

Economic Impact of a Pacific Northwest Port Shutdown

Prepared for:
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May 21, 2003

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Executive Summary

This study examines the effects of closing a major seaport in the Pacific Northwest. Three closures are studied: the Port of Seattle/Tacoma, the Port of Portland, and all the ports of Alaska. Within these closures, we focus on answering the following four study questions:

- 1) What is the economic impact to Washington and Oregon of an immediate closure of the Port of Seattle/Tacoma occurring in 2004 and lasting for one year?
- 2) What is the economic impact to Alaska of an immediate closure of the Port of Seattle/Tacoma occurring in 2004 and lasting for one year?
- 3) What is the economic impact to Washington and Oregon of a gradual shut down of the Port of Portland beginning in 2004 and be completed by 2010?
- 4) What is the economic impact to Alaska of an immediate closure of all Alaska ports occurring in 2004 and lasting for one year?

The Regional Economic Modeling, Inc. (REMI) Policy Insight model is used to obtain expected impacts to the economy from the different port closures. The REMI model is a regional macroeconomic model that is customized to the regions of the Pacific Northwest, including areas from within Washington, Oregon, Alaska, California, and British Columbia. We simulate the port closures by adjusting policy variables in REMI. To aid in determining the levels of adjustment to the REMI policy variables, numerous types of data are collected. These data include trade flows through the major ports, origin-destination flows, transportation use data, and transportation costs. Adjustments to REMI include expected costs and revenues to the region resulting from closing one of the major seaports. After determining the appropriate levels of regional costs and revenues, we revise the REMI variables as follows:

- Eliminate the expected water transportation revenues of the port that is closed;
- Increase port revenues of other West Coast seaports due to rerouting of goods (for shutdown of Seattle/Tacoma and Portland ports only);
- Increase revenues of trucking, railroads and airlines created by using alternative routes;
- Increase production costs for industries that use goods that typically come through the closed port;
- Increase foreign export costs due to the increased cost of transporting goods to alternative ports; and
- For the shutdown of the Alaska ports only, eliminate the revenues from oil production.

The focus of this study is on Washington, Oregon, and Alaska. However, results for other areas in the region are included when noteworthy. Impacts of the port closures are summarized using the economic indicators of Employment, GRP, Output, Imports, Foreign Exports, Prices and Trade Flows.

Closure of Port of Seattle/Tacoma: Impact to Washington and Oregon

In this scenario the Port of Seattle/Tacoma is closed for the entire year of 2004. As a result of the closure, both Washington and Oregon experience significant negative impacts to their economies. Table 1 summarizes the impact of closing the port on several key economic indicators for each state. In the year of the closure, Washington loses a total of 122,960 jobs (4.2%) while Oregon loses 38,060 jobs (2.0%). Manufacturing employment is hit harder than Non-Manufacturing based on percent loss in each of the states. However, Non-Manufacturing is hit harder based on actual number of jobs. Other economic indicators, including GRP, Output, Personal Income, and Wage Rates, drop in both of the states as well.

Total employment drops in both states, however we do see a slight increase in employment in the Trucking, Railroads, and Airline industry due to transporting goods to and from alternative ports (0.2% in Washington and 0.6% in Oregon). Oregon also has an increase in Water Transportation employment of 1,237 due to heavier trade flows through the Port of Portland.

Summary of Economic Impact to Washington and Oregon Closure of Port of Seattle/Tacoma Year 2004				
	Washington		Oregon	
		Percent		Percent
Employment				
Total	-122,960	-4.2%	-38,060	-2.0%
Manufacturing	-23,420	-6.7%	-12,430	-5.0%
Non-Manuf., excl. Transp.	-87,148	-3.5%	-27,219	-1.7%
Water Transportation	-12,540	NA	+1,237	NA
Truck, Rail, and Air Transp.	+148	+0.2%	+352	+0.6%
GRP (Bil Fixed 99\$)	-7.544	-3.8%	-2.840	-2.2%
Personal Income (Bil Nom \$)	-6.097	-2.9%	-1.533	-1.3%
Output (Bil Fixed 99\$)	-14.660	-4.8%	-6.053	-2.9%
Imports (Bil Fixed 99\$)	-4.612	-5.6%	-1.769	-3.5%
Exports (Bil Fixed 99\$)	-4.990	-6.1%	-2.628	-4.1%
Wage Rate (Thou. Nom \$)	-0.397	-1.1%	-0.148	-0.5%
Export Price (\$/\$)	+0.006	+0.2%	+0.004	+0.1%

Table 1: Summary of Economic Impact to WA and OR, Seattle/Tacoma Closure

Whereas both Washington and Oregon experience a significant hit to their economies in the year 2004, the economies of surrounding areas, such as California and British

Columbia experience an overall positive impact. This is due to the diversion of trade to the other areas.

With respect to specific Manufacturing industries impacted by closing the Port of Seattle/Tacoma, the Durables industry is larger and loses more jobs than Non-Durables. However, both Durables and Non-Durables industries lose jobs. In Washington, Machinery & Computers and Motor Vehicles are the hardest hit Manufacturing industries based on percent loss. Transportation Equipment loses the most based on number of jobs. In Oregon, the largest percent losses occur in Machinery & Computers, Transportation Equipment and Motor Vehicles. Based on number, the greatest losses occur in Machinery and Computers and Electrical Equipment.

There is no significant long-term impact from the closure of the Port of Seattle/Tacoma. From 2005 through 2010, the only impact is caused by an investment bounce in the years following the port closure, creating a slightly positive impact to the economy.

Closure of Port of Seattle/Tacoma: Impact to Alaska

The closure of the Port of Seattle/Tacoma has a negative impact on Alaska's economy in the year of the closure. Alaska's domestic waterborne trade primarily goes through the Port of Seattle/Tacoma (Pacific Alaska Forwarders, Inc. website). In the event of a closure of the Port of Seattle/Tacoma, Alaska needs to reroute its goods through another port thereby increasing transportation costs.

Summary of Economic Impact to Alaska Closure of Port of Seattle/Tacoma Year 2004		
	Alaska	Percent
Employment		
Total	-2,464	-0.7%
Manufacturing	-144	-0.9%
Non-Manuf., excl. Transp.	-2,207	-0.8%
Water Transportation	-24	NA
Truck, Rail, and Air Transp.	-90	-0.5%
GRP (Bil Fixed 99\$)	-0.123	-0.5%
Personal Income (Bil Nom \$)	-0.084	-0.3%
Output (Bil Fixed 99\$)	-0.226	-0.7%
Imports (Bil Fixed 99\$)	-0.076	-0.9%
Exports (Bil Fixed 99\$)	-0.014	-0.2%
Wage Rate (Thou. Nom \$)	-0.001	0.0%
Export Price (\$/\$)	+0.065	+0.5%

Table 2: Summary of Economic Impact to Alaska, Seattle/Tacoma Closure

Table 2 summarizes the impact of the port closure on several key economic indicators for the State of Alaska. In 2004, Alaska's total employment drops by 2,464 jobs or 0.7%. This represents 144 Manufacturing jobs and a total of 2,321 Non-Manufacturing jobs (including Water Transportation and Truck, Rail, & Air Transportation).

The Export Price of goods traveling from Alaska increases 0.5%, which reduces Output by 0.7% and GRP by 0.5%. Wages are essentially unchanged, but the loss of jobs reduces Personal Income by 0.3%. There is a nearly 1% reduction in Imports while Exports drop 0.2%. (See Table 2)

The industries in Alaska most impacted by the closure of the Port of Seattle/Tacoma are, for the most part, the industries with the largest employment. No industry stands out as being hit significantly harder than the others on a percentage basis. The Manufacturing industries with the largest number of job losses are Food (78 jobs – 1.0%) and Lumber (24 jobs – 1.1%). The Non-Manufacturing jobs hardest hit include Services (812 jobs - 0.6%), Retail Trade (666 jobs - 1.0%), and Construction (358 jobs - 1.5%)

After 2005, when the port is reopened, the impact to Alaska is very slight, indicating that, long term, there is almost a full recovery of Alaska's economy by 2010.

Closure of Port of Portland: Impact to Oregon and Washington

In this scenario, the Port of Portland is shutdown gradually from 2004 through 2010. As a result of the closure, both Oregon's and Washington's economies are negatively impacted. Table 3 shows the impacts to several key economic indicators in year 2010, which is the first year the port is completely closed.

As is shown in Table 3, Oregon loses a total of 27,015 jobs (1.3%) while Washington loses 2,667 (0.1%). This loss includes a drop of 3,985 (1.7%) Manufacturing jobs in Oregon and 1,272 (0.4%) Manufacturing jobs in Washington. In Oregon, Non-Manufacturing, excluding Transportation, loses 1.1% of jobs (18,369) and Washington loses 0.1% (2,230). Whereas Oregon experiences a loss of 4,467 jobs that are directly related to the port (Water Transportation), Washington gains 801 direct jobs. This gain is due to Washington picking up some of the diverted port traffic from the Port of Portland.

Impacts to the states are less than they would be with an immediate closure because the gradual closure allows for time to adjust. When considering total-labor years lost across the seven years, Oregon loses 111,585 labor-years and Washington loses 10,325 labor-years.

The loss of jobs in Oregon reduces Oregon Output in 2010 by 1.6%, GRP by 1.3%, and Personal Income by 1.0%. The impact is smaller, but still negative, in Washington where Output drops 0.2%, GRP by 0.1%, and Personal Income 0.1%. Further, there is decline in the value of goods imported to Oregon (1.9%) and Washington (0.2%), as well as a drop in the value of goods exported from Oregon (1.8%) and Washington (0.3%).

Summary of Economic Impact to Oregon & Washington Closure of Port of Portland, 2010				
	Oregon	Percent	Washington	Percent
Employment				
Total	-27,015	-1.3%	-2,667	-0.1%
Manufacturing	-3,985	-1.7%	-1,272	-0.4%
Non-Manuf., excl. Transp.	-18,369	-1.1%	-2,230	-0.1%
Water Transportation	-4,467	NA	+801	NA
Truck, Rail, and Air Transp.	-194	-0.3%	+34	0.0%
GRP (Bil Fixed 99\$)	-1.872	-1.3%	-0.259	-0.1%
Personal Income (Bil Nom \$)	-1.504	-1.0%	-0.172	-0.1%
Output (Bil Fixed 99\$)	-3.720	-1.6%	-0.544	-0.2%
Imports (Bil Fixed 99\$)	-1.108	-1.9%	-0.178	-0.2%
Exports (Bil Fixed 99\$)	-1.325	-1.8%	-0.277	-0.3%
Wage Rate (Thou. Nom \$)	-0.127	-0.3%	-0.006	0.0%
Export Price (\$/\$)	+0.001	0.0%	+0.001	0.0%

Table 3: Summary of Economic Impact on OR and WA, Portland Closure

The specific Manufacturing industries that are hardest in Oregon occur in Motor Vehicles (649 or 6.1%), Machinery and Computers (567 or 3.0%), and Transportation Equipment (564 or 9.2%). In Washington, the Manufacturing industry with the greatest losses in 2010 is in Transportation Equipment (647 jobs or 0.8%). Employment in the Transportation Equipment industry makes up about 40% of Washington's Durables employment and accounts for about 60% of the job losses.

The impact to Oregon of gradually closing the Port of Portland grows each year from 2004 through 2010 as the trade through the port is reduced. There is no evidence of any new economic growth filling the gap left by the closure of the port. The Employment loss is about 4,000 jobs per year with about 600 (15%) of those being Manufacturing jobs. Output declines by over \$500 million per year with GRP dropping over \$250 million per year and Personal Income dropping over \$200 million per year. These losses are essentially a permanent impact of the closure of the Port of Portland.

Washington's economic indicators all decline by approximately 0.1% across the years 2004 through 2010, indicating a slight long-term impact to Washington's economy. The surrounding regions (British Columbia and California) show a slight increase in economic activity but less than the losses in Oregon and Washington.

Closure of Alaska Ports: Impact to Alaska

In this scenario all the ports in Alaska are closed for the entire year of 2004. This closure necessitates diverting Alaska's waterborne imports and exports to either trucking or air transport. Portions of Alaska (Southwest and Southeast Alaska) are not accessible by

truck due to the lack of coastal highways (Pacific Alaska Forwarders, Inc. website). As a result, we assume that trade typically going through Southeast or Southwest Alaska ports are transported by air. The rest of the trade, we assume to be trucked.

With the closure of the Alaska ports, we also suspend the exporting of crude oil based on the assumption that it would be too expensive to acquire and utilize the trucks needed to move the crude oil. This results in a significant reduction in the production of crude oil in Alaska.

Alaska is highly dependent on its seaports and closing the ports of Alaska dramatically affects its economy. Employment levels decrease by over 16% (53,901 jobs) in the year of the closure. Of the total jobs lost in Alaska, 2,791 jobs are in the Manufacturing sector, translating into a 17.8% loss in Manufacturing. Direct job losses (port-related jobs) total 2,758 (Table 4).

Summary of Economic Impact to Alaska, 2004 Closure of Alaska Ports		
	Alaska	Percent
Employment		
Total	-53,901	-16.4%
Manufacturing	-2,791	-17.8%
Non-Manuf., excl. Transp.	-47,581	-16.4%
Water Transportation	-2,758	NA
Truck, Rail, and Air Transp.	-771	-4.6%
GRP (Bil Fixed 99\$)	-3.924	-16.6%
Personal Income (Bil Nom \$)	-2.349	-9.7%
Output (Bil Fixed 99\$)	-7.502	-23.2%
Imports (Bil Fixed 99\$)	-2.697	-31.2%
Exports (Bil Fixed 99\$)	-3.016	-38.2%
Wage Rate (Thou. Nom \$)	-2.302	-8.2%
Export Price (\$/\$)	+0.161	+1.3%

Table 4: Summary of Economic Impact to Alaska, Alaska Ports Closure

The closure of the ports further affects Alaska's Economic Output, dropping by 23.2% or \$7.5 billion. GRP declines by 16.6% or \$3.9 billion, and Personal Income drops by 9.7% or \$2.3 billion.

Wage rates in Alaska drop \$2,302 or 8.2%. Imports and Exports drop significantly by 31.2% and 38.2% respectively.

The most dramatic employment impact is on the Oil Mining industry (in the Non-Manufacturing sector), which loses almost 92% (9,286 jobs) of its employment. In terms of percent losses, there are also dramatic reductions in Petroleum Products (38%),

Construction (33%), Stone and Clay (32%), and Fabricated Metals (32%). Although both Machinery & Computer and Primary Metals are small industries, they still have losses of 58% and 41% of their respective employment.

Long-term, there is a nearly immediate recovery of Employment with a significant, but not complete recovery of Output, GRP, and Personal Income in 2005.

Introduction

This study examines the importance of several major seaports in the Pacific Northwest to the economy of the region. The primary focus of the study is on the economic impact to the states of Washington, Oregon and Alaska; however, impacts to other areas (California, British Columbia and the Rest of the U.S.) are occasionally reported. Detailed data for the other areas are included in the Appendix.

In this report we answer four study questions related to the closure of one of the ports (or group of ports) in the states of Washington, Oregon or Alaska.

In the State of Washington, we examine the impact of an immediate closure of the Seattle/Tacoma port complex. This port complex is one of the largest port complexes in the U.S. and is closer to Asia than any other major U.S. port (Port of Seattle website). It ranks fourth in tonnage among West Coast ports and fifth in containerized shipping to and from Asia (Washington Development Network Online). The Port of Seattle/Tacoma handles 48.1 million tons of foreign and domestic trade with an estimated value of \$73.6 billion in 2000 (U.S. Army Corps of Engineers and U.S. Bureau of Census, 2000).

In the State of Oregon, we examine the impact of a gradual shutdown of the Port of Portland (over 7 years). It is the largest seaport in Oregon and handles 45.6 million tons of foreign and domestic trade with an estimated value of \$23.5 billion in 2000. (Army Corps of Engineers and U.S. Bureau of Census, 2000)

In the State of Alaska, we examine the impact of an immediate shutdown of all Alaska ports. Alaska is divided into three primary regions (Western Alaska, Central Alaska and Southeast Alaska), and there are multiple seaports in each area. The Alaska ports handle 55.1 million tons of foreign and domestic traffic with an estimated value of \$20 billion in 2000. (U.S. Army Corps of Engineers and U.S. Bureau of Census, 2000)

What follows is a list of study questions related to the above port closures.

- 1) What is the economic impact to Washington and Oregon of an immediate closure of the Port of Seattle/Tacoma occurring in 2004 and lasting for one year?
- 2) What is the economic impact to Alaska of an immediate closure of the Port of Seattle/Tacoma occurring in 2004 and lasting for one year?
- 3) What is the economic impact to Washington and Oregon of a gradual shut down of the Port of Portland beginning in 2004 and be completed by 2010?
- 4) What is the economic impact to Alaska of an immediate closure of all Alaska ports occurring in 2004 and lasting for one year?

The analysis is performed using the Regional Economic Models, Inc (REMI) Policy Insight model (Version 5.2). The REMI model is a regional macroeconomic model and examines the interrelationships between the regions of the Pacific Northwest. There are 11 regions defined in this version of the REMI model, and they are: Port of Seattle/Tacoma, Other Washington, Port of Portland, Columbia-Snake River, Other Oregon, British Columbia, Alaska, Port of Oakland/San Francisco, Port of Long Beach/LA, Other California, and Rest of U.S. Results from the analysis are aggregated to the state level.

