries in the nation. The Texas Railroad Commission sets rates for
intrastate shipments in Texas as much as 50% higher than comparable
interstate shipments (see main report text and tables). With the
deregulation of interstate trucking in 1980, a shipment which
originated, terminated, and was warehoused completely in Texas had a
higher shipping cost than a comparable shipment which either
originated, terminated, or was warehoused outside of the state.
Running a shipment even a few miles outside of the border could cause
the shipment to be classified as interstate and make the shipment
eligible for lower interstate rates. There has been anecdotal evidence
of, and folklore about, an increase in trucking firm activity just
outside the borders of Texas since the passage of MCA-1980. The states
surrounding Texas (Arkansas, Louisiana, New Mexico and Oklahoma) all
practice somewhat less restrictive regulation of their intrastate
trucking rates. In addition, locating just outside the border of Texas
allows a firm to maintain relatively easy access to the large Texas
market. Houston, Dallas-Fort Worth, Amarillo, Lubbock, El Paso, and
Wichita Falls are all within about 150 miles of the Texas border.

The Model:

Our model is a simple one. Microeconomic theory tells us that a
profit maximizing firm will act to minimize cost. This model measures
employment growth in the trucking industry as a function of the costs
of doing business and of general economic conditions.
The primary costs of trucking firms which may vary depending on

firm location, are wage rates, fuel costs, and taxation. Capital costs are based on national or regional capital markets. Obtaining permits and licenses in many states has now been simplified by the states' participation in the International Registration Plan, removing regional effects. These should not be considered in location decisions.

Demand for trucking services is a derived demand, so the model should control for general economic activity in the county. Variation in trucking employment could simply result from general good or bad fortunes of the whole county. Control for this effect is achieved by including total county employment in the model. The other large general economic impact on trucking in this region of the United States is likely to have been the state of the oil industry. The years surrounding the MCA-1980 were years of turmoil in the oil industry, particularly in the Texas area. We include the mining or oil and gas exploration employment of the county in the model to control for oil industry volatility.

The final component of the model is the variable which measures shifts in employment not accounted for by measured costs or general economic conditions. This model includes an indicator variable for a shift in trucking employment after the 1980 federal deregulation.

The model is thus:

$$\text{Trucking Employment} = A + B(1)*\text{Wage} + B(2)*\text{Fuel} + B(3)*\text{Tax} + B(4)*\text{Total Empl.} + B(5)*\text{Oil Empl.} + B(6)*\text{Level Shift} + \text{error.}$$

Cost minimizing behavior suggests that the various measures of cost should have a negative effect on county employment in the trucking sector. As wage rates, fuel costs, and tax payments go up, the cost of doing business goes up. This should tend to decrease employment. The derived demand nature of trucking should lead to a positive effect of total county employment on trucking employment. The nature of oil and gas exploration is that of a competitor with the trucking industry for employees. In addition, since most crude oil and gas is piped rather than trucked, the greater the proportion of a county's economic activity comprised by production of oil and gas, the lower the derived demand for trucking services. This should lead to a negative impact of SIC 013 employment on SIC 421 employment. Controlling for trucking firm costs and general economic activity, one should see an increase in the level of employment in the trucking industry as firms locate close to major markets, but outside of the restrictions of strong regulation. The main hypothesis of this study is that federal deregulation has made counties just outside the borders of Texas relatively more attractive to trucking companies than other locations.

Data Sources:

Data are available for counties from 1946 to 1986 by Standard Industry Classification (SIC) in the U.S. Census Bureau's <u>County</u>
5
<u>Business</u> <u>Patterns</u>. This publication lists number of employees, total annual payroll, and number of establishments by industry in each

county. The industry classification has detail as fine as three digit SIC codes. This study used data from SIC 42: Trucking and Warehousing, and SIC 421: Trucking - Local and Long Distance. Average wage rates for the trucking sector were calculated by dividing the total annual trucking payroll by the total trucking employment. County Business Patterns also includes total employees, total payroll and total number of establishments for each county. The data on mining (MIN sector) employment, and oil and gas exploration (SIC 013) employment also were gathered from County Business Patterns. We were interested in controlling specifically for the effects of the oil and gas exploration industry on trucking employment, but not every county had sufficient activity to warrant reporting of SIC 013 data. In these counties, numbers from mining were used.

We used data on average state price per gallon of regular gasoline as a proxy for the cost of diesel fuel. These fuel prices from 1974 through 1978 and 1981 through 1987 were generously provided by the

6

American Automobile Association (AAA). Additional fuel price information was obtained from the Consumer Price

7

Index - Detailed Reports of the U.S. Bureau of Labor Statistics. The CPI contains a component which tracks the price of regular gasoline.

Data on local per mil property taxation payments were obtained

8

from the U.S. Census Bureau's City and County Data Book, and the Consumer Price Index - Detailed Reports. The City and County Data Book provides data on local per capita property tax payments by county from 1949 to 1983. We used the data for 1967, 1972, 1977, and 1983. The CPI includes a national component for property tax costs of owning a home. The local tax payments were regressed against the CPI property tax component, and the predicted values of this regression were used for the property tax variable in the primary regression.

The variables included in the study were used in real terms. Wage rates, fuel prices, and tax payments were deflated by the aggregate Consumer Price Index for wage earners and clerical workers (CPIW). The CPIW was used since it is the overall price index which was recalibrated the least over the period of the study.

Not all counties contain firms in every SIC category. Out of the 33 counties which border Texas, only 18 had measured trucking employment in enough years to do any statistical testing. In these 18 counties, trucking was not reported as a separate industry in every year of the study. This is primarily due to insufficient activity in that economic sector within the county. Just as each county may not have had sufficient SIC 013 activity, "trucking and warehousing" activity (SIC 42) was used as the dependent variable when a county had insufficient activity in the more specific "trucking - local and long distance" (SIC 421) sector. For each border county, the model was tested against the available data.

