

*Imports, Exports, and Shipping Services:  
The Balance Between California and  
Other States*

*Jon D. Haveman  
Research Fellow  
Public Policy Institute of California*

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**Public Policy Institute of California**

500 Washington Street, Suite 800 • San Francisco, California 94111

Telephone: (415) 291-4400 • Fax: (415) 291-4401

info@ppic.org • www.ppic.org

## Summary

Congress is in the process of allocating more than \$200 billion over the next five years for improvements in the U.S. surface transportation system. This process will update federal transportation laws such as the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) of 1998. These laws distribute federal expenditures to states and other local administering entities via formulas called apportionments. In 2002, California received \$2.7 billion, less than 9 percent of the nation's total apportionments. This amount is also less than California's contributions to the system through fuel tax payments, making California a net donor state.<sup>1</sup>

This donor status is inconsistent with the increased burden on California's infrastructure that is the result of growing international trade. California's position on the western coast of the United States provides it with important portals through which imports and exports flow. In 2000, almost \$440 billion in internationally traded goods flowed through California. Of this, \$149 billion was made up of U.S. exports, and \$290 billion was made up of imported products. More than \$49 billion in exports passed through California on their way from some other mainland states to their ultimate destination. In addition, as much as \$248 billion worth of imports may have entered the United States through California for ultimate use in some other state.

Once California's shipments through other states are accounted for, \$177 billion worth of goods, weighing 32 billion kilograms, are transshipped through California by other states in excess of what California ships through other states. The size of this surplus is equivalent to approximately 9.3 percent of the value of all freight shipments in and through California and 1.8 percent of the weight of these shipments.

Because most of these goods are shipped by truck on California's highways, this traffic places a heavy burden on the state's roads, increases congestion, and poses significant safety issues for state residents who make use of the these same roads. These findings may help outline a case for additional benefits for California in the forthcoming reauthorization of the TEA-21 Act.

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<sup>1</sup> Ransdell and Bolorian, 2003.

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## Introduction

The efficient movement of goods is essential to the smooth functioning of the U.S. economy. As international production-sharing, outsourcing, and joint ventures, become increasingly commonplace, goods movement both across and within borders increases. Accordingly, the role played by California and other coastal states in terms of moving goods to and from foreign countries is also growing in importance.

In 2000, almost \$400 billion in internationally traded goods flowed through California. Of this, \$149 billion was made up of exported goods from throughout the continental United States. The majority, \$244 billion, was made up of goods imported for use throughout the continental United States.

Exporting and importing often require that goods travel through other states on their way to and from foreign shores. This transshipment of goods through other states imposes a cost on these other states. To the extent that California is a state through which imports or exports of other states frequently travel, it bears a significant burden in providing and maintaining sufficient transportation infrastructure. This paper attempts to measure that burden by providing an account of the shipping services surplus or deficit between California and the other states in the continental United States.<sup>2</sup>

The term “shipping services surplus” refers to the extent to which one state provides more shipping services to another state than it demands in return. The tabulation of this surplus considers both imports and exports, implying four components to the calculation. From California’s perspective, these components include:

- Exports flowing through California that originate in some other state,
- Exports flowing out of California, but leaving U.S. shores from a portal in another state,
- Imports arriving in California that are ultimately destined for use in another state, and
- Imports destined for use in California, but that first arrived on U.S. shores in another state.

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<sup>2</sup> Because is unlikely that imports and exports for Hawaii, Alaska, and other U.S. territories travel through California, or that California’s imports and exports travel through these states, we have omitted them from the analysis.

This calculation omits both California exports that go abroad without traveling through another state and imports into California that are absorbed by consumers and producers in California.

A surplus in the above account represents a transfer of resources from California to other states. In what follows, we present an overview of California's international freight-related shipping services balance. This is followed by separate presentations of the contribution of exports and imports to the services balance. In each case, we present evidence on the balance by value and weight. The balance by value provides an indication of the level of economic activity that is supported by this trade, whereas the balance by weight is a better indicator of the actual burden placed on resources in shipping these goods.

## Overall Shipping Services Balance

In total, California services some \$177 billion worth of goods weighing in at over 32 billion kilograms in excess of what Californians demand from other states (Table 1). The majority of this shipping surplus arises from the transshipment of imported products. Almost 90 percent, or \$156 billion, of the \$177 billion surplus is the result of a higher value of imports coming through California for use in other states than arrives in other states for use in California. By weight, imported products account for two-thirds, or some 22 billion kilograms of the 32 billion kilogram imbalance.

**Table 1**  
**California's Aggregate International Trade-Related**  
**Shipping Services Surplus in 2000**

	Shipments for California Through Other States*	Shipments for Other States Through California**	Shipping Services Surplus
<i>Billions of Dollars</i>			
Exports	29.1	49.4	20.3
Imports	91.8	248.0	156.2
Total	120.9	297.4	176.5
<i>Billions of KG</i>			
Exports	9.9	20.5	10.6
Imports	68.2	90.0	21.8
Total	78.1	110.5	32.4
*These figures include both imports for Californians that arrive on U.S. shores in other states and California exports that depart from U.S. shores via port facilities in other states.			
**Similarly, the figures in this column also account for both imports arriving in California and exports departing through California ports.			