The first section of the report contains a description of the baseline economic conditions of the Pacific Northwest. The baseline data consist of projections from the REMI model for the years 2004 through 2010. From this baseline, we then create policy runs by changing variables in the REMI model to simulate the appropriate port closure. The Methodology section is at the end of the report and describes in detail the inputs to REMI used to simulate each port closure. Results for each of the study questions follow the section titled *Baseline Economic Conditions by State*. Within each of the study questions, we report the economic impacts using the following indicators: Employment, GRP, Output, Imports, Exports, Prices and Trade Flows.

Tables that exist in the body of this report for Washington, Alaska, and Oregon can be found in the Appendix for California, British Columbia and the Rest of the United States. Summary economic indicators that are in the body of this report are also available in more detailed, by-industry format (2-digit SIC categories) in the Appendix. These data are available for each area (Washington, Oregon, Alaska, California, British Columbia, and the Rest of the United States) and include: GRP, Output, Imports, Exports to Rest of World, Wage Rate, and Delivered Price.

Baseline Economic Conditions by State

This section describes the expected baseline conditions for each of the states in the Pacific Northwest before the closure of any ports. Specifically, it provides a general overview of the economic conditions in each state, identifies the key industries in terms of employment in each state, and characterizes the primary imports and exports through the major port of each state.

As described in the Introduction, the three states of primary interest to this study are Washington, Oregon and Alaska. The other areas of California, British Columbia and the Rest of the United States are occasionally included in tables simply as a reference.

Baseline Conditions: Overview

Table 5 provides a summary of several key economic indicators by state for the year 2004. These data are output from REMI's base case economic forecast and serve as the reference point for the different port closures. Table 5 includes the economic indicators of Employment, GRP, Personal Income, Output, Imports, Exports, Wage Rates and Export Prices. Total employment consists of private, non-farm employment (that is, it excludes government and farm employment). To isolate the direct impacts (port-related jobs), Transportation employment is broken out from Non-Manufacturing employment. Transportation employment is further broken down into the two categories of Other Transportation (which includes Water Transportation) and Truck, Rail, and Air Transportation. The Export Price listed on the table is, in REMI, the variable called Relative Composite Price.

Figure 1 provides a visual comparison of the breakdown of employment by Manufacturing, Non-Manufacturing, and Transportation industries for each of the states of the Pacific Northwest. California and the Rest of the United States were left off the chart because of their relative sizes. As can be seen on the chart, Washington State has the largest employment levels in the Pacific Northwest at a total of 2.9 million. Oregon's total employment is 1.9 billion; Alaska's total employment is .3 billion; and British Columbia's total employment is 2.0 billion.

The Manufacturing industry makes up a much smaller portion of employment than does Non-Manufacturing for each of the areas. However, the Manufacturing industry is of particular interest because it is likely to be directly affected by the closure of a major port. In 2004, the REMI model projects Manufacturing employment to be approximately 348,000 (11.9% of total employment) in Washington; 240,000 (13.2% of total) in Oregon; 15,700 (4.8% of total) in Alaska; and 210,000 (10.3% of total) in British Columbia (See Table 5).

Economic Indicators by Area, Year 2004						
Base Case						
	Washington	Oregon	Alaska	California	British Columbia	Rest of US
Employment (Thou.)						
Total	2,919	1,889	329.4	16,847	2,027	122,526
Manufacturing	348	250	15.7	1,800	210	15,191
Non-Manuf., excl. Transp.	2,462	1,572	290.7	14,480	1,722	102,798
Other Transportation	26	11	6.2	120	32	701
Truck, Rail, and Air Transp.	84	56	16.8	446	63	3,837
GRP (Bil Fixed 99\$)	200.6	128.8	23.7	1,167.7	112.3	8,345
Personal Income (Bil Nom \$)	210.0	119.3	24.2	1,271.1	88.3	8,297
Output (Bil Fixed 99\$)	303.9	206.0	32.4	1,820.1	197.4	13,419
Imports (Bil Fixed 99\$)	82.7	50.5	8.6	331.6	48.8	1,423
Exports (Bil Fixed 99\$)	82.2	63.9	7.9	321.3	45.6	1,341
Wage Rate (Thou. Nom \$)	36.6	29.6	28.2	35.2	27.8	32.8
Export Price (\$/\$)	3.5	2.9	12.8	1.2	1.4	0.8

Table 5: Economic Indicators by Area, Base Case

Projected Employment in Pacific Northwest, 2004 **Base Case**

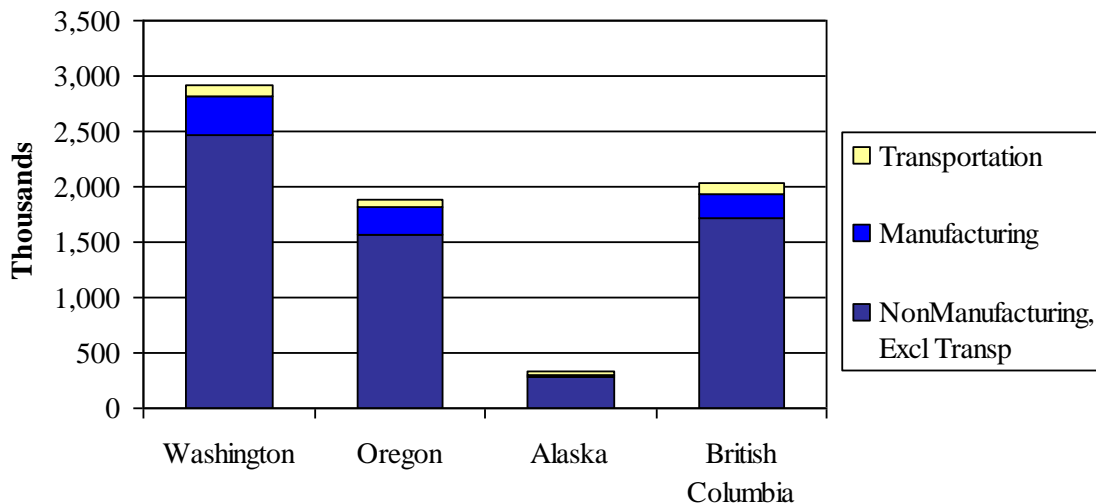


Figure 1: Projected Employment in PNW, Base Case

Manufacturing Employment in PNW, 2004 Base Case

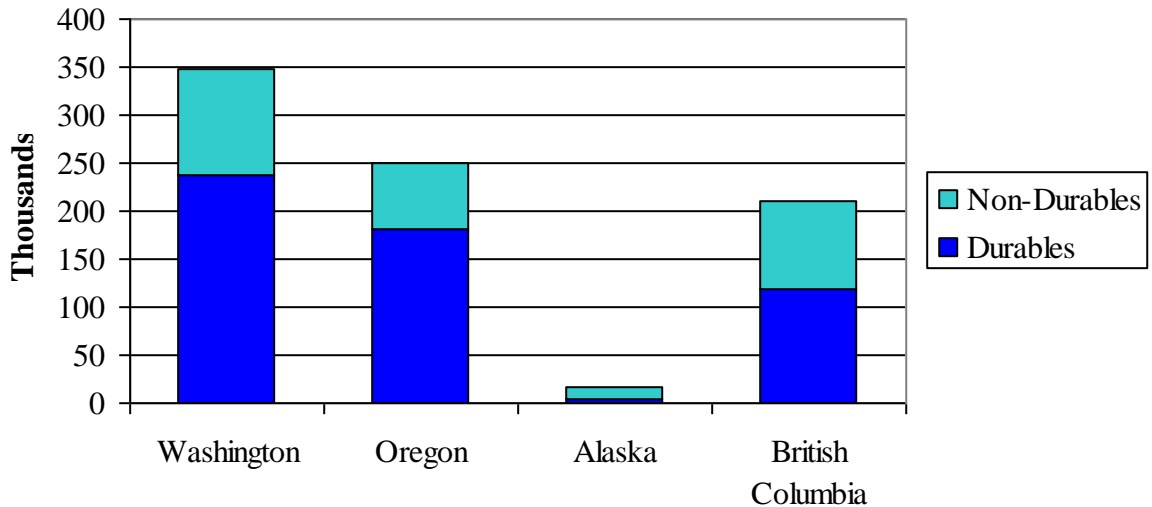


Figure 2: Manufacturing Employment in PNW, 2004

Figure 2 shows the break down of the Manufacturing jobs into Durables compared to Non-Durables employment for each of the areas of the Pacific Northwest. Except in Alaska, employment in the Durables industry is larger than in the Non-Durables industry. Durables employment makes up 68% (approximately 237,000) of total manufacturing employment in Washington, 73% (182,000) in Oregon, 28% (4,000) in Alaska, and 57% (119,000) in British Columbia. The data for this chart can be found in the state employment tables (Table 8 for Washington, Table 12 for Oregon, Table 16 for Alaska, and the Appendix for British Columbia).

Table 6 reports the REMI model's baseline levels of trade flows by area. This table shows the supply sources to each region. For example, looking at the first column, we see that Washington's Demand is \$289.95 billion. In order to supply Washington's Demand, Washington self-produces \$207.2 billion and imports \$8.3 billion from Oregon, \$0.2 billion from Alaska, \$11.1 billion from California, \$6.8 billion from British Columbia, \$36.6 billion from the Rest of U.S. and Canada, and \$19.9 billion from the Rest of the World.

The last column in Table 6 sums the flows to get total Exports by area. Total Exports are \$82.2 billion in Washington, \$63.9 billion in Oregon, \$7.9 billion in Alaska, \$321.3 billion in California, \$45.6 billion in British Columbia, and \$1,084 billion in the Rest of U.S. and Canada.

The last row in the table shows total Imports by area. Imports total \$82.8 billion in Washington, \$50.5 billion in Oregon, \$8.6 billion in Alaska, \$331.6 billion in California,

\$48.8 in British Columbia, and \$263.5 billion in the Rest of the U.S. and Canada. All values are reported for the year 2004 and are in billions of fixed 1999 dollars.

2004 Trade Flows (Bil. Fixed \$99)									
Base Case									
	Wash- ington	Oregon	Alaska	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Washington	207.20	6.55	0.30	11.08	6.92	36.93	20.44	289.43	82.23
Oregon	8.25	135.31	0.16	10.82	4.23	27.28	13.18	199.22	63.91
Alaska	0.20	0.10	24.46	0.84	0.14	5.38	1.23	32.35	7.89
California	11.07	8.20	0.95	1,384.94	7.94	174.81	118.33	1,706.25	321.31
BC	6.76	2.41	0.14	7.78	151.82	19.08	9.45	197.44	45.62
Rest of US&CN	36.61	19.99	4.99	176.12	17.43	12,611.98	828.93	13,696.05	1,084.07
Rest of World	19.86	13.27	2.10	124.93	12.10	969.68			
Demand	289.95	185.83	33.10	1,716.50	200.59	13,845.15			
Imports	82.75	50.52	8.64	331.56	48.77	263.48			

Table 6: 2004 Trade Flows, Base Case

The next sections provide more detail about each of the states of Washington, Oregon and Alaska. They show, for each state, the expected economic growth between 2004 and 2010. The largest industries are identified in each of the states based on employment in Manufacturing (Durable and Non-Durable) industries as well as in Non-Manufacturing industries. Finally, the largest imports and exports through the major port(s) are identified for each of the states.

Baseline Conditions for State of Washington

Table 7 shows the expected economic growth in Washington between 2004 and 2010 before the closure of any ports. Whereas total employment is expected to grow at a rate of 1.16%, Manufacturing employment is expected to decline at a rate of 1.38% and Non-Manufacturing employment (excluding transportation) is expected to grow at 1.47%. Other economic indicators show steady growth over the study period. GRP at a rate of 1.88%; Personal Income at 4.62%; Output at 2.09%; Wage Rate at 3.92%; and Export Price at 0.18%.

Economic Indicators for State of Washington								
Base Case								
	2004	2005	2006	2007	2008	2009	2010	Growth Rate
Employment (Thou.)								
Total	2,919.1	2,948.2	2,984.7	3,016.1	3,056.5	3,091.4	3,129.8	1.16%
Manufacturing	347.6	342.3	337.7	332.8	328.5	323.9	320.1	-1.38%
Non-Manuf., excl. Transp.	2,462.1	2,494.7	2,533.7	2,568.1	2,610.7	2,648.4	2,688.6	1.47%
Other Transportation	25.7	26.1	26.5	26.8	27.2	27.6	27.9	1.36%
Truck, Rail, and Air Transp.	83.6	85.1	86.7	88.3	90.0	91.6	93.1	1.79%
GRP (Bil Fixed 99\$)	200.6	204.2	208.2	212.1	216.4	220.4	224.6	1.88%
Personal Income (Bil Nom \$)	210.0	219.6	230.2	240.8	252.7	264.6	277.1	4.62%
Output (Bil Fixed 99\$)	303.9	310.0	316.8	323.2	330.5	337.3	344.5	2.09%
Imports (Bil Fixed 99\$)	82.7	NA	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	82.2	NA	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	36.6	38.1	39.6	41.2	42.9	44.6	46.3	3.92%
Export Price (\$/\$)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	0.18%

Table 7: Economic Indicators for State of Washington

In order to identify the key industries in the State of Washington based on employment, Table 8 is included below. Table 8 provides a breakdown of Washington's expected employment levels over the years 2004-2010 for each industry (by 2-digit SIC categories).

Calculated from Table 8, we see that in 2004 the Durables industries make up 68% of all Manufacturing employment in Washington (237,101 jobs) compared to Non-Durables making up 32% of all Manufacturing employment (110,538 jobs).

Employment in State of Washington							
BaseCase							
	2004	2005	2006	2007	2008	2009	2010
<i>Total</i>	2,919,066	2,948,202	2,984,672	3,016,117	3,056,487	3,091,395	3,129,783
Manufacturing	347,638	342,331	337,725	332,847	328,511	323,896	320,097
Durables	237,101	232,710	228,798	224,793	221,080	217,194	214,062
Lumber	42,302	42,764	43,303	43,776	44,311	44,751	45,184
Furniture	5,393	5,333	5,284	5,227	5,181	5,126	5,074
Stone,Clay,Etc.	8,654	8,473	8,317	8,148	8,003	7,843	7,692
Primary Metals	10,010	9,817	9,642	9,462	9,291	9,106	8,930
Fabricated Metals	14,963	14,788	14,646	14,479	14,345	14,185	14,047
Machine&Computers	18,486	18,084	17,729	17,350	17,015	16,654	16,315
Electric Equip	10,571	9,894	9,272	8,685	8,135	7,606	7,112
Motor Vehicles	5,858	5,846	5,848	5,839	5,844	5,836	5,833
Transp Equip	94,994	92,073	89,310	86,591	83,914	81,281	79,307
Instruments	14,136	13,958	13,793	13,628	13,453	13,258	13,057
Misc. Manufact	11,735	11,680	11,653	11,608	11,589	11,547	11,511
Non-Durables	110,538	109,620	108,927	108,055	107,431	106,702	106,035
Food	43,745	43,560	43,447	43,234	43,134	43,031	42,941
Tobacco Manuf	0	0	0	0	0	0	0
Textiles	791	769	749	728	708	687	667
Apparel	6,720	6,355	6,023	5,700	5,406	5,117	4,845
Paper	14,743	14,626	14,532	14,415	14,319	14,197	14,075
Printing	27,648	27,694	27,798	27,857	27,974	28,037	28,116
Chemicals	5,806	5,741	5,686	5,625	5,569	5,503	5,439
Petro Products	1,949	1,911	1,876	1,841	1,807	1,770	1,733
Rubber	8,669	8,524	8,397	8,260	8,138	8,004	7,881
Leather	466	441	418	396	376	356	338
Non-Manufacturing	2,571,428	2,605,871	2,646,947	2,683,270	2,727,976	2,767,499	2,809,687
Mining	4,732	4,679	4,631	4,580	4,528	4,469	4,406
Construction	214,855	218,969	224,077	228,486	234,332	239,695	245,598
Trans.&Public Util.	166,449	168,437	170,782	172,976	175,454	177,653	179,921
Fin&Ins&Real Est	261,676	262,757	264,351	265,902	267,890	269,474	271,136
Retail Trade	589,217	594,032	600,528	605,554	612,951	619,013	625,639
Wholesale Trade	157,264	156,190	155,443	154,457	153,789	152,832	151,973
Services	1,107,034	1,128,806	1,153,167	1,175,438	1,201,080	1,224,439	1,249,073
Agri&For&Fish Serv	70,202	72,001	73,967	75,877	77,951	79,923	81,941

Table 8: Employment in State of Washington

Figure 3 provides a picture of the Durables industries that have the largest employment in 2004. The top five Durables industries based on employment in the State of Washington are: Transportation Equipment, excluding motor vehicles, (94,994 jobs – 41%), Lumber (42,302 jobs – 18%), Machinery and Computers (18,486 jobs – 8%), Fabricated Metals (14,963 jobs – 6%), and Instruments (14,136 jobs – 6%).

Figure 4 shows a pie chart of employment in the Non-Durables industries. This chart identifies the top five Non-Durables industries in Washington to be: Food (43,745 jobs – 40%), Printing (27,648 jobs – 25.0%), Paper (14,743 jobs – 13%), Rubber (8,669 jobs – 8%), and Apparel (6,720 jobs – 6%).