Estimation and Results:

The model was estimated for the eighteen counties which had

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sufficient trucking activity using Ordinary Least Squares (OLS) estimation. The results are shown in Table A-1.

Generally, this model captures quite a bit of the variation in county trucking employment. Twelve of the 18 counties studied have at least 65% of the variation accounted for, nine have at least 75% of the variation accounted for, and eleven of the equations have F-Tests significant at the .10 level.

The most significant and consistently signed variables were the wage rate and the total county employment. The units on the wage variable are $ 1/100,000 in real annual wage. Therefore, in Miller County, Arkansas, a $1 increase in the real annual salary in SIC 042 would result in 2076/100,000 or .02076 decrease in jobs. The total employment and trucking employment units are single employees, allowing one to see the derived demand nature of trucking. For example, at the mean values for both employment variables, in Miller County, an increase of 100 total employees in the county would include 1.1 trucking employees. Fifteen of the wage variables are of the hypothesized sign, and all of the six significant wage terms are correctly signed. All eighteen of the total employment variables are correctly signed, including the seven significant terms. Since these are most likely the best measured of our explanatory variables and have the best theoretical support, it is not surprising that these capture so much of the explanatory power of the regressions.

The remainder of the economic explanatory variables are a bit more mixed. The oil and gas, or mining variable (units is employees) has the hypothesized negative sign in 11 of the 18 equations, and three of the four significant terms are negative. The fuel variable, measured in real dollars per gallon, was also correctly signed in eleven of the eighteen equations and was correctly signed in two of the (only) three significant terms. Finally, the property tax variable measured in real cents per $1000 of property value was negatively signed in ten of the eighteen equations, including the single significant term.

This table shows that there have been some shifts in county trucking employment, but surprisingly, the only significant shifts were negative in sign.

This study does not provide evidence supporting the hypothesis of Tiebout type firm location. Out of the eighteen counties in our study, none show significantly positive level shifts of trucking employment which start in 1980. The evidence from this study suggests that changes in the real wage and total employment in the county have been the primary determinants of county trucking employment.

Suggestions for Further Research:

The nature of data as detailed as county employment by two and three digit SIC as well as local costs of doing business is that the data are quite sparse. In this study, we needed flexibility in both the sectors used for dependent and independent variables, as well as the time intervals for which we estimated the equations. Not all of the data was available for all of the counties over the entire period of interest. We wished to use as much information for each county as possible, and thus estimated each county's trucking employment

Table B-1: Statistics from Regressions

County	Fit Per.	Dep. SIC	Oil SIC	Dep. Mean	R-bar Sqrd	Wage	Tot. Emp.	Oil/ Mine.	SHIFT	Fuel	Tax
Arkansas											
Miller	74-86	042	Min	120	.65 ++	-2076 *	.0110	-0.727 **	-84.1 **	-391 *	-325
Lousiana											
Beauregard	70-86	421	Min	83	.54 ++	-3610 ***	.0329 **	0.226	-29.3	111	98
Bossier	71-85	042	013	611	.87 +++	9464	.0107	0.638	285.0	-321	63
Caddo	70-85	421	013	1305	.86 +++	-1776 **	.0143 *	0.123	-103.5	-1951	-1062
Calcacieu	71-85	421	013	561	.94 +++	-5045	.0130 ***	0.134 ***	49.4	-175	-34
Vernon	71-86	421	Min	90	.75 +++	-80	.0347 ***	-0.215	-20.2	-215 **	31
New Mexico											
Curry	70-86	042	Min	148	.34	25	.0220	-0.936	-5.7	-162	28
Dona Ana	70-86	042	Min	176	-.04	-1566	.0046	1.257	1.0	15	621
Eddy	74-86	421	013	218	.85 +++	-975	.0523 ***	-0.165 *	46.0	731	389 .
Lea	70-85	042	013	400	.96 +++	-8142 ***	.0715 ***	-0.057 ***	-125.3 ***	-321	-319 ***
Otero	72-84	421	Min	96	-.08	83	.0168	-1.761	-44.8	-509	-1058
Quay	78-86	042	Min	218	.77	-5610	.4163	9.072	132.4	-77	-733
Roosevelt	70-86	042	Min	57	.16	-280	.0107	-0.097	-5.0	27	-24
Oklahoma											
Beckham	78-86	042	013	113	.98 ++	-1477	.0092	0.072	-8.7	250	-36
Comanche	70-85	042	Min	271	-.21	-1991	.0101	-0.184	19.1	377	610
Jackson	71-86	042	Min	138	.70 +++	- 726	.0574	-0.084	-164.6 ***	-12	-216
McCurtain	72-86	421	Min	101	.76 +++	-2744 ***	.0413 *	-1.103	29.0	-197	-259
Tillman	71-85	042	Min	73	.64 +++	-1718 **	.0415	-0.198	15.2	220	128

R-bar Squared Column: Coefficients:
+   - Eq. F Stat. Significant at .10   *   - significant at .10
++ - Eq. F Stat. Significant at .05   ** - significant at .05
+++ - Eq. F Stat. Significant at .01   *** - significant at .01

Column Headings

Fit Per. = Years' Data Included   **Dep. Mean** = Mean of dependent variable
                                               (County Motor Carrier Employment)

Dep. SIC = SIC of dependent variable   **Oil SIC** = SIC of Oil Ind. Empl. Used
      (042 = Trucking and Warehousing   (MIN = Aggregated Mining ("SIC 001")
   421 = Trucking, Local & Long Dist.)   013 = Oil and Gas Extraction.)

separately.

      This may not be the most efficient estimation technique.
Zellner[9] has established a technique for improving the efficiency of such separate estimates. The technique is called Seemingly Unrelated Regression Estimation (SURE) and has been applied to problems of this type, when the time intervals for each equation are the same. The next stage of this study is to apply the SURE estimation technique over some common time interval and impose linear constraints on the values of common explanatory variables across equations. Information lost in either shortening the time interval for estimation or excluding counties which do not have data for the full interval, but we expect this approach to strengthen the significance of our findings here through sharing information across the counties.