To put this surplus in perspective, we compare the flows presented above to total freight shipments in California. From U.S. Department of Transportation (2002), we are able to generate figures for both the total value and weight of all freight shipments making use of California's infrastructure. The data there indicate total shipments originating in and destined for California in 1997. These figures are not directly comparable to those in Table 1, which are for 2000. Instead, we assume that freight shipments involving California grow at the same rate as Gross State Product for the United States as a whole between 1997 and 2000. After making this adjustment, we find that total freight shipments through California totaled \$1,908 billion and weighed a total of 1,757 billion kilograms. Accordingly, the shipping services surplus for California amounts to 9.3 percent of the total value and 1.8 percent of the weight of all goods placing demand on California's infrastructure.

**Table 2**  
**Shipping Services by Mode of Transportation**

Mode	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	121,021	297,509	176,488	78,097	110,537	32,440
Air	6,337	16,006	9,669	4	12	8
Rail	5,899	9,554	3,655	3,816	3,147	-669
Truck	81,607	201,985	120,378	73,116	106,151	33,035
Parcel	17,600	50,192	32,592	68	200	132
Water	1,176	1,451	275	425	397	-28
Pipeline	695	714	19	246	216	-30
Rail & Water	59	37	-22	56	34	-22
Truck & Rail	1,584	3,263	1,679	7	12	5
Truck & Water	65	121	56	0	0	0
Other Multiple Mode	11	12	1	0	0	0
Other Unknown	5,988	14,173	8,185	358	369	11

Servicing this volume of goods is costly to California, particularly when the modes of transportation employed are financed in large part from state resources. Table 2 presents a decomposition of the surplus by mode of transportation. Both by value and by weight, the majority of the surplus is shipped by truck. Trucking is likely to be the most costly form of transport for a state to bear, given that it is the most heavily supported by state resources.<sup>3</sup> A larger proportion of air transportation infrastructure is borne by the federal government, and the rail system is largely privately owned and operated. Likewise, the costs of intrastate transportation by water are largely borne by those engaged in the activity rather than by the state. Given the composition of the shipping surplus by mode, this service to other states is likely to be very costly for California.

As all states are not uniformly engaged in international trade, it is important to assess the sources of the imbalance on a state-by-state basis. Table 3 presents the states with which California has the largest surpluses and deficits, by weight. In all, there are

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<sup>3</sup> U.S. Department of Transportation, 2001, provides great detail on transportation expenditures by mode and by state. On a ton-mile basis, trucking received 200 times the government expenditures than did rail. Data on relative expenditures for the other modes are much more difficult to come by. By ton shipped, highway expenditures were five times those for in support of water transportation. A comparison by air is complicated by expenditures on passenger travel facilities.



38 states with which California maintains a surplus. This surplus is particularly significant for five states: Ohio, North Carolina, New Jersey, Illinois, and Indiana. The imbalances with these states are largely the result of an imbalance with respect to imports. As three of these are large inland states, the flow of imports that enter through California and find their way to these states is substantial. Conversely, both the value and weight of imports that are used by California that first arrive in these states are very small.

**Table 3**  
**Selected Shipping Services Balances by State<sup>4</sup>**

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	121,021	297,509	176,488	78,097	110,537	32,440
Ohio	5,574	14,362	8,788	1,012	5,315	4,302
North Carolina	324	9,238	8,914	254	3,933	3,679
New Jersey	1,231	9,850	8,619	626	3,844	3,218
Illinois	4,699	16,192	11,493	2,282	5,285	3,002
Indiana	615	8,489	7,873	100	3,081	2,981
Montana	1,075	568	-507	1,509	292	-1,217
Michigan	14,726	14,504	-221	6,085	4,675	-1,410
Washington	9,331	7,060	-2,271	5,197	2,502	-2,695
Texas	19,502	30,718	11,217	15,472	12,733	-2,739
Louisiana	7,959	4,323	-3,636	8,955	3,134	-5,821
New York	26,989	21,091	-5,898	14,777	6,675	-8,102

California runs a deficit with the remaining ten states in the continental United States. The deficits with two states in particular are sizable. Louisiana and New York combined account for almost 14 billion kilograms of deficit, implying that they service substantially more trade for California than California services for them. These states both receive significant volumes of imports, which is the driving force behind this imbalance.

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<sup>4</sup> Appendix B provides tables with data for all states and sectors.

By weight, exports make up almost 90 percent of California's surplus. Table 4 lists the six two-digit Standard Industrial Classification (SIC) sectors in which California has the largest shipping surplus and those two in which California has the largest shipping deficit with other states. Shipments of products in the Stone, Clay, and Glass sector account for more than 40 percent of the total surplus in shipping weight. Note that these products, accounting for almost half of the weight surplus, are also very cheap, valued at roughly \$0.15 per kilogram. Accordingly, they contribute only \$2 billion to the \$177 billion surplus in the value of goods shipped. Food and kindred products also average just under \$1 per kilogram. In contrast, industrial machinery and equipment, which contributes significantly to the value shipping services balance, are priced at \$11.19 per kilogram. Those products offsetting the surplus, Petroleum and Mining, are also low-value products, valued at approximately \$0.12 per kilogram.