**Manufacturing Employment (Durables), 2004
Base Case - Washington**

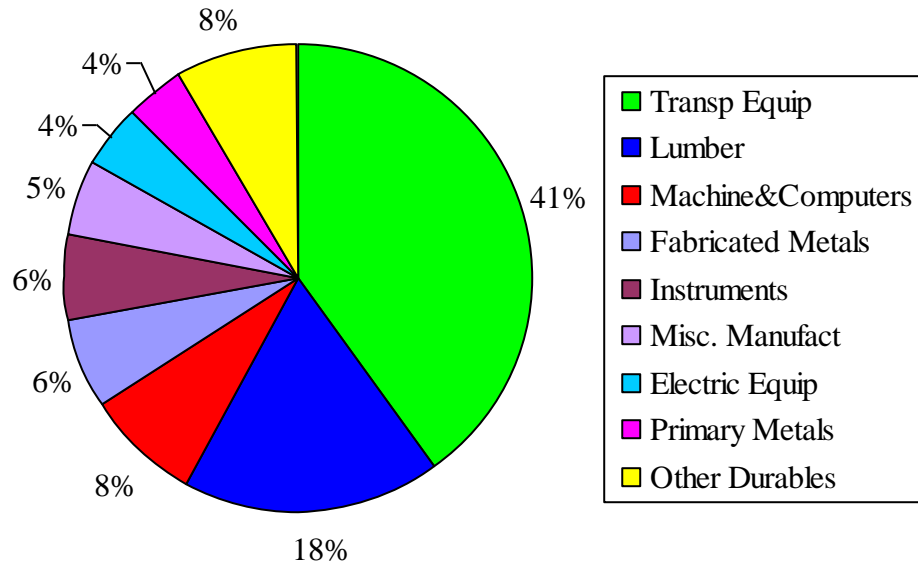


Figure 3: Manufacturing Employment (Durables), Base Case - WA

**Manufacturing Employment (Non-Durables), 2004
Base Case - Washington**

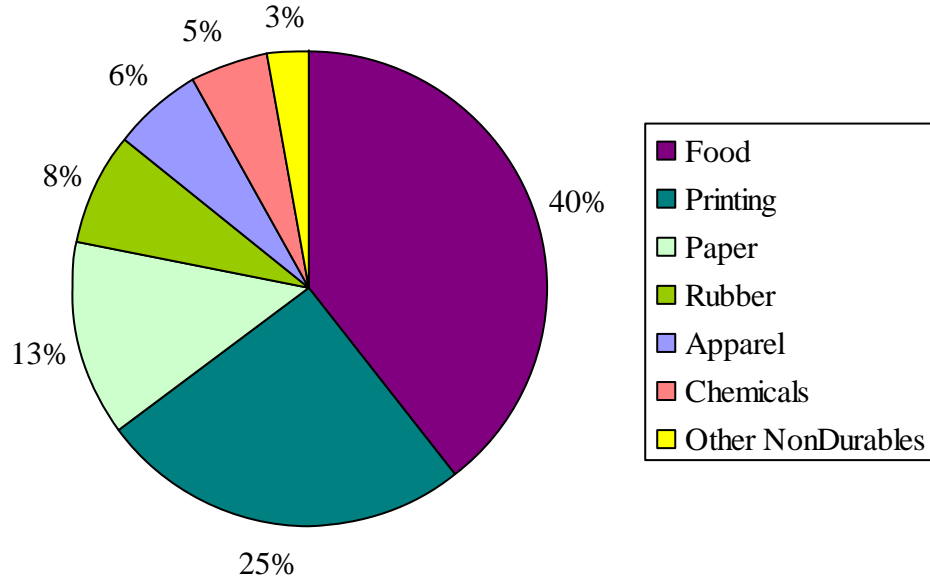


Figure 4: Manufacturing Employment (Non-Durables), Base Case - WA

In the State of Washington, Non-Manufacturing employment is expected to be 88% of total employment (2.6 million) in 2004 – see Table 8. Figure 5 shows the breakdown of Non-Manufacturing industries based on employment. The top five Non-Manufacturing

industries in Washington are: Services (1.1 million jobs - 44%), Retail Trade (589,217 jobs - 23%), Finance, Insurance and Real Estate (261,676 - 10%), Construction (214,855 - 8%), and Transportation and Public Utilities (166,449 - 6%).

**Non-Manufacturing Employment, 2004
Base Case - Washington**

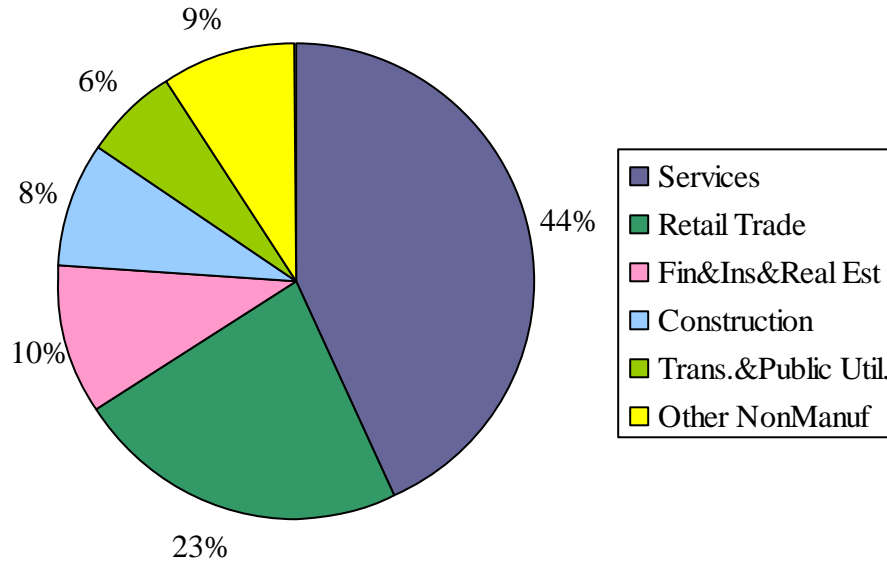


Figure 5: Non-Manufacturing Employment, Base Case - WA

To obtain information about the expected top imports and exports into Washington’s largest port complex of Seattle/Tacoma, we use historical trade data from the U.S. Army Corps of Engineers, *Waterborne Commerce of the United States*. These data are reported by tonnage, not dollar value. Dollar values for trade data by commodity are obtained from the U.S. Bureau of the Census, Foreign Trade Division. National average dollar values by commodity are then applied to the port flow data to obtain estimated dollar values of trade data. The U.S. Army Corps of Engineer’s port data is categorized using the Standard Transportation Commodity Classification (STCC) system. These categories are mapped over to the 2-digit SIC codes that are used in the REMI model. All port data reported below are from the year 2000 and are reported in 2000\$.

Table 9 lists the top ten imports based on value to the Port of Seattle/Tacoma. Shipping weight is also shown for each of the ten commodities. Based on value the top imports to the Port of Seattle/Tacoma are Machinery and Computers (\$10.6 billion), Miscellaneous Manufacturing (\$10.6 billion), and Motor Vehicles (\$8.9 billion). Based on tonnage, the top imports to the Port of Seattle/Tacoma are Mining (Crude Oil) - from “Other” category – (8.2 million tons) and Petroleum Products (4.9 million tons), Lumber - from “Other” category (3.4 million tons), and Miscellaneous Manufacturing (2.2 million tons).

Foreign & Domestic Imports, 2000		
Port of Seattle/Tacoma		
	Tons	Dollars
	(Thousands)	(Thousands)
Machinery & Computers	1,187	10,629,371
Misc. Manufacturing	2,233	10,602,730
Motor Vehicles	928	8,947,934
Apparel	491	4,102,659
Transportation Equipment	21	1,597,099
Fabricated Metals	631	1,456,865
Food	609	1,147,528
Petro Products	4,874	1,041,287
Primary Metals	479	965,537
Chemicals	386	903,896
Other	12,982	2,063,635

Table 9: Foreign & Domestic Imports, Port of Seattle/Tacoma

Table 10 lists the top ten exports (based on value) through the Port of Seattle/Tacoma. Shipping weight is also shown for each of the ten commodities. Based on value the top exports through the Port of Seattle/Tacoma are Miscellaneous Manufacturing (\$15.4 billion), Food (\$4.2 billion), and Machinery and Computers (\$2.0 billion). Based on tonnage, the top exports to the Port of Seattle/Tacoma are Food (11.3 million tons), Lumber (4.4 million tons), and Miscellaneous Manufacturing (2.0 million tons).

Foreign & Domestic Exports, 2000		
Port of Seattle/Tacoma		
	Tons	Dollars
	(Thousands)	(Thousands)
Misc. Manufacturing	2,027	15,422,916
Food	11,319	4,185,333
Machinery & Computers	218	1,996,993
Primary Metals	346	1,895,877
Chemicals	771	1,307,878
Lumber	4,410	1,077,040
Motor Vehicles	122	1,024,421
Fabricated Metals	179	805,221
Paper	1,430	771,037
Petro Products	1,791	326,553
Other	684	950,799

Table 10: Foreign & Domestic Exports, Port of Seattle/Tacoma

The above tables and charts provide an overview of Washington's economic condition before the closure of any ports. The key Manufacturing industries based on employment are identified. For Durables, those top industries are Transportation Equipment, Lumber, Machinery & Computers, Fabricated Metals and Instruments. For Non-Durables the top industries are Food, Printing, Paper, Rubber and Apparel. The largest Non-Manufacturing Industries, based on employment, are identified and ranked as follows: Services, Retail Trade, Finance-Insurance-and-Real Estate, Construction, and Transportation and Public Utilities. Major Imports and Exports to the State of Washington through the Port of Seattle/Tacoma are also identified. The top Imports based on value are Machinery & Computers, Miscellaneous Manufacturing, and Motor Vehicles. The top Exports based on value are Miscellaneous Manufacturing, Food, and Machinery & Computers.

Baseline Conditions for Oregon

Table 11 shows the expected economic growth in Oregon between 2004 and 2010 before the closure of any ports. Whereas total employment is expected to grow at a rate of 1.12%, Manufacturing employment is expected to decline at a rate of 1.05% and Non-Manufacturing employment (excluding transportation) is expected to grow at 1.41%. Other economic indicators show steady growth over the study period. GRP at a rate of 2.03%; Personal Income at 4.50%; Output at 2.28%; Wage Rate at 3.96%; and Export Price at 0.17%.

Economic Indicators for State of Oregon								
Base Case								
	2004	2005	2006	2007	2008	2009	2010	Growth Rate
Employment (Thou.)								
Total	1,889.2	1,906.4	1,929.5	1,949.5	1,975.3	1,997.4	2,019.9	1.12%
Manufacturing	250.1	247.1	244.7	242.0	239.8	237.3	234.9	-1.05%
Non-Manuf., excl. Transp.	1,571.9	1,591.2	1,615.5	1,636.9	1,663.7	1,687.2	1,711.0	1.41%
Other Transportation	11.0	11.1	11.3	11.4	11.6	11.7	11.9	1.35%
Truck, Rail, and Air Transp.	56.1	57.1	58.1	59.1	60.2	61.2	62.1	1.69%
GRP (Bil Fixed 99\$)	128.8	131.3	134.1	136.8	139.8	142.6	145.5	2.03%
Personal Income (Bil Nom \$)	119.3	124.5	130.4	136.2	142.8	149.4	156.2	4.50%
Output (Bil Fixed 99\$)	206.0	210.4	215.5	220.4	225.8	231.0	236.2	2.28%
Imports (Bil Fixed 99\$)	50.5	NA	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	63.9	NA	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	29.6	30.8	32.1	33.3	34.7	36.1	37.5	3.96%
Export Price (\$/\$)	2.9	2.9	2.9	3.0	3.0	3.0	3.0	0.17%

Table 11: Economic Indicators for State of Oregon, Base Case

In order to identify the key industries, based on employment, in the State of Oregon, Table 12 is included below. Table 12 provides a breakdown of Oregon's expected employment levels over the years 2004-2010 for each industry (by 2-digit SIC categories).

Calculated from Table 12, we see that in 2004 the Durables industries make up 73% of all Manufacturing employment in Oregon (181,554 jobs) compared to Non-Durables making up 27% of all Manufacturing employment (68,568 jobs).

Employment in State of Oregon							
BaseCase							
	2004	2005	2006	2007	2008	2009	2010
<i>Total</i>	<i>1,889,155</i>	<i>1,906,404</i>	<i>1,929,523</i>	<i>1,949,467</i>	<i>1,975,318</i>	<i>1,997,434</i>	<i>2,019,916</i>
Manufacturing	250,122	247,084	244,659	241,989	239,810	237,307	234,920
Durables	181,554	179,029	176,957	174,750	172,882	170,776	168,781
Lumber	58,148	58,783	59,525	60,164	60,895	61,490	62,067
Furniture	4,752	4,700	4,659	4,610	4,571	4,522	4,473
Stone,Clay,Etc.	5,864	5,748	5,651	5,543	5,452	5,351	5,250
Primary Metals	11,115	10,943	10,791	10,627	10,475	10,305	10,136
Fabricated Metals	16,229	16,103	16,017	15,901	15,823	15,710	15,598
Machine&Computers	21,213	20,771	20,382	19,962	19,592	19,186	18,788
Electric Equip	29,982	28,128	26,415	24,794	23,262	21,784	20,381
Motor Vehicles	10,665	10,636	10,633	10,607	10,607	10,583	10,560
Transp Equip	7,297	7,078	6,872	6,668	6,466	6,268	6,120
Instruments	10,283	10,157	10,040	9,922	9,795	9,653	9,500
Misc. Manufact	6,006	5,981	5,970	5,950	5,943	5,925	5,906
Non-Durables	68,568	68,055	67,702	67,240	66,928	66,532	66,140
Food	22,135	22,033	21,977	21,872	21,825	21,771	21,718
Tobacco Manuf	0	0	0	0	0	0	0
Textiles	1,272	1,238	1,208	1,176	1,146	1,115	1,084
Apparel	3,085	2,917	2,764	2,616	2,480	2,346	2,220
Paper	10,303	10,237	10,190	10,127	10,080	10,014	9,944
Printing	19,696	19,725	19,803	19,849	19,937	19,985	20,034
Chemicals	3,806	3,766	3,732	3,694	3,660	3,619	3,577
Petro Products	401	394	388	382	375	369	362
Rubber	7,521	7,417	7,330	7,232	7,148	7,050	6,953
Leather	347	327	310	293	277	262	247
Non-Manufacturing	1,639,032	1,659,319	1,684,864	1,707,478	1,735,508	1,760,127	1,784,996
Mining	3,618	3,580	3,546	3,508	3,471	3,427	3,381
Construction	137,738	140,217	143,483	146,304	150,119	153,603	157,213
Trans.&Public Util.	101,400	102,652	104,150	105,550	107,136	108,545	109,941
Fin&Ins&Real Est	173,734	174,210	175,047	175,915	177,003	177,834	178,599
Retail Trade	383,362	385,788	389,583	392,418	396,862	400,416	404,010
Wholesale Trade	99,869	99,305	98,989	98,516	98,260	97,804	97,332
Services	690,900	703,960	719,143	733,058	749,065	763,596	778,307
Agri&For&Fish Serv	48,410	49,607	50,924	52,208	53,592	54,901	56,212

Table 12: Employment in State of Oregon, Base Case

Figure 6 provides a picture of the Durables industries that have the largest employment in 2004. The top five Durables industries based on employment in the State of Oregon are: Lumber (58,148 jobs – 31%), Electrical Equipment (29,982 jobs – 17%), Machinery and Computers (21,213 jobs – 12%), Fabricated Metals (16,229 jobs – 9%), and Primary Metals (11,115 jobs – 6%).

Figure 7 shows a pie chart of employment in the Non-Durables industries. This chart identifies the top five Non-Durables industries in Oregon to be: Food (22,135 jobs – 32%), Printing (19,696 jobs – 29%), Paper (10,303 jobs – 15%), Rubber (7,521 jobs – 11%), and Apparel (3,085 jobs – 4%).

**Manufacturing Employment (Durables), 2004
Base Case - Oregon**

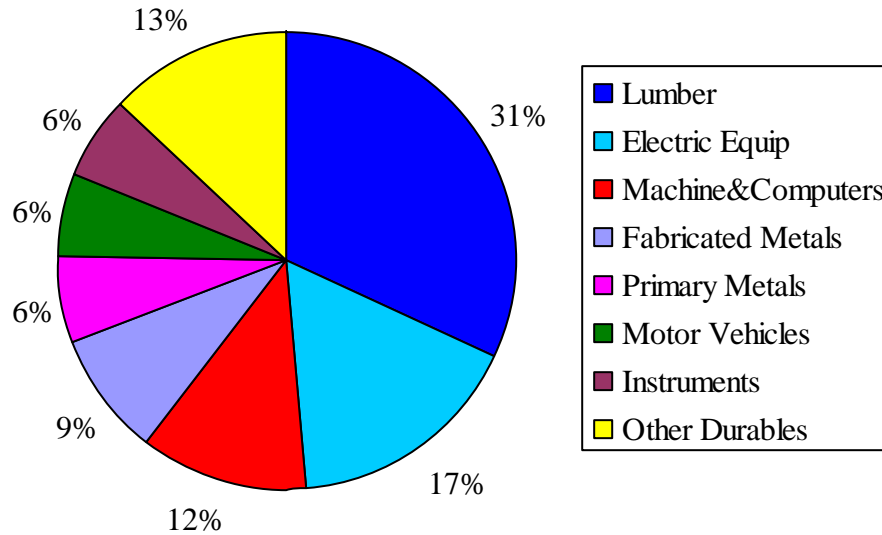


Figure 6: Manufacturing Employment (Durables), Base Case - OR

**Manufacturing Employment (Non-Durables), 2004
Base Case - Oregon**

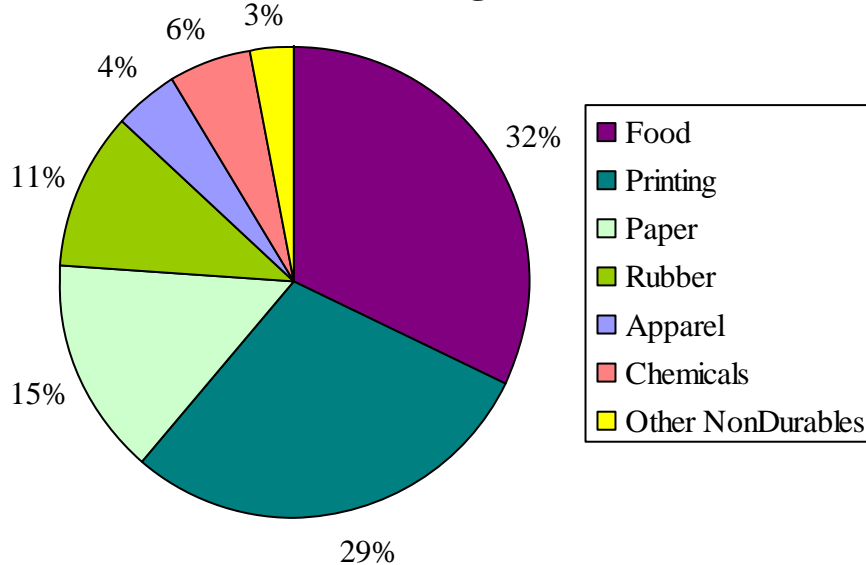


Figure 7: Manufacturing Employment (Non-Durables), Base Case - OR

In the State of Oregon, Non-Manufacturing employment is expected to be 87% of total employment (1.6 million) in 2004 – see Table 12. Figure 8 shows the breakdown of

Non-Manufacturing industries based on employment. The top five Non-Manufacturing industries in Oregon are: Services (690,900 jobs or 43%), Retail Trade (383,362 jobs or 23%), Finance, Insurance and Real Estate (173,734 or 11%), Construction (137,738 or 8%), and Transportation and Public Utilities (101,400 or 6%).