Endnotes

1. Tiebout, C., "A Pure Theory of Local Government Expenditures", Journal of Political Economy, vol 60, 1956, pp 415-424.

2. Inman, Robert P., "Markets, Government and the 'New' Political Economy", in A. Auerbach and M. Feldstein, eds., Handbook of Public Economics, Volume II, North-Holland, Amsterdam, 1978, pp. 647-777.

3. Carlino, Gerald A., and Mills, Edwin S., "Do Public Policies Affect County Growth?", Business Review of the Federal Reserve Bank of Philadelphia, July-August, 1985, pp 3-16.

4. Carlino, Gerald A., and Mills, Edwin S., "The Determinants of County Growth", Journal of Regional Science, vol 27, 1987, pp 39-53.

5. U.S. Bureau of the Census, County Business Patterns, Washington, D.C, 1970-1986.

6. Data obtained from Mr. Jerry Cheske, Director of AAA Public Relations, Falls Church, VA.

7. U.S. Bureau of Labor Statistics, Consumer Price Index - Detailed Reports, Washington, D.C., 1967-1987.

8. U.S. Bureau of the Census, County and City Data Book, Washington, D.C., 1972-1988.

9. Zellner, Arnold, "An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias", The Journal of the American Statistical Association, vol 57, 1962, pp 348-368.

APPENDIX B

DEREGULATION AND INFORMATION COSTS

Introduction: The Motor Carrier Act of 1980 (MCA-1980)
significantly deregulated (de jure) the interstate for-hire motor
carrier industry in the United States. In addition, the
interpretation of the MCA-1980 by the Interstate Commerce
Commission (ICC) has resulted in further administrative decisions
(de facto) that have left the industry virtually deregulated with
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respect to entry, exit, and pricing. For ease of exposition, the
industry will be referred to as deregulated below.

While significant numbers of new entrants have appeared in the
truckload segment of the market, the less-than-truckload (LTL)
market has also experienced significant new entrants in the sense
of the pre-deregulation LTL carriers expanding the geographic scope
1
of their markets. This increased competition (along with the
recession of the early 1980's) has lead to a decrease in real motor
carrier rates.

However, information costs to the shipper (and to the
carriers) has been increased as a result of deregulation. To
simplify the situation a bit, under regulation, rates were proposed
by rate bureaus in a cartel like setting and approved (usually
without much question) by the ICC. While independent actions were
2
allowed by the Reed Bulwinkle Act, they were the exception.
Basically, all carriers moving commodity X between A and B charged
the same rate. A single call to a carrier (or a single viewing of
a tariff) would produce the rate for all carriers.

After deregulation, rates could differ dramatically in the
same marketplace as carriers utilized information asymmetries and
the monopoly powers which they conferred. For example, the local
drayage market produced hauls for $225 and for $100 under the same
3
conditions. Today, discounts from the rate bureau tariff levels
4
range from 0% to 80% with the average being in the 40-50% range.
Calling up a single carrier today does not yield "the rate" for
commodity X from A to B.

Since firms compete in the sales of commodity X and since
transportation is part of the cost of producing and selling X,
most firms are interested in lowering input costs in order to
enhance their profit/market share. In order to determine the
rate which they must pay in order to move X from A to B, carriers
must search the carriers which serve the A to B market for the
rates being charged. These rates may vary over relatively short
time periods (as opposed to regulated rates which were sticky) so
that the rates determined last week may not be the rates in place
today. Shippers must conduct this search with internal staff or
engage a third party (broker) to find the rate. Not surprisingly,

the rate of growth of third parties has been very large since
5
deregulation.   A third option is to enter into a contract/
6
partnership with a motor carrier.   However, this option still entails search for the partner. It would seem logical that the search costs for rates is higher today for shippers than it was under regulation.

Likewise, there are information costs for carriers. Under regulation, it was very easy to know your competitive carriers' rates for X from A to B. In essence, they were your rates since all rates were the same. Today, carriers must also search to determine the rates of their competitors so that they can determine their pricing strategies.

The motor carriers, in particular, and some other parties did
7
not favor the deregulation of the industry.   While prior to deregulation information costs were not a major portion of their
8
anti-deregulation arguments, e.g., Friedman,   soon after 1980, several studies (see below) appeared which argued for the positive information provision of regulation. This was probably due to the fact that the passage of the MCA-1980 took the motor carriers by
9
surprise (they didn't prepare a major defense)   and because the MCA-1980 established the Motor Carrier Ratemaking Policy Study Commission to determine the status of collective ratemaking in the motor carrier industry. Since the MCA-1980 was history, the industry wanted to mount an attack to save collective ratemaking.
10
Booz, Allen and Hamilton   produced a report for the Motor Common Carrier Association. The Booz study interviewed a focus group of shippers to determine the predicted changes in their traffic operations which they would anticipate as the result of the elimination of collective ratemaking. Using the focus group results, Booz conducted a nationwide stratified sampling (by annual revenue) of shippers. Booz concluded that if shippers had to deal with individual carrier's individually determined rates that gross shipper costs would increase between $4 and $7 billion per year:

Transportation Staff Increases	$1.3 to $3.9 billion
Use of Outside Expertise	.2 to .3 billion
Increased Computer Support	1.2 to 1.6 billion
New or Expanded Private Fleet Operations	1.3 to 1.3 billion
	$4.0 to $7.0 billion

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Note that the Booz study said nothing of net shipper costs, i.e., also accounting for the impact of reduced rates.