**Table 4**  
**Selected Shipping Services Balance by Sector**

Sector	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
All Sectors	121,021	297,509	176,488	78,097	110,537	32,440
Stone, Clay, and Glass Products	1,513	3,637	2,123	9,964	23,945	13,981
Food and Kindred Products	3,713	7,504	3,790	3,929	7,940	4,011
Industrial Machinery and Equipment	18,491	58,039	39,548	1,652	5,185	3,533
Miscellaneous Manufacturing	4,362	15,341	10,978	1,334	4,691	3,357
Apparel and Other Textile Products	6,016	19,871	13,855	1,140	3,765	2,625
Electronic and Other Electric Equipment	25,157	86,109	60,951	1,048	3,588	2,540
Petroleum and Coal Products	2,450	1,989	-461	7,221	5,862	-1,359
Mining Products	2,040	1,249	-791	23,711	14,515	-9,195

The rest of this paper will shed additional light on these patterns by decomposing the shipments into their export and import components.<sup>5</sup> In each case, the state-to-state relationships are disaggregated by mode of transport.

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<sup>5</sup> See Appendix A for a brief description of the methods used for calculating both the import and export shipping services balances.



## Exports

This section discusses the extent to which California provides more in the way of export transportation services to other states than it requires in return. This exercise takes into account both goods exported by other states through California and goods exported by California through other states. In fact, a significant proportion of California's exports do not flow directly through a California port. Approximately one quarter of California's 2001 exports, by value, left U.S. soil by way of a port in some other state.

Both by weight and by value, California is running a significant trade surplus in the provision of export freight transportation services (Table 5). On a value basis, exports account for only 12 percent of the total trade shipping surplus, account almost a third of the weight-based surplus.

**Table 5**  
**California's Export Shipping Trade Balance**

	<b>California's Exports Through other States</b>	<b>Other States' Exports Through California</b>	<b>California's Shipping Surplus</b>
<b>By Value (\$ B)</b>	29.1	49.4	20.3
<b>By Weight (B KG)</b>	9.9	20.5	10.6

By value, more than \$20 billion more exports flow through California on their way to foreign shores than California ships through other states.<sup>6</sup> Given California's position on the western coast of the United States, this result is not surprising. Regardless of their state of origin, most goods destined for Asia or the South Pacific by ship will travel through California. According to the U.S. Department of Transportation (1), the \$49 billion figure represents approximately 16 percent of all goods shipped to California from other states. Reflecting this significant excess of goods flowing through California over those shipped by California through other states, the surplus is almost 11 billion kilograms by weight.

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<sup>6</sup>This number may actually understate California's surplus. These statistics are based on a series maintained by the Census bureau that is referred to as the Origin of Movement series. This series records the location where goods started their export journey rather, which is often not the same as where they were produced. There is a tendency for shipments to be attributed to California when in fact the goods were manufactured in other states. The same problem arises when calculating the value of California's exports through other states. However, if the same proportion of goods are misclassified regardless of their state of origin, the figures for California are understated by a smaller amount than are the figures for other U.S. exports through California and the surplus is understated.

**Table 6  
Export Balance by Mode**

Mode	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	29,185	49,492	20,308	9,898	20,490	10,592
Air	1,690	2,647	957	1	2	1
Rail	943	1,898	955	263	752	489
Truck	19,249	33,318	14,069	9,475	19,470	9,995
Parcel	5,264	8,142	2,878	20	30	10
Water	226	409	183	70	108	38
Pipeline	85	210	125	28	49	20
Rail & Water	2	6	5	1	6	5
Truck & Rail	306	529	223	1	2	1
Truck & Water	15	28	13	0	0	0
Other Multiple Mode	2	3	2	0	0	0
Other Unknown	1,404	2,302	898	39	72	33

Table 6 provides detail on California’s export shipping surplus by mode of transportation. Of a shipping surplus in excess of \$20 billion, just under three-quarters is accounted for by truck, the mode that imposes the greatest cost on a hosting state. Parcel is a distant second, followed by air and rail.<sup>7</sup> Other modes, or mode combinations, are rare relative to those four, with correspondingly small trade balances, but all are nonetheless positive. This is also true on a weight basis, with trucking accounting for more than 95 percent of the surplus.

California is a net provider of shipping services to exporters in 39 of the 48 continental United States. The surplus is quite evenly distributed across states. In fact, California runs a trade surplus of over \$1 billion with only one state (Texas), and runs a deficit of the same size with only one other (Louisiana). Table 7 presents greater detail on California’s state-to-state export freight balances for those states with the largest surplus’ and deficits. By far, the largest amount of state-to-state export swapping is undertaken with Texas. Total export flows between the two states amount to almost \$14 billion. Texas is also the state to which California is the largest net provider of

<sup>7</sup> Goods shipped by parcel also travel by truck, air, and rail. As such, the other categories are to some extent understated.

export shipping services. The excess of Texas' exports through California over California's exports through Texas accounts for one-third of California's surplus by value and almost one-quarter of the surplus by weight, more than twice as much as any other state.