**Non-Manufacturing Employment, 2004
Base Case - Oregon**

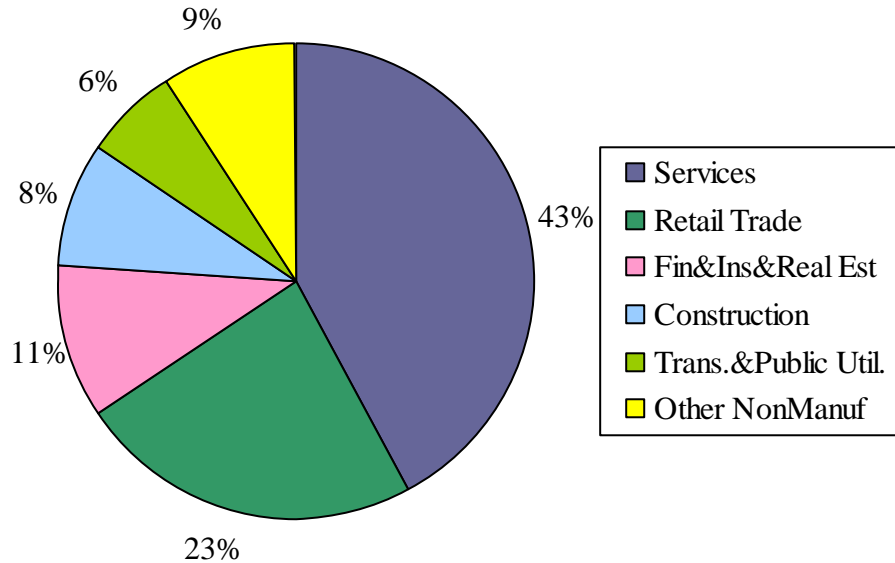


Figure 8: Non-Manufacturing Employment, Base Case - OR

To obtain information about the expected top imports and exports into Oregon’s largest port, the Port of Portland, we use historical trade data from the U.S. Army Corps of Engineers, *Waterborne Commerce of the United States*. These data are reported by tonnage, not dollar value. Dollar values for trade data by commodity are obtained from the U.S. Bureau of the Census, Foreign Trade Division. National average dollar values by commodity are then applied to the port flow data to obtain estimated dollar values of trade data. The U.S. Army Corps of Engineer’s port data is categorized using the Standard Transportation Commodity Classification (STCC) system. These categories were are over to the 2-digit SIC codes that are used in the REMI model. All port data reported below are from the year 2000 and are reported in 2000\$.

Table 13 lists the top ten imports to the Port of Portland based on value. Shipping weight is also shown for each of the ten commodities. Based on value the top imports to the Port of Portland are Motor Vehicles (\$8.6 billion), Petroleum Products (\$1.7 billion), and Machinery & Computers (\$1.3 billion). Based on tonnage, the top imports to the Port of Portland are Petroleum Products (8.1 million tons), Food (5.2 million tons), and Mining (Crude Oil) - from “Other” category – (4.1 million tons).

Foreign & Domestic Imports, 2000		
Port of Portland		
	Tons	Dollars
	(Thousands)	(Thousands)
Motor Vehicles	897	8,649,026
Petro Products	8,105	1,714,079
Machinery & Computers	132	1,283,704
Rubber	427	995,491
Food	5,192	848,003
Misc. Manufact	116	550,368
Fabricated Metals	232	535,646
Apparel	26	217,249
Chemicals	428	183,112
Lumber	478	157,335
Other	4,696	413,293

Table 13: Foreign & Domestic Imports, Port of Portland

Table 14 lists the top ten exports (based on value) through the Port of Portland. Shipping weight is also shown for each of the ten commodities. Based on value the top exports through the Port of Portland are Food (\$2.0 billion), Chemicals (\$1.4 billion), and Petroleum Products (\$.8 billion). Based on tonnage, the top exports to the Port of Portland are Food (11.8 million tons), Chemicals (4.2 million tons), and Petroleum Products (3.4 million tons).

Foreign & Domestic Exports, 2000		
Port of Portland		
	Tons	Dollars
	(Thousands)	(Thousands)
Food	11,772	1,975,900
Chemicals	4,242	1,359,953
Petro Products	3,413	815,969
Machinery & Computers	75	716,166
Paper	1,077	556,264
Primary Metals	91	473,473
Mining (Crude Oil)	2,306	367,714
Lumber	612	359,733
Motor Vehicles	38	319,082
Rubber	76	209,958
Other	325	465,093

Table 14: Foreign & Domestic Exports, Port of Portland

The above tables and charts provide an overview of Oregon's economic condition before the closure of any ports. Key Manufacturing industries, based on employment are identified. For Durables, those top industries are Lumber, Electrical Equipment, Machinery & Computers, Fabricated Metals and Primary Metals. For Non-Durables the top industries are Food, Printing, Paper, Rubber, and Apparel. The largest Non-Manufacturing Industries, based on employment, are identified and ranked as follows: Services, Retail Trade, Finance-Insurance-and-Real Estate, Construction, and Transportation and Public Utilities. Major Imports and Exports to the State of Oregon through the Port of Portland are also identified. The top Imports based on value are Motor Vehicles, Petroleum Products, and Machinery & Computers. The top Exports based on value are Food, Chemicals and Petroleum Products.

Baseline Conditions for Alaska

Table 15 shows the expected economic growth in Alaska between 2004 and 2010 before the closure of any ports. Whereas total employment is expected to grow at a rate of 0.61%, Manufacturing employment is expected to decline at a rate of 1.57% and Non-Manufacturing employment (excluding transportation) is expected to grow at 0.66%. Other economic indicators show steady growth over the study period. GRP at a rate of 1.08%; Personal Income at 5.29%; Output at 0.98%; Wage Rate at 3.91%; and Export Price at 1.33%.

Economic Indicators for State of Alaska								
Base Case								
	2004	2005	2006	2007	2008	2009	2010	Growth Rate
Employment (Thou.)								
Total	329.4	331.8	334.7	336.6	339.0	340.5	341.8	0.61%
Manufacturing	15.7	15.5	15.3	15.0	14.8	14.5	14.3	-1.57%
Non-Manuf., excl. Transp.	290.7	293.0	295.7	297.5	299.8	301.1	302.4	0.66%
Other Transportation	6.2	6.2	6.3	6.3	6.4	6.4	6.4	0.78%
Truck, Rail, and Air Transp.	16.8	17.1	17.5	17.8	18.1	18.4	18.6	1.70%
GRP (Bil Fixed 99\$)	23.7	24.0	24.3	24.6	24.8	25.1	25.3	1.08%
Personal Income (Bil Nom \$)	24.2	25.6	27.1	28.6	30.2	31.7	33.3	5.29%
Output (Bil Fixed 99\$)	32.4	32.7	33.1	33.5	33.8	34.1	34.3	0.98%
Imports (Bil Fixed 99\$)	8.6	NA	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	7.9	NA	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	28.2	29.4	30.5	31.7	33.0	34.3	35.7	3.91%
Export Price (\$/\$)	12.8	13.0	13.2	13.4	13.6	13.7	13.9	1.33%

Table 15: Economic Indicators for State of Alaska, Base Case

In order to identify the key industries in the State of Alaska based on employment, Table 16 is included below. Table 16 provides a breakdown of Alaska's expected employment levels over the years 2004-2010 for each industry (by 2-digit SIC categories).

Alaska's Manufacturing employment is different than Washington's and Oregon's Manufacturing employment in that its Non-Durables industry is larger than its Durables industry. Calculated from Table 16, we see that in 2004 the Durables industries make up 28% of all Manufacturing employment in Alaska (4,398 jobs) compared to Non-Durables making up 72% of all Manufacturing employment (11,306 jobs).

Employment in Alaska BaseCase							
	2004	2005	2006	2007	2008	2009	2010
<i>Total</i>	329,424	331,833	334,739	336,585	339,030	340,455	341,788
Manufacturing	15,704	15,475	15,269	15,014	14,790	14,541	14,292
Durables	4,398	4,327	4,262	4,185	4,116	4,037	3,960
Lumber	2,282	2,280	2,279	2,271	2,266	2,253	2,240
Furniture	102	99	97	94	91	88	85
Stone,Clay,Etc.	407	392	379	364	351	337	324
Primary Metals	49	47	45	43	41	39	38
Fabricated Metals	385	374	364	352	342	330	319
Machine&Computers	94	89	85	81	78	74	70
Electric Equip	44	40	37	34	31	28	26
Motor Vehicles	7	7	7	7	7	7	6
Transp Equip	506	484	464	443	423	404	386
Instruments	15	15	14	14	14	13	13
Misc. Manufact	507	499	491	482	473	463	452
Non-Durables	11,306	11,148	11,007	10,829	10,674	10,504	10,332
Food	8,336	8,224	8,126	7,998	7,891	7,774	7,657
Tobacco Manuf	15	16	16	16	17	17	17
Textiles	17	17	16	15	15	14	13
Apparel	220	206	192	179	166	155	143
Paper	66	64	63	61	60	58	57
Printing	1,983	1,971	1,960	1,942	1,927	1,905	1,883
Chemicals	232	226	221	215	209	203	197
Petro Products	385	376	367	357	347	337	327
Rubber	40	38	37	36	35	33	32
Leather	11	10	10	9	8	7	7
Non-Manufacturing	313,720	316,358	319,470	321,571	324,240	325,914	327,496
Mining	10,114	9,978	9,850	9,717	9,581	9,428	9,269
Construction	24,083	24,456	24,899	25,196	25,609	25,911	26,213
Trans.&Public Util.	34,519	34,947	35,426	35,844	36,292	36,655	36,996
Fin&Ins&Real Est	24,167	23,988	23,820	23,618	23,413	23,156	22,885
Retail Trade	65,253	65,557	66,007	66,149	66,485	66,548	66,566
Wholesale Trade	10,209	10,065	9,936	9,777	9,637	9,471	9,304
Services	126,773	128,445	130,276	131,721	133,363	134,621	135,882
Agri&For&Fish Serv	18,601	18,922	19,255	19,549	19,860	20,125	20,382

Table 16: Employment in Alaska, Base Case

Figure 9 provides a picture of the Durables industries that have the largest employment in 2004. The top five Durables industries based on employment in the State of Alaska are: Lumber (2,282 jobs - 52%), Miscellaneous Manufacturing (507 jobs - 12%), Transportation Equipment - excluding Motor Vehicles (506 jobs - 12%), Stone, Clay Etc (407 jobs - 9%), and Fabricated Metals (385 jobs - 9%).

Figure 10 illustrates the breakdown of employment in the Non-Durables industries. This chart identifies the top Non-Durables industries in Alaska to be: Food (8,336 jobs - 77%), Printing (1,983 jobs - 18%), and Petroleum Products (385 jobs - 4%)

**Manufacturing Employment (Durables), 2004
Base Case - Alaska**

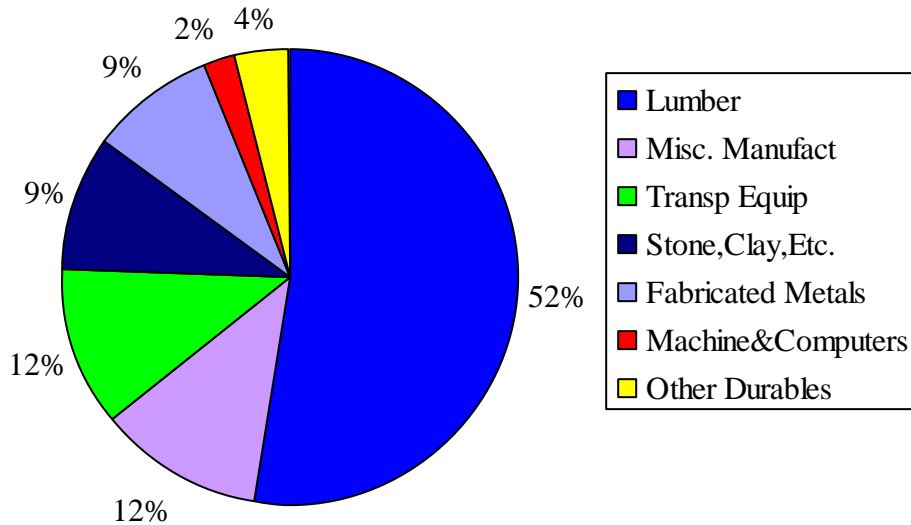


Figure 9: Manufacturing Employment (Durables), Base Case - AK

**Manufacturing Employment (Non-Durables), 2004
Base Case - Alaska**

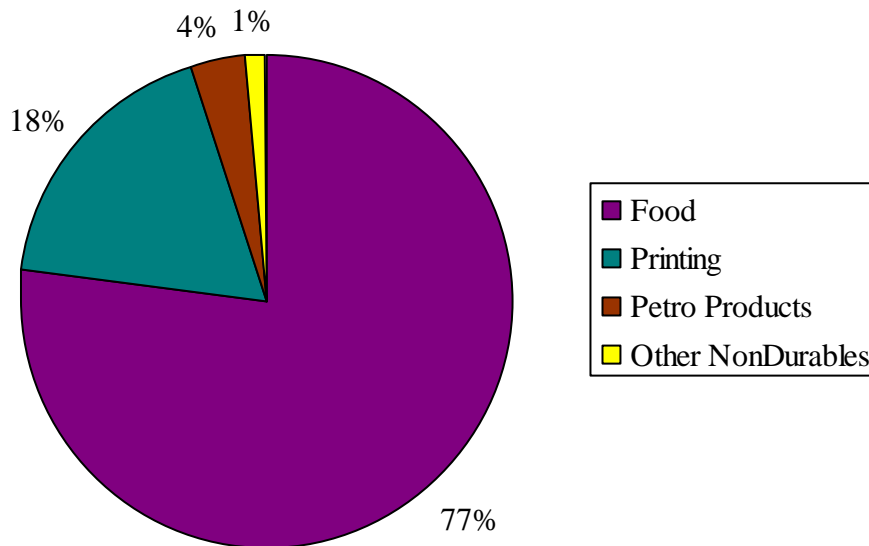


Figure 10: Manufacturing Employment (Non-Durables), Base Case - AK

In the State of Alaska, Non-Manufacturing employment is expected to be 95% of total employment (313,720) in 2004 (see Table 16). Figure 11 shows the breakdown of Non-

Manufacturing industries based on employment. The top five Non-Manufacturing industries in Alaska are: Services (126,773 jobs – 40%), Retail Trade (65,253 jobs - 21%), Transportation and Public Utilities (34,519 - 11%), Finance, Insurance and Real Estate (24,167 - 8%), and Construction (24,083 - 8%).

**Non-Manufacturing Employment, 2004
Base Case - Alaska**

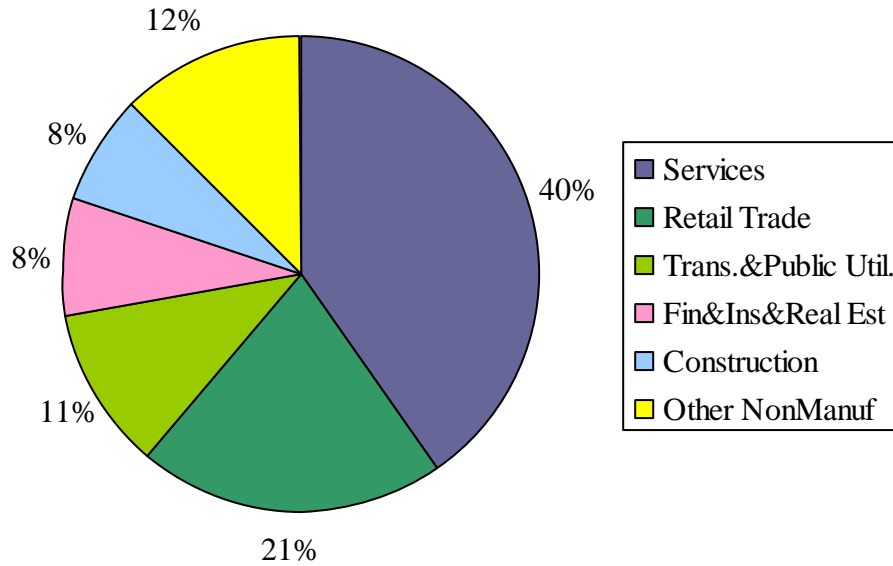


Figure 11: Non-Manufacturing Employment, Base Case - AK

To obtain information about the expected top imports and exports into the Ports of Alaska, we use historical trade data from the U.S. Army Corps of Engineers, *Waterborne Commerce of the United States*. These data are reported by tonnage, not dollar value. Dollar values for trade data by commodity are obtained from the U.S. Bureau of the Census, Foreign Trade Division. National average dollar values by commodity are then applied to the port flow data to obtain estimated dollar values of trade data. The U.S. Army Corps of Engineer’s port data is categorized using the Standard Transportation Commodity Classification (STCC) system. These categories are mapped over to the 2-digit SIC codes that are used in the REMI model. All port data reported below are from the year 2000 and are reported in 2000\$.