Evidence exists to suggest that transportation staffs have actually been reduced in size (although their composition has changed dramatically from the "green eyeshade" clerk to a computer literate, marketing and finance educated individual with negotiating skills).[11] However, since the latter group of employees is more expensive per employee than the former group, it is not clear whether personnel expense has increased or decreased (adjusting for inflation). Use of outside expertise has clearly increased as evidenced by the 6,000 brokers now in the marketplace.[12] Increased computer support may be necessary but is hardly unusual given the computer revolution sweeping all elements of clerical and managerial work. Evidence also suggests that private fleet usage is falling as shippers are now able to purchase the motor carrier product in the marketplace rather than having to make the product themselves.[13]

The Regular Common Carrier Conference,[14] DANA/ATA Foundation,[15] Hausman,[16] and Tye[17] argue that the institutional arrangement of collective ratemaking increases economic efficiency. Rate stability is cited as a big benefit to shippers. No empirical work is done in the above studies except for Hausman who documents monotonically greater discounts through independent actions and nonbureau tariffs in 1980 and 1981 (after deregulation). This suggests competition to Hausman despite the presence of rate bureaus. He concludes that the rate structure will tend to ossify (at a high level) in the absence of collective ratemaking as opposed to the continuous and competitive discounting that he has observed with collective ratemaking and "free" entry. According to Hausman, the existence of rate bureau tariffs creates a competition to discount against such tariffs. Hausman suggests that "substantial economic resources" would be required to obtain information in a deregulated market but does not present any empirical estimates.

Clearly, it would seem that the simple statement that rates fell from P_r under regulation to P_c under deregulation and that such a price change is indicative of the benefits of deregulation overstates the case for deregulation. Information obtaining costs exist in the deregulated market that do not exist in the regulated market. Prior to 1980, these were discussed as the benefits of rate stability. After 1980, they became identified as information costs.

A Framework for Analysis:

Consider the traditional impact of regulation analysis of Posner.[18] A regulated price exists at P_r. A deregulated price exists at P_c where P_c also equals the marginal cost and average average of the industry in question. Evidence suggests that the truckload industry is a constant cost industry (Chow).[19] Wang Chiang and Friedlaender[20] suggest that LTL operations quickly exhaust economies of scale and many firms may operate under diseconomies of scale. In either case, the scale economies or scale diseconomies are slight. Hence, the assumption of constant cost seems reasonable. Service levels (time, reliability, tracing, loss and damage, etc.) are assumed to be the same for all carriers. In reality, under regulation, carriers competed on a service dimension because price competition was precluded. Today, carriers can compete on both price and service dimensions.

Under such circumstances, the deadweight loss of regulation is given by triangle L and the Posner welfare trapezoid is given by D + L in Figure B-1.
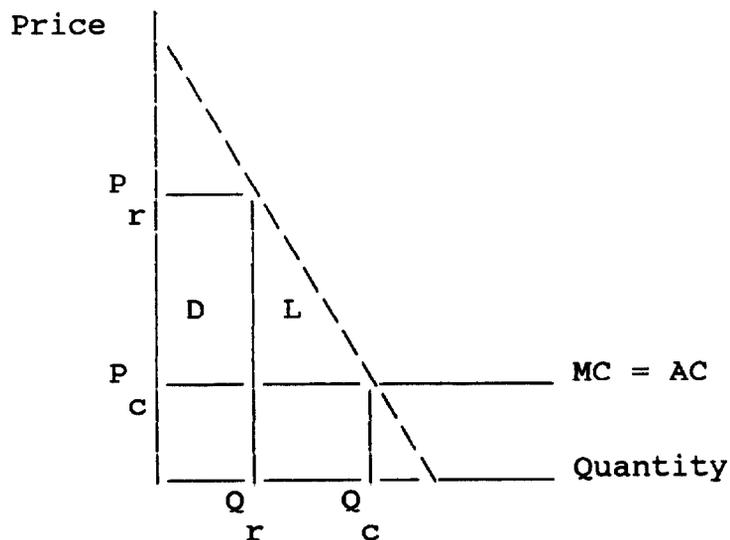

Figure B-1: Typical Welfare Triangle and Posner Welfare Trapezoid

Consider, however, the impact of information costs. P_r requires no search costs. Assume that P_c requires search costs of

i. i is a per unit cost and must be incurred each time the market
is entered. (Obviously, there is learning by doing. A good decision
rule might be going to the carrier in time t+1 that was judged to
be the best carrier in time t. Since rates can change frequently,
however, the carrier best at t may not be best at t+1).

Clearly, if $P_i = P_c + i > P_r$, then society is worse off

than at P_r since consumer surplus will be less than A and

producer surplus will be zero (since the carrier is charging
P_c). Consider, however, a case where $P_c + i < P_r$. The
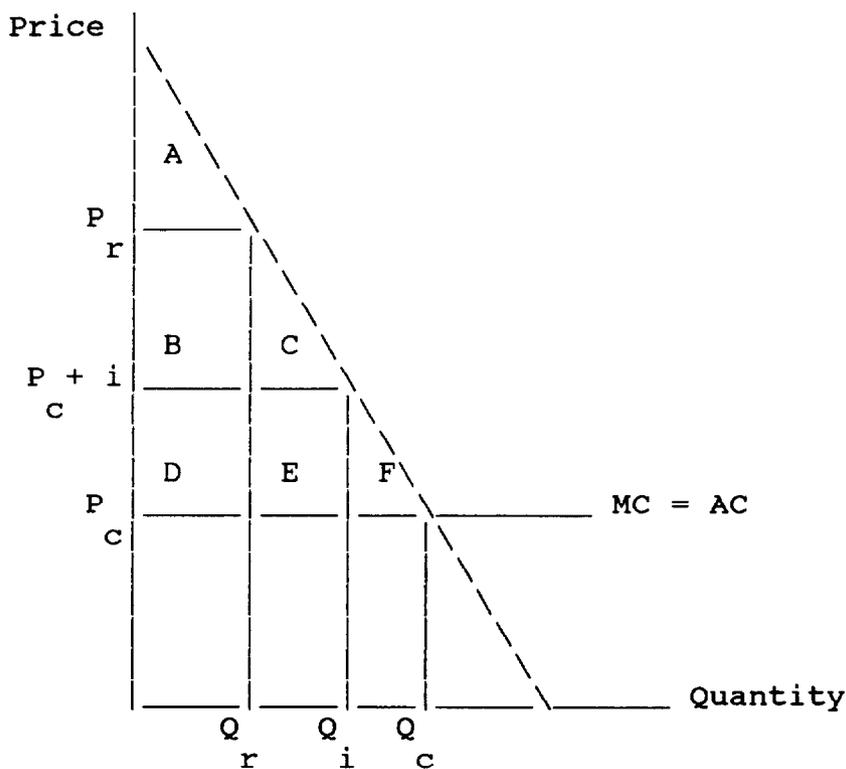
situation will appear as below in Figure B-2.

```
Price |
      |  \
      |   \
      |    \
      | A   \
      |__   \
   P  |  \
   r  |    |\
      |    | \
      |    |  \
      | B  | C \
P + i |__  |    \
   c  |    |    |\
      |    |    | \
      | D  | E  |F \
   P  |__  |__  |_____  MC = AC
   c  |    |    |   \
      |    |    |    \
      |    |    |     \
      |____|____|___|_____ Quantity
         Q    Q    Q
         r    i    c
```