**Table 7  
Selected California Export Freight Balances by State**

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	29,185	49,492	20,308	9,898	20,490	10,592
Texas	3,987	9,868	5,881	1,407	3,699	2,291
Oregon	354	2,943	2,589	308	1,153	844
Utah	1	1,200	1,200	0	792	792
Arizona	388	4,761	4,373	84	857	773
Virginia	78	1,154	1,076	46	812	766
North Carolina	36	1,155	1,119	63	821	758
Washington	2,055	988	-1,067	950	420	-530
New York	4,519	1,480	-3,039	1,303	523	-780
Michigan	4,434	1,538	-2,897	1,446	566	-880
Louisiana	4,312	849	-3,463	2,242	962	-1,280

By sector, the export surplus is concentrated in four sectors when considering weight (Table 8). These sectors account for more than three-quarters of the shipping services surplus. In a very small number of sectors – Agricultural Production is the only significant one – California runs a deficit in shipping services with other continental states. By value, the surplus is more widely distributed, with five sectors each contributing more than \$1 billion to the surplus. Note that the Stone, Clay and Glass Products category contributes very little to the surplus by value.

**Table 8**  
**Selected California Export Freight Balances by Sector**

	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
<b>Mode</b>						
Total	29,185	49,492	20,308	9,898	20,490	10,592
Food and Kindred Products	953	3,274	2,322	1,008	3,465	2,457
Chemicals and Allied Products	1,101	3,753	2,652	984	3,355	2,371
Mining Products	43	211	168	499	2,456	1,957
Stone, Clay, and Glass Products	197	414	217	1,296	2,726	1,430
Agricultural Production	1,511	1,183	-328	1,925	1,508	-417



## Imports

Imports are the other side of the trade equation. In 2000, California was a net provider of shipping services, in the amount of \$156 billion, or almost 22 billion kilograms of imports (Table 9). Imports are responsible for the majority of California's overall surplus both by value and by weight. Comparing the import figures by value with shipping data in U.S. Department of Transportation (2002), the \$156 billion in imports handled by California for other states accounts for almost 17 percent of the value, but only 3.8 percent of the weight of all goods shipped from California to other states.

**Table 9**  
**California's Import Shipping Trade Balance**

	<b>California's Imports Through other States</b>	<b>Other States' Imports Through California</b>	<b>California's Trade Surplus</b>
<b>By Value (\$ B)</b>	91.8	248.0	156.2
<b>By Weight (B KG)</b>	68.2	90.0	21.8

As with exports, imports are primarily shipped by truck. By value, trucking accounts for a little over two-thirds of the shipping services surplus that California holds over other states. By weight, however, trucking makes up the vast majority of imports shipped and is equal to 115 percent of California's import related shipping services surplus. This surplus in trucking is primarily offset by a deficit in the rail category equal to about 5 percent of the surplus in trucking. Four other categories also have small deficits. Compared to other states' shipments of imported goods, California's imports are more commonly shipped by rail and less commonly shipped by truck.

**Table 10  
Import Balance by Mode**

Mode	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	91,836	248,017	156,180	68,199	90,047	21,848
Air	4,647	13,359	8,711	3	10	6
Rail	4,956	7,656	2,700	3,553	2,395	-1,158
Truck	62,358	168,667	106,309	63,641	86,681	23,040
Parcel	12,336	42,050	29,713	48	170	122
Water	950	1,042	92	355	289	-66
Pipeline	610	504	-106	218	167	-52
Rail & Water	57	31	-26	55	28	-26
Truck & Rail	1,278	2,734	1,457	6	10	5
Truck & Water	50	93	43	0	0	0
Other Multiple Mode	9	9	0	0	0	0
Other Unknown	4,584	11,871	7,287	319	297	-22

The distribution of the surplus resulting from the shipment of imported goods is much more even than is the case for exports (Table 11). California has a significant surplus with several states and a significant deficit with several others. Comparing the states listed in Table 11 with those in Table 3, it is clear that the shipment of imports is driving the overall freight shipping balances between California and other states. The same states are listed here as having the largest import freight shipping surplus as were listed in Table 3. In addition, five of the six states listed in Table 3 are listed here as having the largest freight shipping deficits with California. North Dakota replaces Michigan in this table, indicating that Michigan services a greater volume of exports for California than does North Dakota.

**Table 11**  
**Selected California Import Freight Balances by State**

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	91,836	248,017	156,180	68,199	90,047	21,848
Ohio	1,924	12,721	10,797	470	4,558	4,088
North Carolina	287	8,083	7,795	191	3,112	2,920
New Jersey	961	9,096	8,135	564	3,479	2,914
Indiana	84	7,433	7,349	21	2,705	2,684
Illinois	4,209	13,565	9,357	2,202	4,519	2,317
North Dakota	995	504	-491	1,099	198	-901
Montana	550	537	-12	1,330	256	-1,074
Washington	7,276	6,072	-1,204	4,247	2,082	-2,165
Louisiana	3,647	3,473	-173	6,713	2,173	-4,541
Texas	15,515	20,851	5,336	14,064	9,035	-5,030
New York	22,470	19,611	-2,859	13,473	6,152	-7,322

By sector, the surplus is also distributed evenly. Six sectors appear with a surplus by weight of more than 2 billion kilograms, but only two have a deficit of more than \$1 billion. Mining Products have a significant deficit of more than 11 billion kilograms.