Table 17 lists the top ten imports to the Alaska Ports based on value. Shipping weight is also shown for each of the ten commodities. Based on value, the top imports to the Alaska Ports are Miscellaneous Manufacturing (\$5.4 billion), Food (\$0.7 billion), and Motor Vehicles (\$0.6 billion). Based on tonnage, the top imports to the Alaska Ports are Miscellaneous Manufacturing (1.2 million tons), Petroleum Products (899,000 tons), and Food (444,000 tons).

Foreign & Domestic Imports, 2000		
Ports of Alaska		
	Tons	Dollars
	(Thousands)	(Thousands)
Misc. Manufacturing	1,154	5,439,506
Food	444	744,966
Motor Vehicles	67	646,026
Petro Products	899	224,156
Lumber	371	206,892
Fabricated Metals	75	173,161
Machinery & Computers	19	153,307
Chemicals	59	71,054
Stone,Clay,Etc.	410	68,219
Mining (Crude Oil)	381	59,898
Other	24	64,397

Table 17: Foreign & Domestic Imports, Ports of Alaska

Table 18 lists the top ten exports, based on value, through the Alaska Ports. Shipping weight is also shown for each of the ten commodities. Based on value the top exports through the Alaska Ports are Mining (Crude Oil) (\$8.7 billion), Miscellaneous Manufacturing (\$1.6 billion), and Food (\$.97 billion). Based on tonnage, the top exports to the Alaska Ports are Mining (Crude Oil) (48.4 million tons) and Petroleum Products (1.0 million tons), Food (496,000 tons), and Stone, Clay, Etc. (462,000 tons).

Foreign & Domestic Exports, 2000		
Ports of Alaska		
	Tons	Dollars
	(Thousands)	(Thousands)
Mining (Crude Oil)	48,449	8,737,570
Misc. Manufacturing	201	1,599,519
Food	496	965,968
Petro Products	1,030	249,419
Motor Vehicles	23	193,129
Machinery & Computers	17	157,432
Lumber	347	79,760
Chemicals	141	61,457
Fabricated Metals	9	40,486
Stone,Clay, Etc.	462	34,397
Other	16	18,543

Table 18: Foreign & Domestic Exports, Ports of Alaska

The above tables and charts provide an overview of Alaska's economic condition before the closure of any ports. Key Manufacturing industries, based on employment are identified. For Durables, those top industries are Lumber, Miscellaneous Manufacturing, Transportation Equipment, Stone, Clay, Etc., and Fabricated Metals. For Non-Durables, the top industries are Food, Printing, and Petroleum Products. The largest Non-Manufacturing Industries, based on employment, are identified and ranked as follows: Services, Retail Trade, Finance-Insurance-and-Real Estate, Transportation and Public Utilities, and Construction. Major Imports and Exports to the State of Alaska through the Alaska Ports are also identified. The top Imports based on value are Miscellaneous Manufacturing, Food, and Motor Vehicles. The top Exports based on value are Mining (Crude Oil), Miscellaneous Manufacturing, and Food.

Impact to Washington and Oregon of Closing Port of Seattle/Tacoma

In this scenario the Port of Seattle/Tacoma is closed for the entire year of 2004. The port closure creates an increase in transportation costs, a reduction in port employment, and an increase in Trucking, Railroad, and Airline industry revenues in the region. The expected traffic through the Port of Seattle/Tacoma is either rerouted to another port or not shipped at all. The rerouting of trade increases the cost of goods and the cost of exporting goods due to the added transportation expense. The increase in the cost of goods, in turn, increases the cost of production for industries using those goods. In addition to costs increasing, revenues from the Trucking, Railroad, and Airline industry increase due to the need to move cargo to and from alternative ports. See the Methodology section for a detailed description of the assumptions made when simulating the closure of the Port of Seattle/Tacoma.

Closure of Port of Seattle/Tacoma: Overview Results

This section reports the impacts of the closure of the Port of Seattle/Tacoma on the states of Washington and Oregon. Impacts to other areas are also included as a reference. Table 19 provides a summary of the impact of the closure on several primary economic indicators by state. The impacts are defined as differences from the REMI model's base case conditions.

As can be seen in Table 19, the primary impacts of the closure of the Port of Seattle/Tacoma are the loss of 122,960 jobs in Washington and 38,060 jobs in Oregon while California and British Columbia pick up 38,825 and 6,001 jobs respectively. The job losses to Washington and Oregon include the loss of 23,420 (6.7%) Manufacturing jobs in Washington and 12,430 (5.0%) Manufacturing jobs in Oregon.

The direct loss of jobs (at the port) is in Water Transportation where 12,540 are lost in Washington while Oregon, California, and British Columbia all increase the number of Water Transportation jobs as their ports pick up the rerouted trade flows. California ports receive the bulk of the rerouted trade. Consequently, they pick up the bulk of the Water Transportation jobs and Trucking, Rail, and Air jobs. Trucking, Rail and Air jobs increase in all areas due to goods being transported to alternative ports.

As is also shown on the table, Economic Output drops nearly 5% in Washington and 3% in Oregon. The Output of California, British Columbia, and the Rest of the United States increases but not enough to offset the losses in Washington and Oregon. Washington has a loss of \$7.5 billion in GRP while Oregon has a GRP loss of \$2.8 billion. California and British Columbia show increases in GRP of \$2.1 billion and \$0.29 billion, respectively.

Impact on Economic Indicators by Area, Year 2004 Closure of Port of Seattle/Tacoma						
	Washington	Oregon	Alaska	California	British Columbia	Rest of US
Employment						
Total	-122,960	-38,060	-2,464	+38,825	+6,001	+3,896
Manufacturing	-23,420	-12,430	-144	+1,385	-365	-846
Non-Manuf., excl. Transp.	-87,148	-27,219	-2,207	+22,923	+1,865	+3,994
Water Transportation	-12,540	+1,237	-24	+11,170	+4,236	+21
Truck, Rail, and Air Transp.	+148	+352	-90	+3,347	+265	+726
GRP (Bil Fixed 99\$)	-7.544	-2.840	-0.123	+2.089	+0.288	+0.447
Personal Income (Bil Nom \$)	-6.097	-1.533	-0.084	+1.666	+0.168	+0.269
Output (Bil Fixed 99\$)	-14.660	-6.053	-0.226	+3.833	+0.511	+0.494
Imports (Bil Fixed 99\$)	-4.612	-1.769	-0.076	+0.738	+0.113	-0.050
Exports (Bil Fixed 99\$)	-4.990	-2.628	-0.014	+0.839	+0.132	+0.337
Wage Rate (Thou. Nom \$)	-0.397	-0.148	-0.001	+0.004	+0.002	0.000
Export Price (\$/\$)	+0.006	+0.004	+0.065	0.000	+0.001	0.000
Percent Difference						
Employment						
Total	-4.2%	-2.0%	-0.7%	+0.2%	+0.3%	0.0%
Manufacturing	-6.7%	-5.0%	-0.9%	+0.1%	-0.2%	0.0%
Non-Manuf., excl. Transp.	-3.5%	-1.7%	-0.8%	+0.2%	+0.1%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	+0.2%	+0.6%	-0.5%	+0.7%	+0.4%	0.0%
GRP	-3.8%	-2.2%	-0.5%	+0.2%	+0.3%	0.0%
Personal Income	-2.9%	-1.3%	-0.3%	+0.1%	+0.2%	0.0%
Output	-4.8%	-2.9%	-0.7%	+0.2%	+0.3%	0.0%
Imports	-5.6%	-3.5%	-0.9%	+0.2%	+0.2%	0.0%
Exports	-6.1%	-4.1%	-0.2%	+0.3%	+0.3%	0.0%
Wage Rate	-1.1%	-0.5%	0.0%	0.0%	0.0%	0.0%
Export Price	+0.2%	+0.1%	+0.5%	0.0%	0.0%	0.0%

Table 19: Impact on Economic Indicators by Area, Seattle/Tacoma Closure

The economic downturn from the closure of the Port of Seattle/Tacoma reduces the average Wage Rate in Washington by 1.1% and in Oregon by 0.5%. The loss of jobs and the reduction in the Wage Rate produce a drop in Personal Income in Washington (2.9%) and in Oregon (1.3%).

The increased cost of production and the increased cost of exporting goods through alternative ports increase the Export Price by 0.2% in Washington and 0.1% in Oregon. This reduces Exports in Washington (\$5.0 billion or 6.1%) and in Oregon (\$2.6 billion or 4.1%) while California and British Columbia show an increase in Exports of \$839 million (or 0.3%) and \$132 million (or 0.3%) respectively.

The reduction in Exports, Economic Output, and Personal Income produce a reduced demand for imported goods. Imports drop in Washington (5.6%) and Oregon (3.5%). In California where there is boost to the economy, Imports increase approximately 0.2%.

Table 20 shows the impact of the port closure on trade flows in 2004. This table shows the impacts to supply sources for each region. For example, looking at the first column, we see that closing the port causes Washington's Demand to drop by \$13.7 billion. The decrease in Demand translates into a decrease in Washington's self-supply as well as its level of Imports. Washington's self-supply decreases by \$9.1 billion, and its Imports drop by \$444 million from Oregon, \$8 million from Alaska, \$567 million from California, \$306 million from British Columbia, \$1.7 billion from the Rest of the United States and Canada, and \$1.3 billion from the Rest of the World.

Impact on Trade Flows (Bil. Fixed \$99) Closure of Port of Seattle/Tacoma, 2004									
	Wash- ington	Oregon	Alaska	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Washington	-9.098	-0.182	-0.002	0.012	0.011	0.054	-4.883	-14.09	-4.990
Oregon	-0.444	-3.223	-0.002	0.013	0.005	0.038	-2.239	-5.85	-2.628
Alaska	-0.008	-0.002	-0.212	0.001	0.000	-0.002	-0.002	-0.23	-0.014
California	-0.567	-0.261	-0.008	2.785	0.024	0.275	1.376	3.62	0.839
BC	-0.306	-0.055	-0.001	0.015	0.379	0.026	0.453	0.51	0.132
Rest of US&CN	-1.724	-0.608	-0.040	0.353	0.041	2.504	-0.032	0.49	-2.010
Rest of World	-1.266	-0.561	-0.015	0.296	0.032	-0.004			
Demand	-13.710	-4.991	-0.287	3.524	0.492	0.107			
Imports	-4.612	-1.769	-0.076	0.738	0.113	-2.393			
Percent Difference from Base Case									
	Wash- ington	Oregon	Alaska	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Washington	-4.4%	-2.8%	-0.7%	0.1%	0.2%	0.1%	-23.9%	-4.9%	-6.1%
Oregon	-5.4%	-2.4%	-1.1%	0.1%	0.1%	0.1%	-17.0%	-2.9%	-4.1%
Alaska	-4.1%	-2.2%	-0.9%	0.1%	0.0%	0.0%	-0.2%	-0.7%	-0.2%
California	-5.1%	-3.2%	-0.8%	0.2%	0.3%	0.2%	1.2%	0.2%	0.3%
BC	-4.5%	-2.3%	-0.8%	0.2%	0.2%	0.1%	4.8%	0.3%	0.3%
Rest of US&CN	-4.7%	-3.0%	-0.8%	0.2%	0.2%	0.0%	0.0%	0.0%	-0.2%
Rest of World	-6.4%	-4.2%	-0.7%	0.2%	0.3%	0.0%			
Demand	-4.7%	-2.7%	-0.9%	0.2%	0.2%	0.0%			
Imports	-5.6%	-3.5%	-0.9%	0.2%	0.2%	-0.9%			

Table 20: Impact on Trade Flows, Seattle/Tacoma Closure

The last row sums the impacts to each area's Imports. Total Imports drop in both Washington and Oregon. Washington's Imports drop by \$4.6 billion (5.6%), and Oregon's drop by \$1.8 billion (3.5%). Closing the Port of Seattle/Tacoma increases Imports to California and British Columbia by \$738 million and \$113 million, respectively.

The last column shows the total loss, or gain, of Exports by area. The total Exports for both Washington and Oregon decline. Washington's Exports drop by approximately \$5.0 billion (6.1%), and Oregon's drop by \$2.6 billion (4.1%). California's and British Columbia's Exports, on the other hand, both increase by \$738 million and \$113 million, respectively.

Closure of Port of Seattle/Tacoma - Washington Detail

With the closure of the Port of Seattle/Tacoma in the year 2004, we assume the port reopens in 2005 with no detrimental effects from the closure. We do not assume there is any need for rebuilding the port. Therefore there are essentially no long-term impacts to the State of Washington from the port closure. Table 21 shows that by the year 2010, the impact of the closure is close to 0% for most economic indicators.

In the 2005-2010 period Washington State's Output and Employment both increase very slightly above the Base Case levels. Although not significant, this is due to an increase in investments in capital stock. Investments are a function of the actual capital stock and the optimal amount of capital stock. In 2004 investments in capital stock are retarded due to the port closure. This creates a larger gap between actual capital stock and optimal capital stock in 2005 (and beyond). Since this gap is larger, investments in 2005 are also larger. This increase in investments increases product demand (from investments) that, in turn, increases industry output and employment.

Table 22 lists the impacts of the port closure on Washington's employment by type of industry. It includes both the number and percent of jobs impacted for each industry. Industries are listed in rank order, based on the number of jobs impacted.

As can be seen in Table 22, the Manufacturing industry is harder hit based on percentage loss than Non-Manufacturing, losing 6.7% (23,420 jobs) of its employment in 2004 compared to 3.9% (99,540 jobs) in Non-Manufacturing. Within Manufacturing, Durables industries lose more jobs than Non-Durables industries based on both number and percent of jobs lost - Durables lose 7.9% of jobs (18,760) compared to 4.2% of jobs (4,659) in Non-Durables.

Impact to State of Washington Closure of Port of Seattle/Tacoma							
	2004	2005	2006	2007	2008	2009	2010
Employment							
Total (Private, Non-Farm)	-122,960	4,468	1,943	2,098	1,968	1,721	1,433
Manufacturing	-23,420	210	67	76	65	50	31
Non-Manuf., excl. Transp.	-87,148	4,090	1,778	1,933	1,827	1,608	1,351
Water Transportation	-12,540	98	71	57	45	35	27
Truck, Rail, and Air Transp.	148	70	27	33	32	29	24
GRP (Bil Fixed 99\$)	-7.544	0.056	-0.054	-0.022	-0.009	-0.006	-0.007
Personal Income (Bil Nom \$)	-6.097	-0.126	-0.156	-0.095	-0.061	-0.043	-0.035
Output (Bil Fixed 99\$)	-14.660	0.223	0.016	0.060	0.071	0.069	0.058
Imports (Bil Fixed 99\$)	-4.612	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	-4.990	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	-0.397	-0.020	-0.006	0.004	0.011	0.015	0.017
Export Price (\$/\$)	0.006	-0.001	0.001	0.001	0.001	0.001	0.001
Percent Difference							
Employment							
Total	-4.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%
Manufacturing	-6.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-Manuf., excl. Transp.	-3.5%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
Water Transportation	NA	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
GRP	-3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Personal Income	-2.9%	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.0%
Output	-4.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Imports	-5.6%	NA	NA	NA	NA	NA	NA
Exports	-6.1%	NA	NA	NA	NA	NA	NA
Wage Rate	-1.1%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Export Price	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 21: Impact to State of Washington Closure of Port Seattle/Tacoma

**Impact on Employment in State of Washington, 2004
Closure of Port of Seattle/Tacoma**

	Number	Percent
<i>Total</i>	<i>-123,000</i>	<i>-4.2%</i>
Manufacturing	-23,420	-6.7%
Durables	-18,760	-7.9%
Transp Equip	-7,350	-7.7%
Machine&Computers	-2,988	-16.2%
Instruments	-1,453	-10.3%
Lumber	-1,206	-2.9%
Fabricated Metals	-1,200	-8.0%
Electric Equip	-1,184	-11.2%
Primary Metals	-924	-9.2%
Misc. Manufact	-863	-7.4%
Motor Vehicles	-784	-13.4%
Stone,Clay,Etc.	-451	-5.2%
Furniture	-358	-6.6%
Non-Durables	-4,659	-4.2%
Food	-1,203	-2.8%
Printing	-1,124	-4.1%
Apparel	-668	-9.9%
Rubber	-634	-7.3%
Paper	-481	-3.3%
Chemicals	-337	-5.8%
Textiles	-87	-11.0%
Petro Products	-67	-3.4%
Leather	-60	-12.8%
Tobacco Manuf	0	0.0%
Non-Manufacturing	-99,540	-3.9%
Services	-35,370	-3.2%
Retail Trade	-21,130	-3.6%
Construction	-14,890	-6.9%
Trans.&Public Util.	-14,150	-8.5%
Fin&Ins&Real Est	-6,384	-2.4%
Wholesale Trade	-6,049	-3.8%
Agri&For&Fish Serv	-1,531	-2.2%
Mining	-38	-0.8%

Table 22: Impact on Employment in State of Washington, Seattle/Tacoma Closure

See Figure 12 and Figure 13 for a graphical representation of Washington's Durables and Non-Durables industries most impacted (based on number of jobs) by the shutdown of the Port of Seattle/Tacoma.