Figure B-2: Welfare Analysis with Information Costs

Welfare under regulation is A + B + D while welfare with
information costs is A + B + C (again since the carrier is
charging P_c). The expenditures on information attainment are

assumed to be at their marginal cost. Therefore, whether society
is better under deregulation with information costs or under
regulation hinges on whether C is greater than or less than D.

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The smaller i is, the larger C becomes and the smaller D becomes and hence the greater the likelihood that C > D, i.e., society benefits from deregulation. C = D (solution by the quadratic formula):

$$(i/P_r) = \{1/e\} \{[(1-k)e + 1] - [2(1-k)e + 1]^{1/2}\}$$

where: i = information cost

P_c = perfectly competitive price = average cost

P_r = regulated price

Q_r = quantity moved at regulated price

Q_i = quantity moved at the "full" price P_c + i

$k = (P_c/P_r)$, i.e., motor carrier cost as a proportion of the regulated price

e = own price elasticity of demand at regulated price, i.e, $(P_r/Q_r)(dQ_r/dP_r)$ where $dQ_r = Q_i - Q_r$ and

$dP_r = P_r - P_c - i$

Empirically, the above information could be obtained/estimated and hence it could be determined if C > D. Clearly, however, certain limits can be placed on the results. Since k ranges between zero and one, it can be seen that i is zero when k=1 (which is logical because $P_r = P_c$ and no gain will accrue because of search

and hence no search will take place). If k=0, then

$$i/P_r = \{1/e\}\{e + 1 - (2e + 1)^{1/2}\}$$, i.e., if the marginal cost

of trucking approaches zero, then i/P_r depends solely on e. Since

e ranges between zero and infinity, it is clear that when e=0, i/P_r is undefined. When e is infinite, then i/P_r is zero. More

logical scenarios appear in the sensitivity table below.

TABLE B-1

Information Costs as a Fraction of Regulated Price for Various k's and e's

k	e	i/P_r	k	e	i/P_r	k	e	i/P_r
0	.5	0.172	0	1	0.268	0	1.5	0.333
.1	.5	0.143	.1	1	0.227	.1	1.5	0.284
.2	.5	0.117	.2	1	0.188	.2	1.5	0.237
.3	.5	0.092	.3	1	0.151	.3	1.5	0.193
.4	.5	0.070	.4	1	0.117	.4	1.5	0.151
.5	.5	0.051	.5	1	0.086	.5	1.5	0.113
.6	.5	0.034	.6	1	0.058	.6	1.5	0.078
.7	.5	0.020	.7	1	0.035	.7	1.5	0.048
.8	.5	0.009	.8	1	0.017	.8	1.5	0.023
.9	.5	0.002	.9	1	0.005	.9	1.5	0.007
1.0	.5	0.000	1.0	1	0.000	1.0	1.5	0.000

Table B-1 shows that the greater the rate discounts, i.e., the lower the k, the greater the information costs are as a proportion of the regulated price in order for C = D and that the more elastic the demand curve, the greater the information costs are as a proportion of the regulated price in order for C = D. Under the scenario of an elastic demand curve (1.5) and a very substantial discount (90%, i.e., k = .1), information costs under deregulation must be 28% of the regulated price in order for C = D. A more likely scenario with the same elasticity but a discount of 30% yields information costs of 5% of regulated price for C = D. Thus C > D for situations in Table 1 when i/P_r is less than the value shown in the table.

Suppose a slightly more complicated example. Under Stigler's[21] theory of search, a shipper would search until the expected benefits from further search equalled the expected costs of such search. Searchers will usually adopt an *ad hoc* rule to stop the search, e.g., after n carriers are solicited or when a target price is obtained/approached.

Consider the price axis with a probability distribution of rates ranging from P_r to P_c. Assume that the firm "finds" a rate P_f after incurring search costs of i either internally or by