**Table 12**  
**Selected California Import Freight Balances by Sector**

Sector	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Total	91,836	248,017	156,180	68,199	90,047	21,848
Stone, Clay and Glass Products	1,316	3,223	1,906	8,668	21,219	12,551
Miscellaneous Manufacturing	3,849	14,824	10,975	1,177	4,533	3,356
Industrial Machinery and Equipment	11,364	46,265	34,900	1,015	4,133	3,118
Apparel and Other Textile Products	5,769	19,568	13,799	1,093	3,707	2,614
Electronic and Other Electric Equipment	16,061	71,483	55,422	669	2,979	2,310
Agricultural Services, Fishing, Hunting, and Trapping	737	2,738	2,000	767	2,847	2,080
Petroleum and Coal Products	2,167	1,628	-540	6,389	4,799	-1,591
Mining Products	1,997	1,038	-959	23,212	12,060	-11,152

## Recapitulation

California provides shipping services on \$177 billion worth of traded goods for other states in excess of what other states provide for California's international trade activities. Of perhaps greater importance is the finding that when measured by weight, this surplus amounts to more than 32 billion kilograms of goods shipped via California's transportation facilities. Further, California's highways support a surplus of 33 billion kilograms with other states.

Although both the value and weight of trade with Texas dwarfs the totals of any of California's other bilateral relationships, it is with inland states (such as Ohio, Illinois and Indiana) that California has a significant shipping surplus. These large states have important industrial sectors and demand significant quantities of imports, much of which enter the United States through ports in California. The surplus is large because none of these states is likely to be the first point of contact for imports to California or the point of departure for exports from California.

By value and weight, imports contributed the most significantly to the surplus. This surplus, along with the fact that most intra-continental shipping takes place on highways, is very important for California. The provision of infrastructure for trucking is, by a significant margin, the most costly in terms of wear and tear on California's infrastructure investments. It is also very costly in terms of the pollution and congestion problems plaguing much of California. At the same time, however, it must be recognized that this surplus represents a relatively small share, 1.8 percent by weight, of all shipping that takes place in California.



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## **Appendix A. Methodology**

The data for exports are more complete than are those for imports. As a result, the methods employed for producing the international freight shipping surplus differ. This appendix first outlines the calculation of the export surplus and then turns to imports.

### **Exports**

The published data for exports provide an excellent starting point for analyzing California's shipping surplus. The published data provide:

1. Each state's exports by state of departure
2. Exports produced in each state by sector
3. The industrial composition of the exports flowing through each state.

The overall shipping surplus by value is readily obtained from (2002). However, to generate the surplus by weight, it is necessary to compute the surplus by sector. The weight of exports varies considerably across sectors. The procedure for calculating the weight of goods shipped by each state through every other state begins by allocating each state's exports by sector (as in 2) to one of the other states. This allocation is carried out according to the sector composition of exports passing through each state (3). This allocation is then adjusted so that it is consistent with each of the values in 1.

The result of this procedure is a matrix that contains the distribution of each state's exports by state and by sector. The weight of each state's exports through other states is then calculated with the use of statistics on the weight of U.S. aggregate exports by sector.

### **Imports**

The published data for imports are much less conducive to this type of analysis. Of the three components listed above, we know only the composition of imports flowing into each state by 2-digit SIC sector.

However, it is possible to estimate number 2 above by using import use statistics by sector from the United States as a whole. These data are available from the Bureau of Economic Analysis (BEA) as part of its input output accounts. The BEA also collects statistics on industrial production by state. Combining these data provides an estimate of each state's import use by sector, the second component.

Once we have each state's import use by sector, those imports are distributed across entry points according to their distribution of sector imports by state. This

distribution yields the value of imports by state according to the state in which those imports first arrive on U.S. shores. From this point, the weight of imports is calculated by the average weight of import shipments through each state, by sector.

## **Mode**

Data from the 1997 Commodity Flow Survey are used to estimate the mode of transportation used for exports and imports from one state to another. In particular, the Bureau of Transportation Statistics has published a report detailing the mode by which exported goods commonly flow.<sup>8</sup> It was assumed that the shipments for each state, from each state, by sector, match those of the total for all shipments in 1997.

## **Data Issues**

As there are no specific data that cover the direction, sector, and mode of traded goods, we have pieced together this picture of U.S. freight shipping services with data from several sources. To isolate these patterns, we have made several assumptions, including the following:

1. Shipments by firms in the continental United States do not travel through extra-continental territories. Data for Alaska, Hawaii, Puerto Rico, and the Virgin Islands have been excluded.
2. Each state's imports of a particular commodity are assumed to enter the United States in the same distribution as all imports of that commodity enter the United States.
3. We have excluded all data for the Petroleum and Coal Products industry. This affects primarily the import side of the equation.