**Manufacturing Employment Impacts (Durables)
Port of Seattle/Tacoma Closure
Washington, 2004**

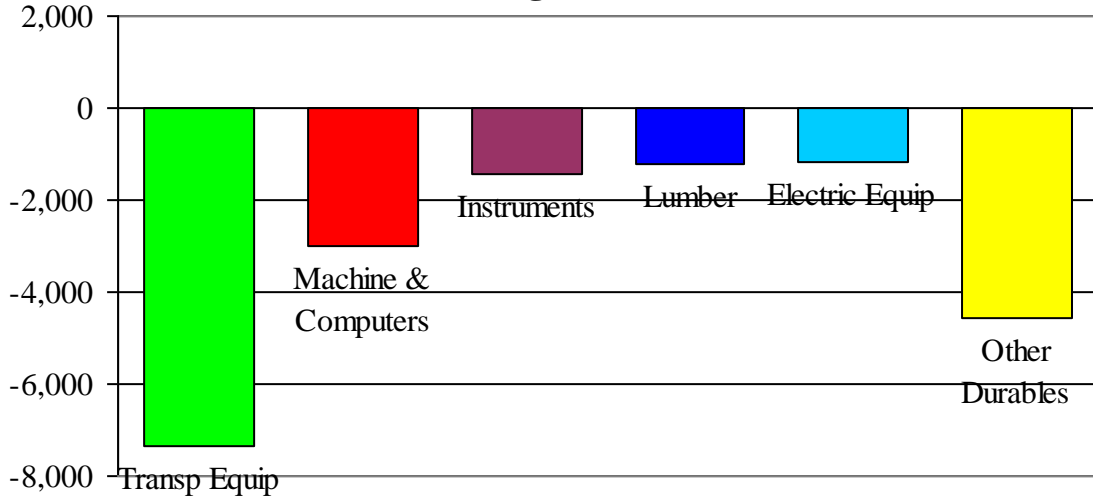


Figure 12: Manuf. Employment Impacts (Durables), Seattle Closure - WA

**Manufacturing Employment Impacts (Non-Durables)
Port of Seattle/Tacoma Closure
Washington, 2004**

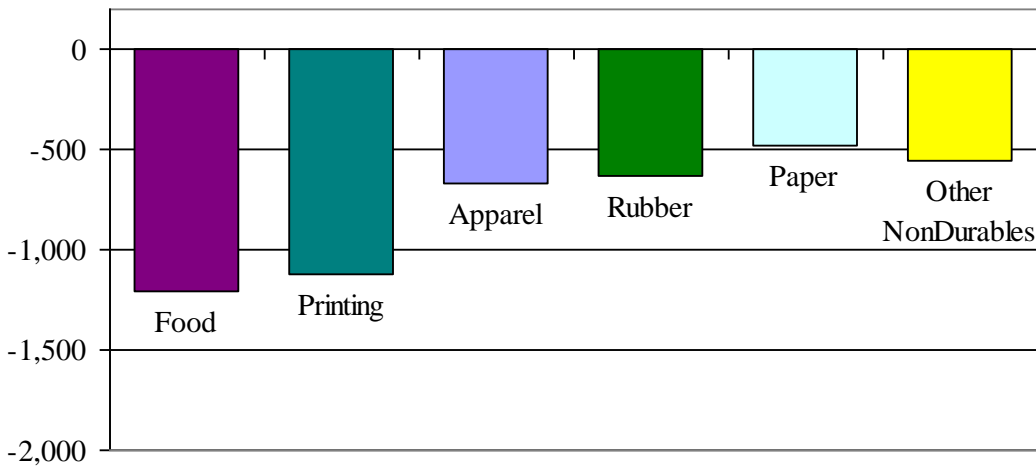


Figure 13: Manuf. Employment Impacts (Non-Durables), Seattle Closure - WA

In the Washington's Manufacturing sector, Transportation Equipment has the largest employment. After the port closure it also experiences the largest loss of jobs (7,350). Following Transportation Equipment, the largest loss of jobs occurs in Machinery and

Computers. When we combine the similar industries of Machinery & Computers, Instruments, and Electrical Equipment we see a combined loss of 5,625 jobs. In terms of number of jobs lost, Washington’s Lumber industry also experiences significant losses of 1,203 jobs.

On a percentage basis the industries hit hardest are Machinery and Computers (16%), Motor Vehicles (13%), Electrical Equipment (11%), and Instruments (10%).

Of the 4,659 (4.2%) jobs lost in the Non-Durables industry, the largest losses occur in Food (1,203 jobs – 2.8%), Printing (1,124 – 4.1%), and Apparel (668 – 9.9%). Of the Non-Durables industries ranked on Figure 13, the largest losses based on percent are Apparel (9.9%) and Rubber (7.3%).

The Non-Manufacturing sectors having the most jobs also have the most job losses. These jobs losses are due to the secondary impact of the loss of Manufacturing jobs and Output. The Transportation and Public Utilities industry (which is where the port employment is located) has the largest percentage reduction (8.5% or 14,150 jobs). (See Table 22) Construction, which is a function of the growth in other industries, has a reduction of 6.9% or 14,890 jobs. The other Non-Manufacturing industries have job losses in the 3% range with the largest absolute reduction in Services (35,370) and Retail Trade (21,130). The industries with the largest drops in Non-Manufacturing employment based on number of jobs are shown in Figure 14.

**Non-Manufacturing Employment Impacts
Port of Seattle/Tacoma Closure
Washington, 2004**

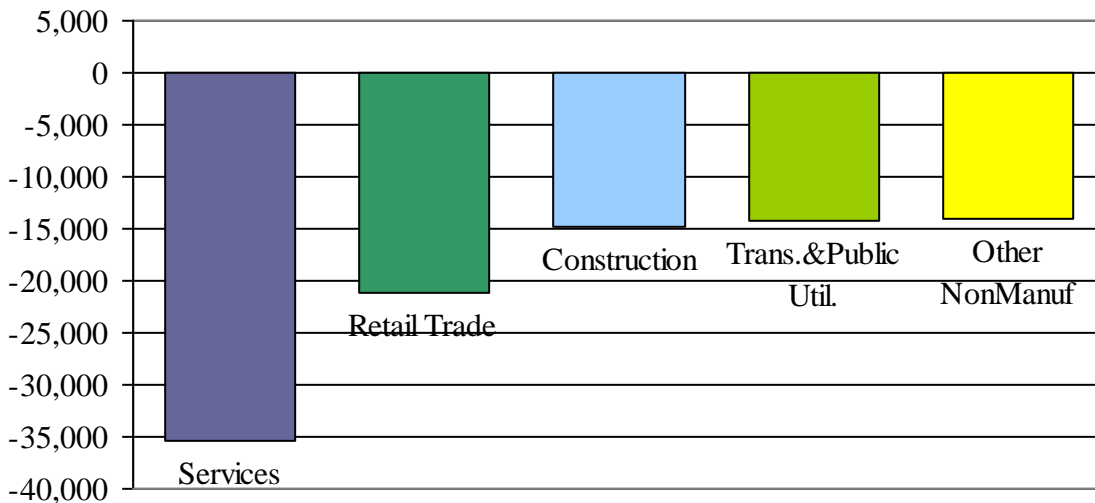


Figure 14: Non-Manufacturing Employment Impacts, Seattle Closure - WA

Closure of Port of Seattle/Tacoma - Oregon Detail

Table 23 shows no long-term impact on Oregon from the closure of the Port of Seattle/Tacoma. The impacts from 2005 to 2010, by percentage, are close to 0% for almost all of the economic indicators.

Impact to State of Oregon Closure of Port of Seattle/Tacoma							
	2004	2005	2006	2007	2008	2009	2010
Employment							
Total (Private, Non-Farm)	-38,060	854	143	263	290	270	235
Manufacturing	-12,430	33	-20	-7	-3	-3	-5
Non-Manuf., excl. Transp.	-27,219	814	169	271	292	271	237
Water Transportation	1,237	-2	-3	-2	-1	-1	-1
Truck, Rail, and Air Transp.	352	9	-3	1	3	3	3
GRP (Bil Fixed 99\$)	-2.840	-0.011	-0.042	-0.029	-0.022	-0.018	-0.016
Personal Income (Bil Nom \$)	-1.533	-0.060	-0.066	-0.050	-0.040	-0.034	-0.030
Output (Bil Fixed 99\$)	-6.053	0.011	-0.049	-0.027	-0.017	-0.012	-0.009
Imports (Bil Fixed 99\$)	-1.769	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	-2.628	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	-0.148	-0.011	-0.005	-0.001	0.001	0.003	0.004
Export Price (\$/\$)	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Percent Difference							
Employment							
Total	-2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manufacturing	-5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-Manuf., excl. Transp.	-1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GRP	-2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Personal Income	-1.3%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
Output	-2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Imports	-3.5%	NA	NA	NA	NA	NA	NA
Exports	-4.1%	NA	NA	NA	NA	NA	NA
Wage Rate	-0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Export Price	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 23: Impact to State of Oregon, Closure of Port of Seattle/Tacoma

Table 24 lists the impacts of the port closure on Oregon's employment by type of industry. It includes both the number and percent of jobs impacted for each industry. The industries are listed in rank order based on the number of jobs impacted.

**Impact on Employment in State of Oregon, 2004
Closure of Port of Seattle/Tacoma**

	Number	Percent
<i>Total</i>	-38,060	-2.0%
Manufacturing	-12,430	-5.0%
Durables	-10,440	-5.8%
Machine&Computers	-2,480	-11.7%
Electric Equip	-2,082	-6.9%
Motor Vehicles	-985	-9.2%
Fabricated Metals	-970	-6.0%
Lumber	-919	-1.6%
Instruments	-854	-8.3%
Transp Equip	-737	-10.1%
Primary Metals	-657	-5.9%
Misc. Manufact	-367	-6.1%
Furniture	-199	-4.2%
Stone,Clay,Etc.	-187	-3.2%
Non-Durables	-1,997	-2.9%
Printing	-391	-2.0%
Rubber	-383	-5.1%
Food	-376	-1.7%
Apparel	-278	-9.0%
Paper	-248	-2.4%
Chemicals	-154	-4.0%
Textiles	-125	-9.9%
Leather	-33	-9.6%
Petro Products	-9	-2.2%
Tobacco Manuf	0	0.0%
Non-Manufacturing	-25,630	-1.6%
Services	-10,350	-1.5%
Retail Trade	-6,679	-1.7%
Construction	-4,464	-3.2%
Wholesale Trade	-2,687	-2.7%
Fin&Ins&Real Est	-1,915	-1.1%
Agri&For&Fish Serv	-559	-1.2%
Mining	-19	-0.5%
Trans.&Public Util.	1,040	1.0%

Table 24: Impact of Employment in State of Oregon, Closure of Seattle/Tacoma

As can be seen in Table 24, the Manufacturing industry is harder hit based on percent loss than Non-Manufacturing, losing 5% of its employment in 2004 compared to 1.6% in Non-Manufacturing. Within Manufacturing, Durables industries lose more jobs than Non-Durables industries based on both number and percent of jobs lost - Durables lose 5.8% of jobs (10,440) compared to 2.9% of jobs (1,997) in Non-Durables. See Figure 15 and Figure 16 for a graphical representation of Oregon's Durables and Non-Durables

industries most impacted (based on number of jobs) by the shutdown of the Port of Seattle/Tacoma.

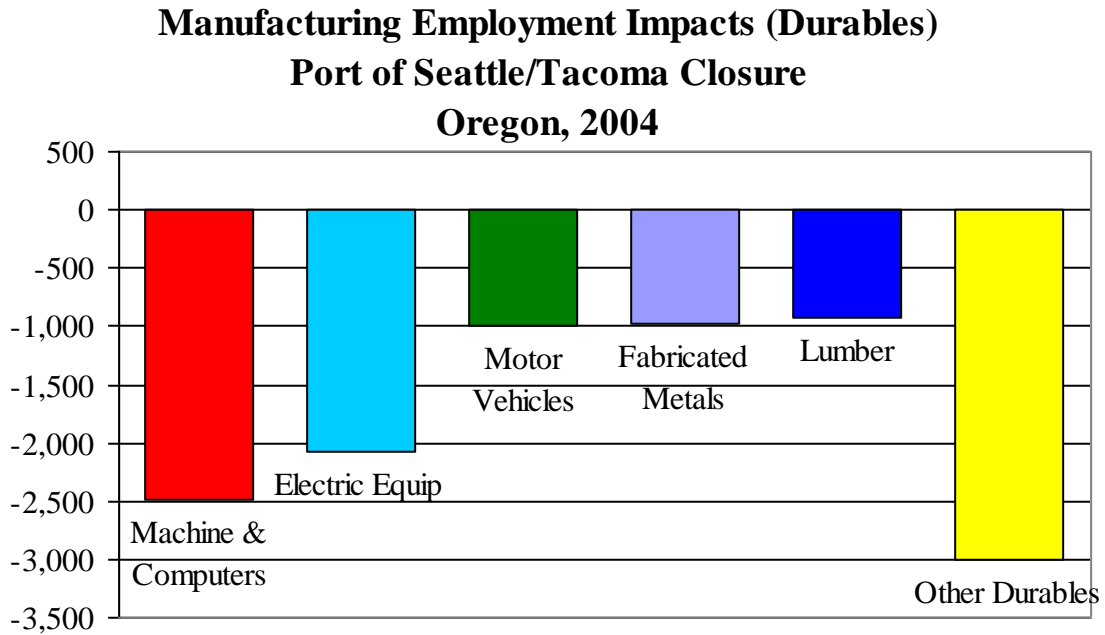


Figure 15: Manuf. Employment Impacts (Durables), Seattle Closure - OR

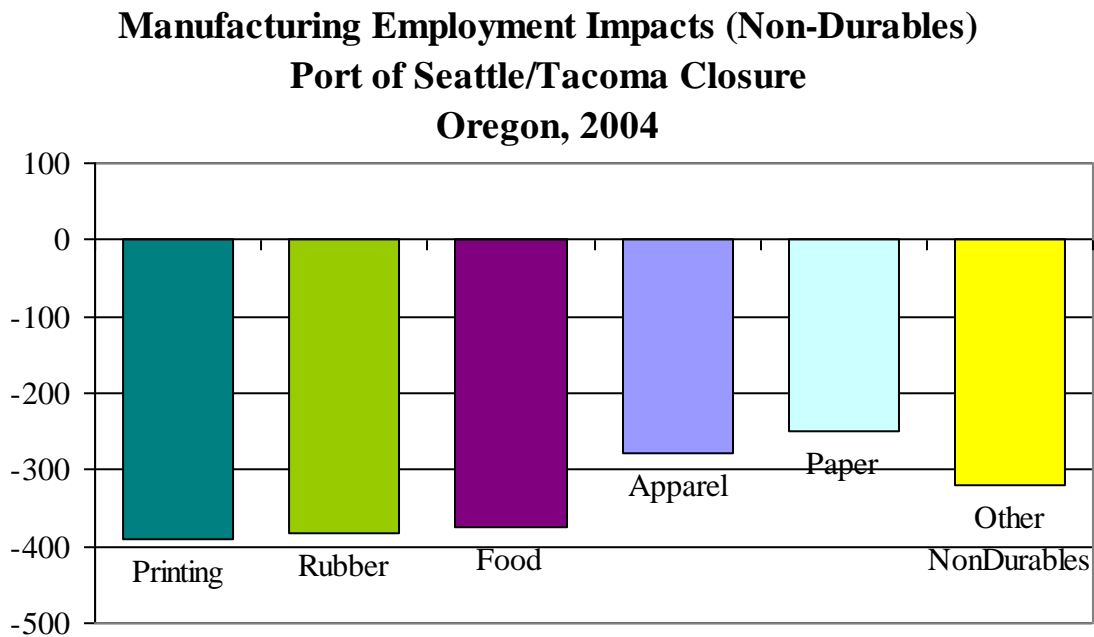


Figure 16: Manuf. Employment Impacts (Non-Durables), Seattle Closure - OR

Whereas the Lumber industry is the largest Durables industry in Oregon (See section titled, *Baseline Conditions for Oregon*), the largest job losses in 2004 based on absolute number occur in Machinery and Computers (2,480 jobs) and Electrical Equipment (2,082 jobs).

When looking at percent job loss, Table 24 shows that the largest Durables industries impacted are Machinery and Computers (11.7% or 2,480 jobs), Transportation Equipment (10.1% or 737 jobs), and Motor Vehicles (9.2% or 985 jobs).

Of the 1,997 (or 2.9%) of jobs lost in the Non-Durables industry, the specific industries with the largest number of job losses are Printing (391 jobs – 2.0%), Rubber (383 jobs – 5.1%), and Food (376 – 1.7%). However, of the industries ranked on Figure 16, the largest based on percent loss are Apparel (9.0%) and Rubber (5.1%).

Figure 17 ranks the impacts to Oregon’s Non-Manufacturing industries due to the closure of the Port of Seattle/Tacoma. Non-Manufacturing job losses are the greatest in the Services (10,350 or 1.5%), Retail Trade (6,679 or 1.7%), and Construction (4,464 or 3.2%) industries. The Transportation and Public Utilities industry shows an increase in employment (1,040 or 1.0%). This increase is reflective of an increase in port employment and trucking in Oregon caused by handling a portion of the diverted trade from the Port of Seattle/Tacoma.