paying an intermediary. The effective price for the shipper is therefore $P_i = P_f + i$. The situation appears as in Figure B-3.
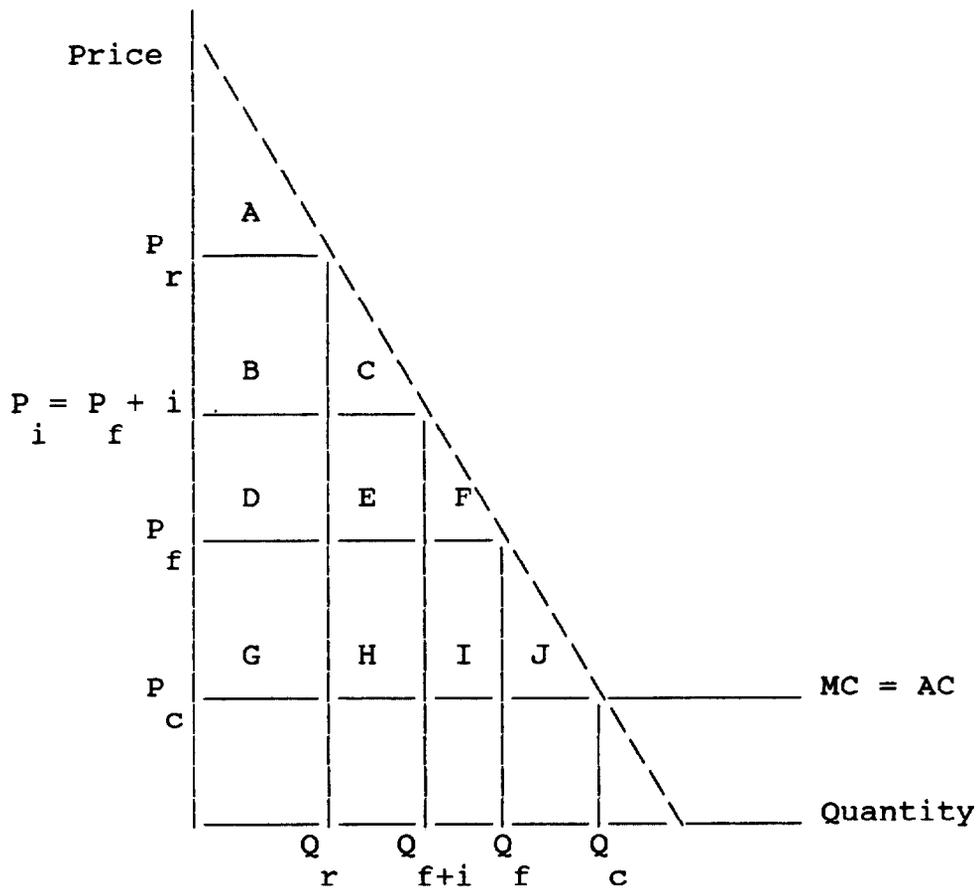

Figure B-3: Welfare Analysis with Information Costs and a Search Rule

Welfare under regulation is A + B + D + G while welfare under deregulation with information costs is (A + B + C) + (G + H) where A + B + C is consumer surplus and G + H is producer surplus. In this case, producers make a profit because the costs to shippers of obtaining information means that rates can lie above costs.

The smaller is i, the larger is C and hence the greater the likelihood that C + H > D, i.e., that deregulation will be beneficial to society. C + H = D (solution by the quadratic equation) implies:

$$i/P_r = (1/e) ([e(1-k) + 1] - ([e(1-k) + 1]^2$$

$$- e^2 (1-m)(1+m-2k))^{1/2})$$

where: i = information costs

P_r = regulated price

Q_r = quantity moved at regulated price

P_f = "found" price

Q_{f+i} = quantity moved at "full" price $P_f + i$

$m = (P_f/P_r)$ = found price as a proportion of the regulated price

P_c = perfectly competitive price = average cost

$k = (P_c/P_r)$ = motor carrier cost as a proportion of the regulated price

e = own price elasticity of demand at regulated price, i.e., $(P_r/Q_r)(dQ_r/dP_r)$ where $dQ_r = Q_{f+i} - Q_r$

and $dP_r = P_r - P_f - i$

Empirically, the above information could be obtained/estimated and hence it can be determined if C + H > D. Again, limits can be placed on the results. If e=0, then i/P_r is undefined, while if e is infinite, i/P_r is zero. If k=1, then m is also equal to one since m is greater than or equal to k and i/P_r will equal zero.

If m=0, then k is also equal to zero (since m is greater than or equal to k) and i/P_r equals $\{ 1/e\}\{(e + 1) - (2e + 1)^{1/2} \}$.

Some more reasonable scenarios are shown in Table B-2.
It is clear that as elasticity increases, the ratio of information costs to the regulated price increases in order for C + H = D, ceteris paribus. As m increases, i.e., motor carrier discounts get smaller, the ratio of information costs to regulated

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TABLE B-2

Information Costs as a Proportion of Regulated Price for Various
k's, m's, and e's

e=.5 m=1		e=.5 m=.9		e=.5 m=.8		e=.5 m=.7		e=.5 m=.6		e=.5 m=.5		e=.5 m=.4	
k	i/P r	k	i/P r	k	i/P r	k	i/P r	k	i/P r	k	i/P r	k	i/P r
1	0												
.9	0	.9	.002										
.8	0	.8	.007	.8	.009								
.7	0	.7	.011	.7	.017	.7	.020						
.6	0	.6	.015	.6	.025	.6	.031	.6	.034				
.5	0	.5	.018	.5	.032	.5	.042	.5	.048	.5	.051		
.4	0	.4	.021	.4	.039	.4	.052	.4	.062	.4	.068	.4	.070
.3	0	.3	.024	.3	.045	.3	.062	.3	.075	.3	.085	.3	.090
.2	0	.2	.027	.2	.050	.2	.071	.2	.087	.2	.100	.2	.109
.1	0	.1	.029	.1	.056	.1	.079	.1	.098	.1	.114	.1	.127
0	0	0	.032	0	.061	0	.086	0	.109	0	.128	0	.143

e=.5 m=.3		e=.5 m=.2		e=.5 m=.1		e=.5 m=0	
k	i/P r	k	i/P r	k	i/P r	k	i/P r
.3	.092						
.2	.115	.2	.117				
.1	.136	.1	.141	.1	.143		
0	.156	0	.165	0	.170	0	.172