The first assumption results in the omission of a small amount of goods that are presumably unrelated to surface transportation issues in the continental United States. The second assumption likely results in an overstatement of the absolute size of the shipment of imports for other states through California, but as it exaggerates the shipment of California's imports through other states by the same amount, the calculated surplus is not affected. Finally, the third assumption is made because we have information from other sources that the imports in support of this industry arrive almost entirely in California via ocean liner or pipeline. When this sector is included in the calculation of the surplus, it results in a severe understatement of California's shipping services surplus by weight.

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<sup>8</sup>See U.S. Department of Transportation, Bureau of Transportation Statistics (1999).

## Appendix B. Complete Tables

**Table B.1  
Surplus by State**

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Alabama	264	4,049	3,784	504	1,803	1,299
Arizona	1,769	9,659	7,889	556	2,361	1,805
Arkansas	52	2,516	2,464	96	1,142	1,046
Colorado	177	6,692	6,515	315	2,195	1,880
Connecticut	206	4,777	4,572	193	1,460	1,267
Delaware	219	955	736	416	357	-58
Dist. of Col.	583	814	230	194	218	24
Florida	5,559	12,830	7,270	2,527	4,281	1,754
Georgia	3,004	9,623	6,619	1,452	3,872	2,419
Idaho	196	2,701	2,504	358	782	425
Illinois	4,699	16,192	11,493	2,282	5,285	3,002
Indiana	615	8,489	7,873	100	3,081	2,981
Iowa	2	3,573	3,572	1	1,428	1,427
Kansas	31	3,451	3,420	18	1,436	1,417
Kentucky	98	5,051	4,953	21	1,898	1,876
Louisiana	7,959	4,323	-3,636	8,955	3,134	-5,821
Maine	764	1,152	388	923	505	-418
Maryland	1,850	4,876	3,027	972	1,686	714
Massachusetts	1,245	8,605	7,360	1,106	2,462	1,356
Michigan	14,726	14,504	-221	6,085	4,675	-1,410
Minnesota	890	6,491	5,601	1,778	2,239	461
Mississippi	334	2,199	1,865	661	1,032	371
Missouri	84	6,162	6,077	45	2,185	2,140
Montana	1,075	568	-507	1,509	292	-1,217
Nebraska	3	2,408	2,405	2	1,074	1,072
Nevada	446	2,066	1,619	112	844	733
New Hampshire	55	1,747	1,692	67	514	447
New Jersey	1,231	9,850	8,619	626	3,844	3,218

**Table B.1**  
**Surplus by State**  
(continued)

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
New Mexico	123	3,132	3,009	21	852	831
New York	26,989	21,091	-5,898	14,777	6,675	-8,102
North Carolina	324	9,238	8,914	254	3,933	3,679
North Dakota	1,152	508	-644	1,179	200	-980
Ohio	5,574	14,362	8,788	1,012	5,315	4,302
Oklahoma	4	3,144	3,140	0	1,257	1,257
Oregon	1,384	7,463	6,079	584	2,567	1,983
Pennsylvania	2,136	12,413	10,277	3,322	5,039	1,716
Rhode Island	73	975	903	165	335	170
South Carolina	2,599	3,734	1,135	1,294	1,455	161
South Dakota	2	709	707	2	239	237
Tennessee	562	6,494	5,932	594	2,430	1,835
Texas	19,502	30,718	11,217	15,472	12,733	-2,739
Utah	3	2,995	2,992	4	1,487	1,482
Vermont	1,052	574	-479	789	201	-587
Virginia	1,975	7,990	6,015	1,435	3,177	1,742
Washington	9,331	7,060	-2,271	5,197	2,502	-2,695
West Virginia	0	1,428	1,428	0	1,326	1,326
Wisconsin	98	6,724	6,626	120	2,334	2,214
Wyoming	1	437	436	3	397	395
<b>Total</b>	<b>121,021</b>	<b>297,509</b>	<b>176,488</b>	<b>78,097</b>	<b>110,537</b>	<b>32,440</b>

**Table B.2  
Surplus by Sector**

Sector	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Agricultural Production	3,080	3,062	-18	3,925	3,902	-23
Agricultural Services, Fishing, Hunting, and Trapping	776	2,807	2,032	807	2,919	2,113
Mining Products	2,040	1,249	-791	23,711	14,515	-9,195
Food and Kindred Products	3,713	7,504	3,790	3,929	7,940	4,011
Tobacco Manufacturers	52	705	653	37	495	458
Textile Mill Products	1,135	2,616	1,481	427	985	557
Apparel and Other Textile Products	6,016	19,871	13,855	1,140	3,765	2,625
Lumber and Wood Products	1,704	2,045	341	6,125	7,352	1,227
Furniture and Fixtures	1,024	4,546	3,521	214	951	737
Paper and Allied Products	1,917	2,127	210	1,344	1,492	147
Printing and Publishing	559	1,264	705	106	239	133
Chemical and Allied Products	7,500	9,688	2,188	6,705	8,661	1,956
Petroleum and Coal Products	2,450	1,989	-461	7,221	5,862	-1,359
Rubber and Misc. Plastics Products	2,089	6,541	4,451	1,006	3,151	2,144
Leather and Leather Products	1,452	9,018	7,566	125	775	650
Stone, Clay, and Glass Products	1,513	3,637	2,123	9,964	23,945	13,981
Primary Metal Industries	4,907	4,816	-92	4,258	4,179	-79
Fabricated Metal Products	3,294	8,251	4,957	909	2,277	1,368
Industrial Machinery and Equipment	18,491	58,039	39,548	1,652	5,185	3,533
Electronic and Other Electric Equipment	25,157	86,109	60,951	1,048	3,588	2,540
Transportation Equipment	20,852	32,040	11,188	1,282	1,970	688
Instruments and Related Products	6,935	14,246	7,311	827	1,699	872
Miscellaneous Manufacturing	4,362	15,341	10,978	1,334	4,691	3,357
ALL SECTORS	121,021	297,509	176,488	78,097	110,537	32,440