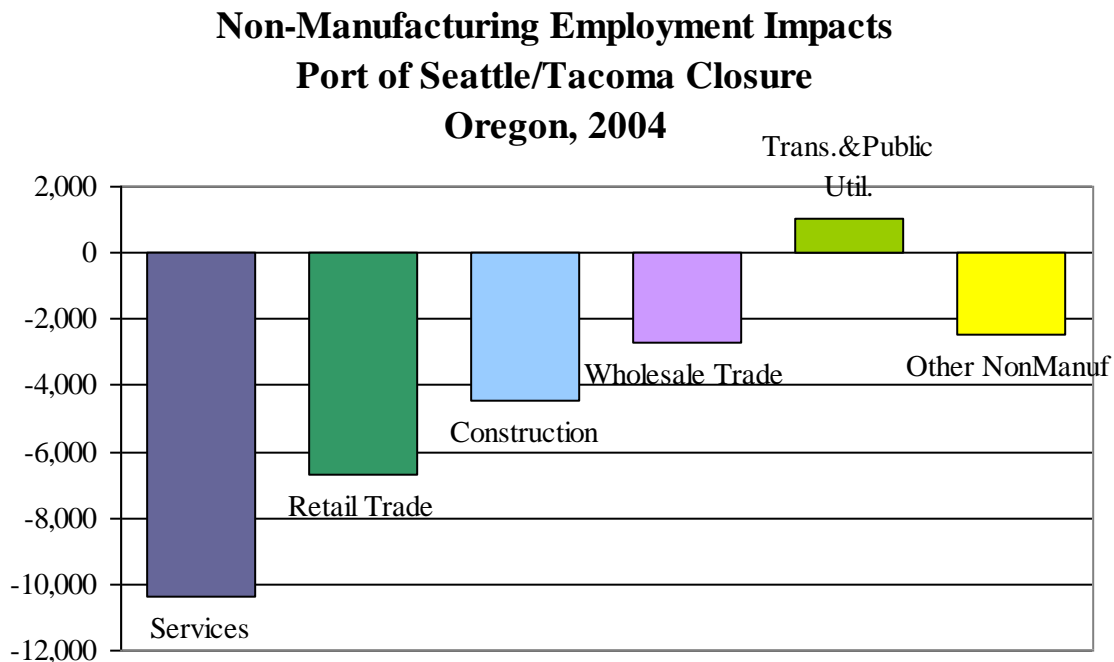


Figure 17: Non-Manufacturing Employment Impacts, Seattle Closure - OR

Impact to Alaska of Closing Port of Seattle/Tacoma

This section describes the impact to Alaska of closing the Port of Seattle/Tacoma for the entire year of 2004. Because of the location of Alaska, much of its foreign and domestic trade is waterborne trade. Its domestic waterborne trade primarily goes through the Port of Seattle/Tacoma. (Pacific Alaska Forwarders, Inc. website) In the event of a closure of the Port of Seattle/Tacoma, Alaska would need to reroute its goods through another port.

In this scenario we assume that goods that normally flow through the Port of Seattle/Tacoma to or from Alaska would be rerouted to other ports (Vancouver, Los Angeles, Portland) with the aid of overland transportation (primarily trucking). We assume that the ships that now travel to and from Alaska from Seattle/Tacoma could also travel to an alternative port with only a modest increase in cost. See the Methodology for a detailed description of the assumptions made when simulating the closure of the Port of Seattle/Tacoma.

Closure of Port of Seattle/Tacoma: Alaska Detail

Table 25 provides a summary of the impact of the closure of the Port of Seattle/Tacoma on several key economic indicators by area. This section focuses on the impact to Alaska; however, other areas are shown as a reference. In 2004, Alaska's Total Employment drops by 2,464 jobs or 0.7%. This represents 144 Manufacturing jobs and a total of 2,320 Non-Manufacturing jobs (including Transportation).

The Export Price of goods traveling from Alaska increases 0.5%, which reduces Output by 0.7% and GRP by \$123 million or 0.5%. Wages are essentially unchanged, but the loss of jobs reduces Personal Income \$84 million or 0.3%. There is a nearly 1% (\$76 million) reduction in Imports while Exports drop 0.2% (\$2 million). (See Table 25)

Table 26 shows the impact of the port closure on trade flows in 2004. This table shows the impacts to supply sources for each region. For example, looking at the first column, we see that closing the port causes Alaska's Demand to drop by \$287 million. The decrease in Demand translates into a decrease in Alaska's self-supply as well as its level of Imports. Alaska's self-supply decreases by \$212 million, and its Imports drop by \$2 million from Washington, \$2 million from Oregon, \$8 million from California, \$1 million from British Columbia, \$40 million from the Rest of the United States and Canada, and \$15 million from the Rest of the World.

We see that Alaska experiences an overall drop in both Imports and Exports with the closure of the Port of Seattle/Tacoma (Table 26). Alaska's total Imports drop by \$76 million (0.9%), and Exports drop by \$197 million (1.2%).

Impact on Economic Indicators by Area, Year 2004 Closure of Port of Seattle/Tacoma						
	Alaska	Washington	Oregon	California	British Columbia	Rest of US
Employment						
Total	-2,464	-122,960	-38,060	+38,825	+6,001	+3,896
Manufacturing	-144	-23,420	-12,430	+1,385	-365	-846
Non-Manuf., excl. Transp.	-2,207	-87,148	-27,219	+22,923	+1,865	+3,994
Water Transportation	-24	-12,540	+1,237	+11,170	+4,236	+21
Truck, Rail, and Air Transp.	-90	+148	+352	+3,347	+265	+726
GRP (Bil Fixed 99\$)	-0.123	-7.544	-2.840	+2.089	+0.288	+0.447
Personal Income (Bil Nom \$)	-0.084	-6.097	-1.533	+1.666	+0.168	+0.269
Output (Bil Fixed 99\$)	-0.226	-14.660	-6.053	+3.833	+0.511	+0.494
Imports (Bil Fixed 99\$)	-0.076	-4.612	-1.769	+0.738	+0.113	-0.050
Exports (Bil Fixed 99\$)	-0.014	-4.990	-2.628	+0.839	+0.132	+0.337
Wage Rate (Thou. Nom \$)	-0.001	-0.397	-0.148	+0.004	+0.002	0.000
Export Price (\$/\$)	+0.065	+0.006	+0.004	+0.000	+0.001	0.000
Percent Difference						
Employment						
Total	-0.7%	-4.2%	-2.0%	+0.2%	+0.3%	0.0%
Manufacturing	-0.9%	-6.7%	-5.0%	+0.1%	-0.2%	0.0%
Non-Manuf., excl. Transp.	-0.8%	-3.5%	-1.7%	+0.2%	+0.1%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	-0.5%	+0.2%	+0.6%	+0.7%	+0.4%	0.0%
GRP	-0.5%	-3.8%	-2.2%	+0.2%	+0.3%	0.0%
Personal Income	-0.3%	-2.9%	-1.3%	+0.1%	+0.2%	0.0%
Output	-0.7%	-4.8%	-2.9%	+0.2%	+0.3%	0.0%
Imports	-0.9%	-5.6%	-3.5%	+0.2%	+0.2%	0.0%
Exports	-0.2%	-6.1%	-4.1%	+0.3%	+0.3%	0.0%
Wage Rate	0.0%	-1.1%	-0.5%	0.0%	0.0%	0.0%
Export Price	+0.5%	+0.2%	+0.1%	0.0%	0.0%	0.0%

Table 25: Impact on Economic Indicators by Area, Seattle/Tacoma Closure

Impact on Trade Flows (Bil. Fixed \$99)									
Closure of Port of Seattle/Tacoma, 2004									
	Alaska	Wash- ington	Oregon	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Alaska	-0.212	-0.008	-0.002	0.001	0.000	-0.002	-0.002	-0.01	0.197
Washington	-0.002	-9.098	-0.182	0.012	0.011	0.054	-4.883	-14.09	-4.988
Oregon	-0.002	-0.444	-3.223	0.013	0.005	0.038	-2.239	-5.85	-2.626
California	-0.008	-0.567	-0.261	2.785	0.024	0.275	1.376	3.63	0.846
BC	-0.001	-0.306	-0.055	0.015	0.379	0.026	0.453	0.51	0.133
Rest of US&CN	-0.040	-1.724	-0.608	0.353	0.041	2.504	-0.032	0.53	-1.971
Rest of World	-0.015	-1.266	-0.561	0.296	0.032	-0.004			
Demand	-0.287	-13.710	-4.991	3.524	0.492	0.107			
Imports	-0.076	-4.612	-1.769	0.738	0.113	-2.393			
Percent Difference from Base Case									
	Alaska	Wash- ington	Oregon	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Alaska	-0.9%	-4.1%	-2.2%	0.1%	0.0%	0.0%	-0.2%	-0.2%	-1.2%
Washington	-0.7%	-4.4%	-2.8%	0.1%	0.2%	0.1%	-23.9%	-4.9%	-6.1%
Oregon	-1.1%	-5.4%	-2.4%	0.1%	0.1%	0.1%	-17.0%	-2.9%	-4.1%
California	-0.8%	-5.1%	-3.2%	0.2%	0.3%	0.2%	1.2%	0.2%	0.3%
BC	-0.8%	-4.5%	-2.3%	0.2%	0.2%	0.1%	4.8%	0.3%	0.3%
Rest of US&CN	-0.8%	-4.7%	-3.0%	0.2%	0.2%	0.0%	0.0%	0.0%	-0.2%
Rest of World	-0.7%	-6.4%	-4.2%	0.2%	0.3%	0.0%			
Demand	-0.9%	-4.7%	-2.7%	0.2%	0.2%	0.0%			
Imports	-0.9%	-5.6%	-3.5%	0.2%	0.2%	-0.9%			

Table 26: Impact on Trade Flows, Seattle/Tacoma Closure

Table 27 shows the impact to Alaska across the years 2004 through 2010. As can be seen from this table, after 2005, when the port is reopened, there is almost a full recovery of the Alaska economy by the year 2010.

Impact to State of Alaska							
Closure of Port of Seattle/Tacoma							
	2004	2005	2006	2007	2008	2009	2010
Employment							
Total (Private, Non-Farm)	-2,464	-361	-316	-259	-212	-174	-142
Manufacturing	-144	-36	-30	-24	-19	-15	-12
Non-Manuf., excl. Transp.	-2,207	-307	-271	-222	-183	-150	-124
Water Transportation	-24	-4	-3	-3	-2	-2	-1
Truck, Rail, and Air Transp.	-90	-13	-12	-9	-8	-6	-5
GRP (Bil Fixed 99\$)	-0.123	-0.026	-0.023	-0.020	-0.017	-0.015	-0.013
Personal Income (Bil Nom \$)	-0.084	-0.025	-0.024	-0.023	-0.021	-0.020	-0.019
Output (Bil Fixed 99\$)	-0.226	-0.041	-0.036	-0.030	-0.025	-0.021	-0.018
Imports (Bil Fixed 99\$)	-0.076	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	-0.014	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	-0.001	-0.001	0.000	0.001	0.002	0.003	0.003
Export Price (\$/\$)	0.065	0.003	0.003	0.002	0.002	0.002	0.001
Percent Difference							
Employment							
Total	-0.7%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%
Manufacturing	-0.9%	-0.2%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%
Non-Manuf., excl. Transp.	-0.8%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	-0.5%	-0.1%	-0.1%	-0.1%	0.0%	0.0%	0.0%
GRP	-0.5%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Personal Income	-0.3%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Output	-0.7%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Imports	-0.9%	NA	NA	NA	NA	NA	NA
Exports	-0.2%	NA	NA	NA	NA	NA	NA
Wage Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Export Price	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 27: Impact to Alaska, Closure of Port of Seattle/Tacoma

Table 28 lists the impacts of the port closure on Alaska's employment by type of industry. It includes both the number and percent of jobs impacted for each industry. Industries are listed in rank order, based on the number of jobs impacted.

About 1% of the Alaska Manufacturing jobs are lost in the year 2004, this translates into a total of 144 jobs. The losses in the Manufacturing sector mirror the sizes of the

individual industries. No industry stands out as losing a significantly higher percentage of jobs than the others. Each industry loses approximately 1% of their employment. In Alaska, the Non-Durables industry is larger than the Durables industry. The largest employment impacts in the total Manufacturing sector (Non-Durables and Durables industries combined) are Food (78 or 1.0%), Lumber (24 or 1.1%), and Printing (15 or 0.7%).

Impact on Employment in Alaska, 2004 Closure of Port of Seattle/Tacoma		
	Number	Percent
<i>Total</i>	-2,464	-0.7%
Manufacturing	-144	-0.9%
Durables	-45	-1.0%
Lumber	-24	-1.1%
Fabricated Metals	-5	-1.3%
Stone,Clay,Etc.	-5	-1.2%
Misc. Manufact	-5	-1.0%
Transp Equip	-2	-0.4%
Furniture	-1	-1.4%
Machine&Computers	-1	-1.4%
Primary Metals	-1	-1.2%
Electric Equip	0	0.0%
Motor Vehicles	0	0.0%
Instruments	0	0.0%
Non-Durables	-99	-0.9%
Food	-78	-0.9%
Printing	-15	-0.7%
Petro Products	-2	-0.6%
Apparel	-1	-0.7%
Chemicals	-1	-0.6%
Paper	-1	-1.0%
Rubber	0	0.0%
Leather	0	0.0%
Textiles	0	0.0%
Tobacco Manuf	0	0.0%
Non-Manufacturing	-2,320	-0.7%
Services	-812	-0.6%
Retail Trade	-666	-1.0%
Construction	-358	-1.5%
Trans.&Public Util.	-188	-0.5%
Fin&Ins&Real Est	-139	-0.6%
Wholesale Trade	-79	-0.8%
Agri&For&Fish Serv	-58	-0.3%
Mining	-19	-0.2%

Table 28: Impact on Employment in Alaska, Port of Seattle/Tacoma Closure

Figure 18 and Figure 19 illustrate graphically the largest impacts to manufacturing employment for the Durables and Non-Durables industries, respectively.

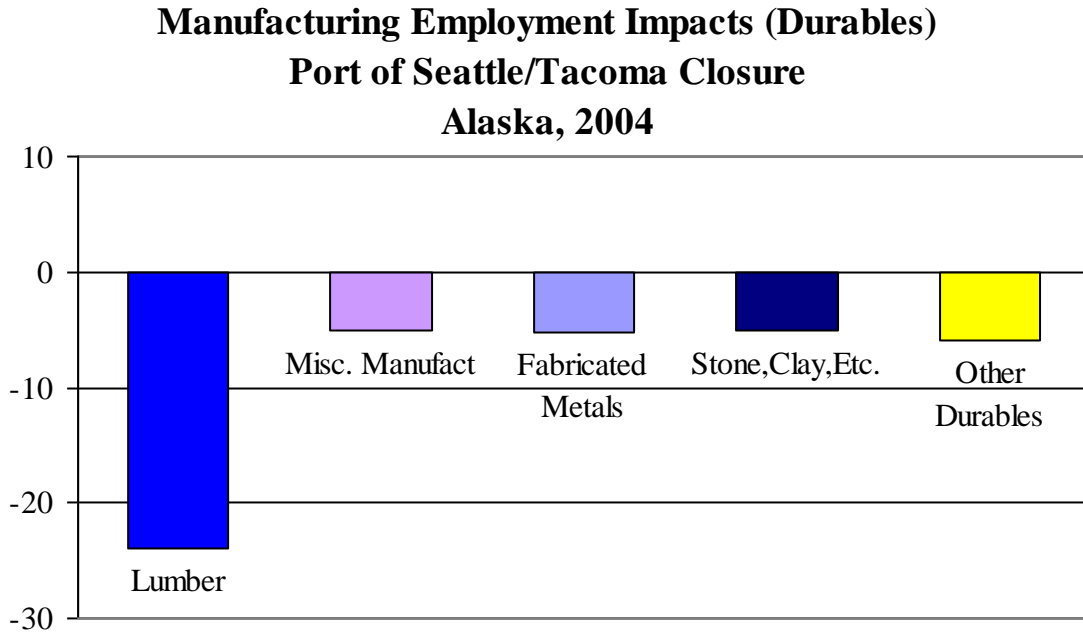


Figure 18: Manuf. Employment Impacts (Durables), Seattle Closure - AK

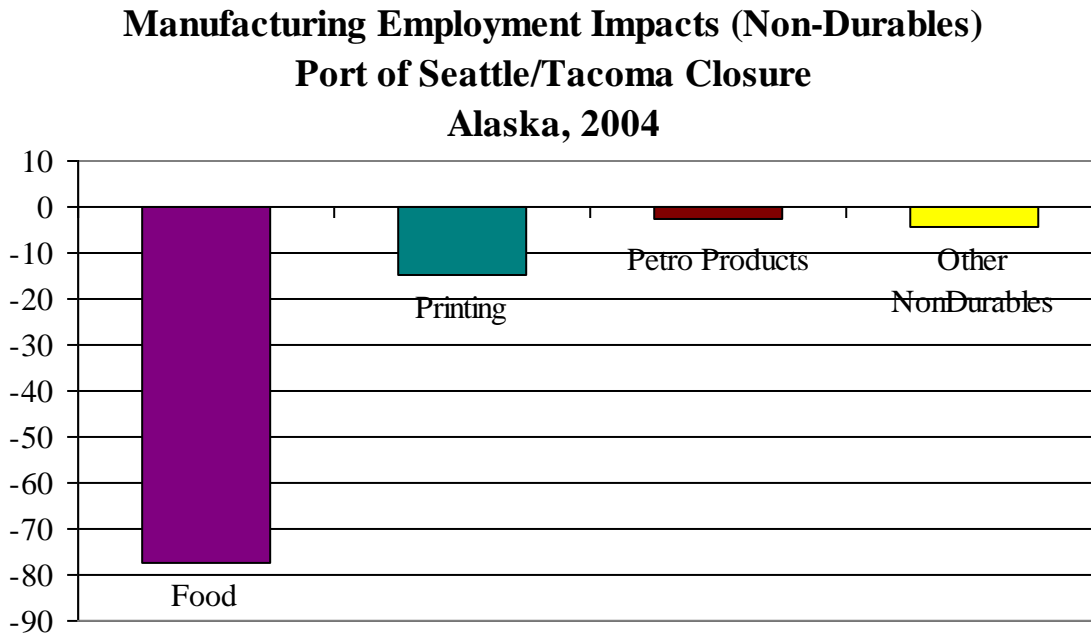


Figure 19: Manuf. Employment Impacts (Non-Durables), Seattle Closure - AK

Figure 20 illustrates the largest impacts on employment in the Non-Manufacturing sector. Except for Construction, the industries with the largest employment experience the largest job losses. In the year of the port closure, the largest Non-Manufacturing job losses in Alaska occur in Services (812 or 0.6%), Retail Trade (666 or 1.0%), and Construction (358 or 1.5%). The Construction industry, which is a function of the growth in other industries, experiences a higher percentage loss than the other industries.