e=1 m=1		e=1 m=.9		e=1 m=.8		e=1 m=.7		e=1 m=.6		e=1 m=.5		e=1 m=.4	
k	i/P r	k	i/P r	k	i/P r	k	i/P r	k	i/P r	k	i/P r	k	i/P r
1	0												
.9	0	.9	.005										
.8	0	.8	.013	.8	.017								
.7	0	.7	.019	.7	.031	.7	.035						
.6	0	.6	.025	.6	.044	.6	.055	.6	.058				
.5	0	.5	.030	.5	.054	.5	.072	.5	.082	.5	.086		
.4	0	.4	.035	.4	.064	.4	.087	.4	.103	.4	.113	.4	.117
.3	0	.3	.039	.3	.072	.3	.100	.3	.122	.3	.138	.3	.148
.2	0	.2	.042	.2	.080	.2	.112	.2	.139	.2	.160	.2	.175
.1	0	.1	.045	.1	.086	.1	.122	.1	.154	.1	.180	.1	.200
0	0	0	.048	0	.092	0	.132	0	.167	0	.197	0	.222

e=1 m=.3 k	i/P r	e=1 m=.2 k	i/P r	e=1 m=.1 k	i/P r	e=1 m=0 k	i/P r
.3	.151						
.2	.184	.2	.188				
.1	.215	.1	.224	.1	.227		
0	.242	0	.256	0	.265	0	.268

e=1.5 m=1 k	i/P r	e=1.5 m=.9 k	i/P r	e=1.5 m=.8 k	i/P r	e=1.5 m=.7 k	i/P r	e=1.5 m=.6 k	i/P r	e=1.5 m=.5 k	i/P r
1	0										
.9	0	.9	.007								
.8	0	.8	.017	.8	.023						
.7	0	.7	.026	.7	.042	.7	.048				
.6	0	.6	.033	.6	.058	.6	.073	.6	.078		
.5	0	.5	.039	.5	.071	.5	.094	.5	.108	.5	.113
.4	0	.4	.044	.4	.082	.4	.111	.4	.133	.4	.147
.3	0	.3	.048	.3	.091	.3	.127	.3	.155	.3	.176
.2	0	.2	.052	.2	.099	.2	.140	.2	.174	.2	.201
.1	0	.1	.055	.1	.106	.1	.151	.1	.190	.1	.223
0	0	0	.058	0	.112	0	.161	0	.205	0	.243

e=1.5 m=.4 k	i/P r	e=1.5 m=.3 k	i/P r	e=1.5 m=.2 k	i/P r	e=1.5 m=.1 k	i/P r	e=1.5 m=0 k	i/P r
.4	.151								
.3	.189	.3	.193						
.2	.221	.2	.233	.2	.237				
.1	.250	.1	.269	.1	.280	.1	.284		
0	.275	0	.300	0	.318	0	.330	0	.333

e	m	k	i/P$_r$	e	m	k	i/P$_r$
4	.9	.8	.035	.33	.9	.8	.005
4	.9	.7	.048	.33	.9	.7	.008
4	.9	.6	.056	.33	.9	.6	.010
4	.9	.5	.0630	.33	.9	.5	.013
4	.8	.7	.078	.33	.8	.7	.012
4	.8	.6	.100	.33	.8	.6	.018
4	.8	.5	.116	.33	.8	.5	.023
4	.7	.6	.128	.33	.7	.6	.022
4	.7	.5	.156	.33	.7	.5	.030

price decreases in order for C + H = D, ceteris paribus. As k increases, i.e., motor carrier costs rise as a proportion of regulated rates, the ratio of information costs to regulated price decreases in order for C + H = D, ceteris paribus. In order for C + H > D, under the conditions shown in Table B-2, the ratio i/P_r must be less than the values shown in the table. As shown in Table B-2, even with very high elasticities and reasonable k's and m's, information costs which are no higher than 16% of the pre-deregulation prices are enough to make deregulation the preferred choice from a social welfare perspective.

It should be noted that the above analysis made no allowances for service elements associated with transport, e.g., time, reliability, etc. Such elements influence the demand for transportation[22] and raise the effective prices paid higher than the P_r and P_{f+i} shown above. Pustay[23] has shown the impact of airline deregulation on welfare of including service elements in addition to monetary prices. In the air case, it was argued that service was better under regulation but with higher prices than under deregulation. However, evidence from trucking suggests that prices are lower and service is better under deregulation.[24] The addition of service elements would raise the i/P threshold for C > D or C + H > D, i.e., make deregulation better under an even broader set of circumstances.

Evidence on i/P_r is not available. As mentioned above, the Booz Allen study did not mention the gains to firms of the decreased rates. Suppose that the Booz estimates of from $4 to $7 billion in 1982 dollars of additional "informational" costs is correct (although this result is overstated since rate bureaus can still file tariffs and general rate increases and joint rates can still be made collectively and hence the information provision of the rate bureau rates still exists in the sense of providing a list price from which bargaining for rates begins [analogous to the sticker price on a new auto]).

The Congressional Budget Office[25] estimated (using composites of other studies) that the benefits of motor carrier deregulation (without accounting for information costs) was from $5.3 to $8 billion/year in 1980 dollars (or from $6.18 to $9.33 billion in 1982 dollars--inflated by the implicit GNP deflator). Thus the LOW end of the benefits range is 88% of the HIGH end of the information costs range while the mean of the information costs is $5.5 billion compared to the mean of benefits of $7.26 billion. This would suggest that overall the benefits of deregulation

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exceeded the costs and that the i/P   ratios for any set of
                                    r

circumstances is less than those values shown in Tables B-1 and
B-2.

Conclusion: Information costs have been largely ignored in the
study of the impacts of motor carrier regulation. The burden of
obtaining information is clearly greater under deregulation than
under regulation where information attainment was simple and
basically free.
       Accounting for information costs, however, still shows that
deregulation was beneficial. In addition, many shippers have
mitigated their search costs by making long term contracts/
partnerships with carriers. Others have turned to information
intermediaries who acquire information for dissemination to many
and thus pass on the economies of doing so to the shipper.
       The benefits of competition exceed the additional costs of
information attainment. This is further attested to by the
                                                           26
overwhelming shipper support for further deregulation.