**Table B.3  
Export Surplus By State**

Mode	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Alabama	24	441	417	16	311	295
Arizona	388	4,761	4,373	84	857	773
Arkansas	0	423	423	0	267	267
Colorado	54	2,177	2,123	19	604	585
Connecticut	3	187	184	0	57	57
Delaware	7	54	47	2	33	31
Dist. of Col.	137	45	-92	21	10	-10
Florida	1,148	565	-583	258	164	-94
Georgia	284	1,234	950	128	799	670
Idaho	57	1,377	1,320	19	321	302
Illinois	491	2,626	2,136	81	766	685
Indiana	531	1,055	524	79	376	297
Iowa	0	667	667	0	309	309
Kansas	0	890	890	0	550	550
Kentucky	27	672	645	4	313	309
Louisiana	4,312	849	-3,463	2,242	962	-1,280
Maine	22	169	148	15	127	112
Maryland	55	184	129	27	71	44
Massachusetts	92	594	501	13	111	98
Michigan	4,434	1,538	-2,897	1,446	566	-880
Minnesota	49	821	772	23	328	305
Mississippi	13	248	235	8	173	164
Missouri	11	536	525	1	228	227
Montana	525	30	-495	179	36	-143
Nebraska	0	717	717	0	517	517
Nevada	431	451	20	106	128	22
New Hampshire	0	115	114	0	29	29
New Jersey	269	754	484	62	366	303
New Mexico	3	1,404	1,400	1	158	157

**Table B.3**  
**Export Surplus By State**  
(continued)

Mode	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
New York	4,519	1,480	-3,039	1,303	523	-780
North Carolina	36	1,155	1,119	63	821	758
North Dakota	157	3	-153	80	2	-79
Ohio	3,651	1,641	-2,010	542	757	215
Oklahoma	0	321	321	0	104	104
Oregon	354	2,943	2,589	308	1,153	844
Pennsylvania	501	731	230	124	390	266
Rhode Island	0	78	78	0	24	24
South Carolina	111	236	125	59	116	57
South Dakota	0	21	21	0	9	9
Tennessee	333	913	580	173	400	227
Texas	3,987	9,868	5,881	1,407	3,699	2,291
Utah	1	1,200	1,200	0	792	792
Vermont	29	20	-10	5	3	-2
Virginia	78	1,154	1,076	46	812	766
Washington	2,055	988	-1,067	950	420	-530
West Virginia	0	312	312	0	660	660
Wisconsin	2	839	836	3	259	257
Wyoming	0	8	8	0	11	11
Total	29,185	49,492	20,308	9,898	20,490	10,592

**Table B.4  
Export Shipping Services by Sector**

Sector	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Agricultural Production	1,511	1,183	-328	1,925	1,508	-417
Agricultural Services, Fishing, Hunting, and Trapping	38	70	31	40	72	33
Mining Products	43	211	168	499	2,456	1,957
Food and Kindred Products	953	3,274	2,322	1,008	3,465	2,457
Tobacco Manufacturers	19	650	631	14	457	443
Textile Mill Products	127	218	90	48	82	34
Apparel and Other Textile Products	247	303	56	47	57	11
Lumber and Wood Products	126	232	106	454	835	381
Furniture and Fixtures	72	112	39	15	23	8
Paper and Allied Products	248	559	311	174	392	218
Printing and Publishing	170	227	57	32	43	11
Chemical and Allied Products	1,101	3,753	2,652	984	3,355	2,371
Petroleum and Coal Products	282	361	79	832	1,064	232
Rubber and Misc. Plastics Products	456	905	450	220	436	217
Leather and Leather Products	52	213	162	4	18	14
Stone, Clay, and Glass Products	197	414	217	1,296	2,726	1,430
Primary Metal Industries	491	779	289	426	676	250
Fabricated Metal Products	595	939	344	164	259	95
Industrial Machinery and Equipment	7,127	11,774	4,648	637	1,052	415
Electronic and Other Electric Equipment	9,096	14,626	5,529	379	609	230
Transportation Equipment	2,398	3,967	1,569	147	244	96
Instruments and Related Products	3,323	4,204	881	396	501	105
Miscellaneous Manufacturing	513	517	4	157	158	1
Total	29,185	49,492	20,308	9,898	20,490	10,592



**Table B.5  
Import Shipping Services by State**

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Alabama	240	3,608	3,368	488	1,492	1,004
Arizona	1,382	4,898	3,516	472	1,504	1,032
Arkansas	52	2,093	2,041	96	875	779
Colorado	122	4,515	4,392	296	1,591	1,295
Connecticut	203	4,591	4,388	192	1,402	1,210
Delaware	211	901	689	414	325	-89
Dist. of Col.	447	769	322	174	208	34
Florida	4,411	12,265	7,854	2,269	4,117	1,847
Georgia	2,720	8,389	5,669	1,324	3,073	1,749
Idaho	140	1,324	1,184	338	462	123
Illinois	4,209	13,565	9,357	2,202	4,519	2,317
Indiana	84	7,433	7,349	21	2,705	2,684
Iowa	2	2,906	2,905	1	1,119	1,118
Kansas	31	2,561	2,530	18	885	867
Kentucky	71	4,379	4,308	17	1,585	1,567
Louisiana	3,647	3,473	-173	6,713	2,173	-4,541
Maine	742	982	240	908	378	-530
Maryland	1,794	4,692	2,898	946	1,615	670
Massachusetts	1,152	8,011	6,859	1,092	2,351	1,258
Michigan	10,291	12,967	2,675	4,638	4,109	-529
Minnesota	841	5,670	4,828	1,754	1,911	156
Mississippi	321	1,952	1,631	653	859	206
Missouri	74	5,626	5,552	44	1,957	1,913
Montana	550	537	-12	1,330	256	-1,074
Nebraska	3	1,691	1,688	2	557	556
Nevada	16	1,615	1,600	5	716	711
New Hampshire	55	1,632	1,578	67	485	418
New Jersey	961	9,096	8,135	564	3,479	2,914
New Mexico	120	1,729	1,609	20	694	674

**Table B.5**  
**Import Shipping Services by State**  
(continued)

State	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
New York	22,470	19,611	-2,859	13,473	6,152	-7,322
North Carolina	287	8,083	7,795	191	3,112	2,920
North Dakota	995	504	-491	1,099	198	-901
Ohio	1,924	12,721	10,797	470	4,558	4,088
Oklahoma	4	2,824	2,820	0	1,154	1,153
Oregon	1,030	4,520	3,490	276	1,414	1,139
Pennsylvania	1,635	11,682	10,047	3,198	4,649	1,451
Rhode Island	73	897	825	165	310	145
South Carolina	2,488	3,498	1,010	1,235	1,339	104
South Dakota	2	688	686	2	230	228
Tennessee	229	5,581	5,353	421	2,030	1,608
Texas	15,515	20,851	5,336	14,064	9,035	-5,030
Utah	2	1,794	1,792	4	694	690
Vermont	1,023	554	-469	784	199	-585
Virginia	1,896	6,835	4,939	1,389	2,365	976
Washington	7,276	6,072	-1,204	4,247	2,082	-2,165
West Virginia	0	1,117	1,116	0	666	666
Wisconsin	95	5,885	5,790	118	2,075	1,958
Wyoming	1	429	428	3	387	384
Total	91,836	248,017	156,180	68,199	90,047	21,848

**Table B.6  
Import Shipping Services by Sector**

Sector	By Value (\$ Millions)			By Weight (Millions of KG)		
	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus	Shipments for California Through Other States	Shipments for Other States Through California	Shipping Services Surplus
Agricultural Production	1,570	1,879	309	2,000	2,394	394
Agricultural Services, Fishing, Hunting, and Trapping	737	2,738	2,000	767	2,847	2,080
Mining Products	1,997	1,038	-959	23,212	12,060	-11,152
Food and Kindred Products	2,761	4,229	1,469	2,921	4,475	1,554
Tobacco Manufacturers	33	54	22	23	38	15
Textile Mill Products	1,007	2,398	1,391	379	903	523
Apparel and Other Textile Products	5,769	19,568	13,799	1,093	3,707	2,614
Lumber and Wood Products	1,577	1,813	235	5,671	6,517	846
Furniture and Fixtures	952	4,434	3,482	199	928	729
Paper and Allied Products	1,670	1,569	-101	1,171	1,100	-71
Printing and Publishing	389	1,036	648	74	196	122
Chemical and Allied Products	6,399	5,935	-464	5,721	5,306	-415
Petroleum and Coal Products	2,167	1,628	-540	6,389	4,799	-1,591
Rubber and Misc. Plastics Products	1,633	5,635	4,002	787	2,714	1,928
Leather and Leather Products	1,400	8,805	7,405	120	756	636
Stone, Clay, and Glass Products	1,316	3,223	1,906	8,668	21,219	12,551
Primary Metal Industries	4,416	4,036	-380	3,832	3,503	-330
Fabricated Metal Products	2,700	7,312	4,613	745	2,018	1,273
Industrial Machinery and Equipment	11,364	46,265	34,900	1,015	4,133	3,118
Electronic and Other Electric Equipment	16,061	71,483	55,422	669	2,979	2,310
Transportation Equipment	18,454	28,072	9,618	1,134	1,726	591
Instruments and Related Products	3,613	10,042	6,429	431	1,198	767
Miscellaneous Manufacturing	3,849	14,824	10,975	1,177	4,533	3,356
<b>Total</b>	<b>91,836</b>	<b>248,017</b>	<b>156,180</b>	<b>68,199</b>	<b>90,047</b>	<b>21,848</b>



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