Endnotes

1. Glaskowsky, Nicholas A., Effects of Deregulation on Motor

Carriers, Eno Foundation for Transportation, Westport, CT, 1986.
----

2. Friedman, Jesse J., "Collective Ratemaking in Trucking: The
Public Interest Rationale", Washington, DC, 1977.

3. Allen, W. Bruce, "Organizing the Local Drayage Market for
Piggyback Services", TR News, Vol. 113, 1984, Transportation

Research Board, Washington, DC, pp. 26-29.

4. "Shippers Surveyed on LTL Motor Carrier Prices/Services",
Transportation Executive Update, Vol. 2, No. 5, 1988, p. 18.
----

5. Crum, Michael R., "The Expanded Role of Motor Freight Brokers
in the Wake of Regulatory Reform", Transportation Journal,

Vol. 24, No. 4, 1985, pp. 5-15.

6. Santaga, Marcia L., "Determination of Factors Which Influence
Truckload Carrier-Shipper Partnership Relationships", Master's
Thesis, University of Wisconsin-Green Bay, May, 1987.

7. Regular Common Carrier Conference, Convention Newsletter,
Alexandria, VA, June 28, 1986 and "Rationale For Trucking

Regulation Espoused By New Informal Coalition", Traffic World,
March 24, 1986, pp. 35-37.

8. Friedman, op. cit.

9. Robyn, Dorthy, Braking the Special Interests: Trucking
Deregulation and the Politics of Regulatory Reform, Chicago,
University of Chicago Press, 1987.

10. Booz, Allen and Hamilton, "Impact on Transportation Management
of Changes in the Collective Ratemaking System", Report for the
Motor Common Carrier Association, Washington, DC, 1982.

11. Galardi, Michael S., "Transportation Strategies: A Review and
Forecast", Proceedings--Annual Meeting of the Council of
Logistics Management, 1986, pp. 57-72.

12. Dillon, Thomas F., "Brokers--Proceed With Caution",
Purchasing World, Vol. 32, No. 1, 1988, p. 55.

13. Roberts, Paul O., "The Structure of the Trucking Industry with
Emphasis on the Truckload Segment and Its Prospects for Future
Growth", Transmode Consultants Inc., Washington, DC, 1989.

14. Regular Common Carrier Conference, "Issues in American
Trucking", Washington, DC, 1981.

15. Dana Corporation/ATA Foundation, "Collective Ratemaking in the
Trucking Industry", Proceedings of the Third Annual Symposium,
American Trucking Associations, Washington, DC, 1982.

16. Hausman, Jerry A., "Information Costs, Competition, and
Collective Ratemaking in the Motor Carrier Industry",
The American University Law Review, Vol. 32, 1983, pp. 377-392.

17. Tye, William B., Encouraging Cooperation Among Competitors:
The Case of Motor Carrier Deregulation and Collective Ratemaking,
Quorum Books, New York, 1987.

18. Posner, Richard, "The Social Costs of Monopoly and Regulation",
Journal of Political Economy", Vol. 83, No. 4, 1975, pp. 807-827.

342

19. Chow, Garland, The Economics of the Motor Freight Industries,
Bloomington, IN, Indiana University Press, 1978.

20. Wang Chaing, Judy S., and Ann Friedlaender, "Truck Technology
and Efficient Market Structure", Review of Economics and
Statistics, Vol. 67, No. 2, 1985, pp. 250-258.

21. Stigler, George J., "The Economics of Information",
The Journal of Political Economy, V. LXIX, No. 3, 1961,
pp. 213-225.

22. Winston, Clifford, "The Demand for Freight Transportation:
Models and Applications", Transportation Research, Vol. 17A,
No. 6, 1983, pp. 419-427.

23. Pustay, Michael W., "The Social Costs of Monopoly and
Regulation: An Empirical Evaluation", Southern Economic Journal,
Vol. 45, No. 2, 1978, pp. 583-591.

24. Beilock, Richard and James Freeman, "Carrier and Shipper
Perceptions of Motor Carrier Deregulation in Florida",
Transportation Research Forum Proceedings, Vol. 23, 1982,
pp. 250-257 and Kidder, Alice E., "Fourth Followup Study of
Shipper/Receiver Mode Choice in Selected Rural Communities,
1984-1985, DOT/OST/P-34/86-028, Springfield, VA, National Technical
Information Service, 1985.

25. See "Deregulation Could Trim Truck Costs By $8 Billion, CBO
Claims In Study", Washington Post, March 31, 1980. Delaney has
estimated yearly rail and truck deregulation benefits of from $56
to $90 billion (Robert V. Delaney, "The Disunited States: A Country
in Search of an Efficient Transportation Policy", Cato Institute
Policy Analysis, No. 84, Washington, DC, March 10, 1987). Beier and
Stone re-estimated Delaney's benefits as between $80 to $90 billion
per year (Beier, Frederick J. and Stone, Garry B., "Review of the
Delaney-Evans Debate", US Department of Transportation,
Transportation Systems Center, Cambridge, MA, January, 1988). Owen
assumes that the benefits attributable to truck deregulation are
proportional to truck's share of the nation's transportation
revenues, i.e., 70% (she mistakenly says ton miles), and calculates
a range of trucking deregulation benefits to be between $27 (using
another Beier and Stone low range estimate) and $63 billion per
year. (Owen, Diane S., "Deregulation in the Trucking Industry: A
Survey of the Literature", Mimeo, Department of Economics, Yale
University, December, 1988).

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26. Letter to US Senator Robert Packwood from James E. Bartley, Executive Vice President, National Industrial Transportation League (NITL), Washington, DC, January 27, 1986. In the letter, the NITL endorsed ending economic regulation of the motor carrier industry. Its membership ships 80% of the country's commercial freight. See also, "New Coalition Formed to Advocate Complete Motor Carrier Deregulation", Traffic World, March 3, 1986, pp. 15-16.

This group contains many of the members that banded together to advocate the MCA-1980.

DOT-T-90-12

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