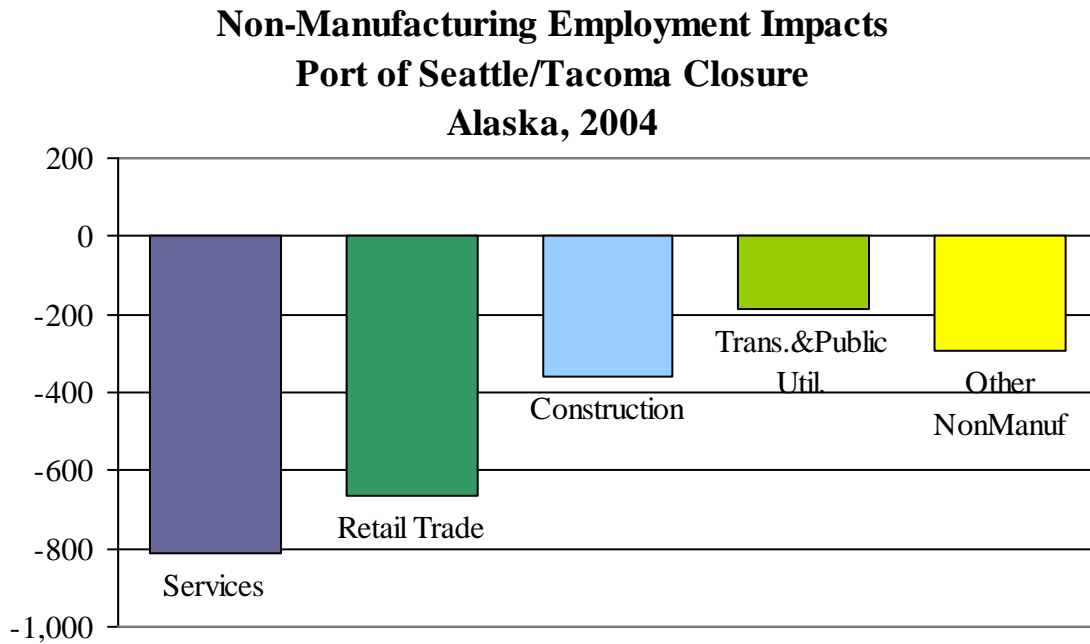


Figure 20: Non-Manufacturing Employment Impacts, Seattle Closure - AK

Impact to Oregon and Washington of Closing the Port of Portland

This scenario consists of the gradual closing of the Port of Portland between 2004 and 2010. The port closure creates an increase in transportation costs, a reduction in seaport employment, and a slight increase in Trucking, Rail and Air revenues. As the port is closed waterborne trade flows are rerouted to alternative ports. The rerouting of trade increases the cost of goods and the cost of exporting goods due to the added transportation expense. The increase in the cost of goods, in turn, increases the cost of production for industries using those goods. In addition to costs increasing, revenues from the trucking, rail, and air industry increase due to the need to move cargo to and from alternative ports. See the Methodology section for a detailed description of the assumptions made when simulating the closure of the Port of Portland.

Closure of Port of Portland: Overview Results

Table 29 shows the impacts of the closure in 2010, which is the first year the port is completely closed. While both Oregon and Washington experience a loss of jobs of 27,015 and 2,667 respectively, California and British Columbia see an increase in jobs of 9,368 and 2,812.

Within the Manufacturing industry, Oregon loses 1.7% of jobs (3,985) and Washington loses 0.4% (1,272). Manufacturing jobs are lost because of increased production costs resulting from increased import costs and increased cost of transporting export goods. This loss of employment in Manufacturing reduces employment in those Non-Manufacturing jobs that support the Manufacturing industry. In Oregon, Non-Manufacturing, excluding Transportation, loses 1.1% of jobs (18,369) and Washington loses 0.1% (2,230).

Water Transportation jobs (jobs directly related to the port) are reduced in Oregon by (4,467), while there is an increase in port-related jobs in Washington (801), California (2,867) and British Columbia (1,108). The closure of the Port of Portland has a dampening impact on the State of Washington causing a slowdown (and a reduction in trade flows) in the Washington economy. This slowdown explains why British Columbia jobs increase more than Washington jobs. Trucking, rail, and air jobs increase slightly in Washington (34), California (397), and British Columbia (55). The increase in port jobs in California and British Columbia are leveraged into additional Non-Manufacturing jobs (5,799 for California and 1,597 for British Columbia) and even some Manufacturing jobs (305 for California and 52 for British Columbia).

The loss of jobs in Oregon reduces Oregon Output by 1.6%, GRP by 1.3%, and Personal Income by 1.0%. These losses are essentially a permanent impact of the closure of the

Port of Portland. The impact is smaller, but still negative, in Washington where Output drops 0.2%, GRP by 0.1%, and Personal Income 0.1%. In British Columbia there is an increase of 0.1% in Output, GRP, and Personal Income.

There is decline in the value of goods imported to (1.9%) and exported from (1.8%) Oregon. Consequently, industries that require imported materials or who export a large portion of their output experience reduced growth due to the higher costs of transporting their goods.

Whereas the areas of Washington, California, and British Columbia experience no impact from the port closure on their Wage Rates, the general economic slowing in Oregon causes its own Wage Rate to drop 0.3% by the year 2010.

Impact on Economic Indicators by Area, Year 2010						
Closure of Port of Portland						
	Oregon	Washington	Alaska	California	British Columbia	Rest of US
Employment						
Total	-27,015	-2,667	-70	+9,368	+2,812	+1,043
Manufacturing	-3,985	-1,272	-4	+305	+52	-199
Non-Manuf., excl. Transp.	-18,369	-2,230	-62	+5,799	+1,597	+1,114
Water Transportation	-4,467	+801	-2	+2,867	+1,108	-33
Truck, Rail, and Air Transp.	-194	+34	-3	+397	+55	+160
GRP (Bil Fixed 99\$)	-1.872	-0.259	-0.004	+0.567	+0.149	+0.108
Personal Income (Bil Nom \$)	-1.504	-0.172	-0.004	+0.585	+0.109	+0.096
Output (Bil Fixed 99\$)	-3.720	-0.544	-0.007	+1.006	+0.272	+0.128
Imports (Bil Fixed 99\$)	-1.108	-0.178	-0.002	+0.201	+0.070	-0.006
Exports (Bil Fixed 99\$)	-1.325	-0.277	-0.001	+0.206	+0.077	+0.020
Wage Rate (Thou. Nom \$)	-0.127	-0.006	0.000	+0.002	+0.002	0.000
Export Price (\$/\$)	+0.001	+0.001	+0.002	0.000	0.000	0.000
Percent Difference						
Employment						
Total	-1.3%	-0.1%	0.0%	0.0%	0.0%	0.0%
Manufacturing	-1.7%	-0.4%	0.0%	0.0%	0.0%	0.0%
Non-Manuf., excl. Transp.	-1.1%	-0.1%	0.0%	0.0%	+0.1%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	-0.3%	0.0%	0.0%	+0.1%	+0.1%	0.0%
GRP	-1.3%	-0.1%	0.0%	0.0%	+0.1%	0.0%
Personal Income	-1.0%	-0.1%	0.0%	0.0%	+0.1%	0.0%
Output	-1.6%	-0.2%	0.0%	0.0%	+0.1%	0.0%
Imports	-1.9%	-0.2%	0.0%	+0.1%	+0.1%	0.0%
Exports	-1.8%	-0.3%	0.0%	+0.1%	+0.1%	0.0%
Wage Rate	-0.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Export Price	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 29: Impact on Economic Indicators by Area, Portland Closure

Table 30 shows the impact of the port closure on trade flows in 2010. This table shows the impacts to supply sources for each region. For example, looking at the first column, we see that closing the port causes Oregon’s Demand to drop by \$3.4 billion. This decrease in Demand translates into a decrease in Oregon’s self-supply as well as its level of Imports. Oregon’s self-supply decreases by \$2.3 billion, and its Imports drop by \$132 million from Washington, \$2 million from Alaska, \$154 million from California, \$43 million from British Columbia, \$380 million from the Rest of the United States and Canada, and \$331 million from the Rest of the World.

The value of 2010 total Imports drops in both Oregon and Washington. Oregon’s total Imports drop by \$1.1 billion (1.9%), and Washington’s drop by \$178 million (0.2%). Closing the Port of Portland increases Imports to California and British Columbia by \$201 million and \$70 million, respectively. Exports from Oregon and Washington also decline. Oregon’s Exports drop by \$1.3 billion (1.8%), and Washington’s drop by \$277 million (0.3%). California’s and British Columbia’s Exports increase by \$206 million and \$77 million respectively.

Impact on Trade Flows (Bil. Fixed \$99)									
Closure of Port of Portland, 2010									
	Oregon	Wash- ington	Alaska	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Oregon	-2.278	-0.021	0.000	-0.001	0.005	-0.006	-1.301	-3.60	-1.325
Washington	-0.132	-0.242	0.000	0.004	0.008	0.000	-0.156	-0.52	-0.277
Alaska	-0.002	0.000	-0.006	0.000	0.000	0.000	0.000	-0.01	-0.001
California	-0.154	-0.022	0.000	0.740	0.012	0.035	0.334	0.95	0.206
BC	-0.043	-0.008	0.000	0.004	0.195	0.003	0.121	0.27	0.077
Rest of US&CN	-0.380	-0.068	-0.001	0.097	0.024	0.467	-0.011	0.13	-0.339
Rest of World	-0.331	-0.048	0.000	0.084	0.021	0.003			
Demand	-3.386	-0.421	-0.008	0.941	0.266	0.089			
Imports	-1.108	-0.178	-0.002	0.201	0.070	-0.381			
Percent Difference from Base Case									
	Oregon	Wash- ington	Alaska	California	BC	Rest of US & Canada	Rest of World	Output	Exports
Oregon	-1.5%	-0.2%	-0.1%	0.0%	0.1%	0.0%	-8.1%	-1.6%	-1.8%
Washington	-1.8%	-0.1%	0.0%	0.0%	0.1%	0.0%	-0.6%	-0.2%	-0.3%
Alaska	-1.5%	-0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
California	-1.6%	-0.2%	0.0%	0.0%	0.1%	0.0%	0.2%	0.0%	0.1%
BC	-1.6%	-0.1%	0.0%	0.0%	0.1%	0.0%	1.0%	0.1%	0.1%
Rest of US&CN	-1.6%	-0.2%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Rest of World	-2.0%	-0.2%	0.0%	0.1%	0.1%	0.0%			
Demand	-1.6%	-0.1%	0.0%	0.0%	0.1%	0.0%			
Imports	-1.9%	-0.2%	0.0%	0.1%	0.1%	-0.1%			

Table 30: Impact on Trade Flows, Port of Portland Closure

Closure of Port of Portland - Oregon Detail

Table 31 shows the impact to Oregon of the gradual closure of the Port of Portland across the years 2004 through 2010. The impacts on Employment, Output, GRP, and Personal Income all grow each year as the trade through the port is reduced. There is essentially no evidence of any new economic growth filling the gap left by the closure of the port. The employment loss is about 4,000 jobs per year with about 600 (15%) of those being Manufacturing jobs. Total labor-years lost is 111,585. Output declines by over \$500 million per year with GRP dropping over \$250 million per year and Personal Income dropping over \$200 million per year. These declines are all relative to the Base Case.

Impact to State of Oregon Closure of Port of Portland								
	2004	2005	2006	2007	2008	2009	2010	7-year Total
Employment								
Total (Private, Non-Farm)	-4,286	-8,376	-12,339	-16,171	-19,895	-23,503	-27,015	-111,585
Manufacturing	-705	-1,355	-1,959	-2,521	-3,045	-3,533	-3,985	-17,103
Non-Manuf., excl. Transp.	-2,874	-5,623	-8,305	-10,911	-13,459	-15,938	-18,369	-75,479
Water Transportation	-678	-1,341	-1,991	-2,627	-3,252	-3,865	-4,467	-18,221
Truck, Rail, and Air Transp.	-29	-57	-84	-112	-139	-167	-194	-782
GRP (Bil Fixed 99\$)	-0.258	-0.517	-0.781	-1.049	-1.320	-1.595	-1.872	-7.392
Personal Income (Bil Nom \$)	-0.169	-0.353	-0.554	-0.769	-1.000	-1.245	-1.504	-5.594
Output (Bil Fixed 99\$)	-0.520	-1.040	-1.566	-2.096	-2.632	-3.174	-3.720	-14.748
Imports (Bil Fixed 99\$)	NA	NA	NA	NA	NA	NA	-1.108	NA
Exports (Bil Fixed 99\$)	NA	NA	NA	NA	NA	NA	-1.325	NA
Wage Rate (Thou. Nom \$)	-0.015	-0.032	-0.050	-0.068	-0.087	-0.107	-0.127	N/A
Export Price (\$/\$)	0.000	0.000	0.000	0.001	0.001	0.001	0.001	N/A
Percent Difference								
Employment								
Total	-0.2%	-0.4%	-0.6%	-0.8%	-1.0%	-1.2%	-1.3%	-0.8%
Manufacturing	-0.3%	-0.5%	-0.8%	-1.0%	-1.3%	-1.5%	-1.7%	-1.0%
Non-Manuf., excl. Transp.	-0.2%	-0.4%	-0.5%	-0.7%	-0.8%	-0.9%	-1.1%	-0.7%
Water Transportation	NA	NA	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%	-0.2%
GRP	-0.2%	-0.4%	-0.6%	-0.8%	-0.9%	-1.1%	-1.3%	-0.8%
Personal Income	-0.1%	-0.3%	-0.4%	-0.6%	-0.7%	-0.8%	-1.0%	-0.6%
Output	-0.3%	-0.5%	-0.7%	-1.0%	-1.2%	-1.4%	-1.6%	-1.0%
Imports	NA	NA	NA	NA	NA	NA	-1.9%	NA
Exports	NA	NA	NA	NA	NA	NA	-1.8%	NA
Wage Rate	-0.1%	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	N/A
Export Price	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	N/A

Table 31: Impact to State of Oregon, Closure of Port of Portland

Table 32 lists the impacts of the port closure on Oregon's employment by type of industry. It includes both the number and percent of jobs impacted for each industry. Industries are listed in rank order, based on the number of jobs impacted.

Impact on Employment in State of Oregon, 2010 Closure of Port of Portland		
	Number	Percent
<i>Total</i>	-27,010	-1.3%
Manufacturing	-3,985	-1.7%
Durables	-3,113	-1.8%
Motor Vehicles	-649	-6.1%
Machine&Computers	-567	-3.0%
Transp Equip	-564	-9.2%
Fabricated Metals	-404	-2.6%
Lumber	-211	-0.3%
Electric Equip	-203	-1.0%
Primary Metals	-202	-2.0%
Instruments	-112	-1.2%
Misc. Manufact	-75	-1.3%
Stone,Clay,Etc.	-65	-1.2%
Furniture	-60	-1.3%
Non-Durables	-872	-1.3%
Rubber	-286	-4.1%
Printing	-263	-1.3%
Food	-104	-0.5%
Paper	-101	-1.0%
Chemicals	-52	-1.4%
Apparel	-46	-2.1%
Textiles	-10	-0.9%
Leather	-5	-2.1%
Petro Products	-5	-1.4%
Tobacco Manuf	0	0.0%
Non-Manufacturing	-23,030	-1.3%
Services	-7,668	-1.0%
Trans.&Public Util.	-4,992	-4.5%
Retail Trade	-4,388	-1.1%
Construction	-3,155	-2.0%
Fin&Ins&Real Est	-1,286	-0.7%
Wholesale Trade	-1,248	-1.3%
Agri&For&Fish Serv	-287	-0.5%
Mining	-5	-0.2%

Table 32: Impact on Employment in Oregon, Portland Closure

In 2010 the Manufacturing industry is slightly harder hit based on percent loss than Non-Manufacturing, losing 1.7% of its employment compared to 1.3% in Non-Manufacturing. Within Manufacturing, the Durables industry is impacted slightly more than Non-

Durables based on percent of jobs lost - Durables lose 1.8% of jobs (3,113) compared to 1.3% of jobs (872) in Non-Durables. Figure 15 and Figure 16 illustrate the largest impacts based on number of jobs to Oregon's Durables and Non-Durables industries.

**Manufacturing Employment Impacts (Durables)
Port of Portland Closure
Oregon, 2010**

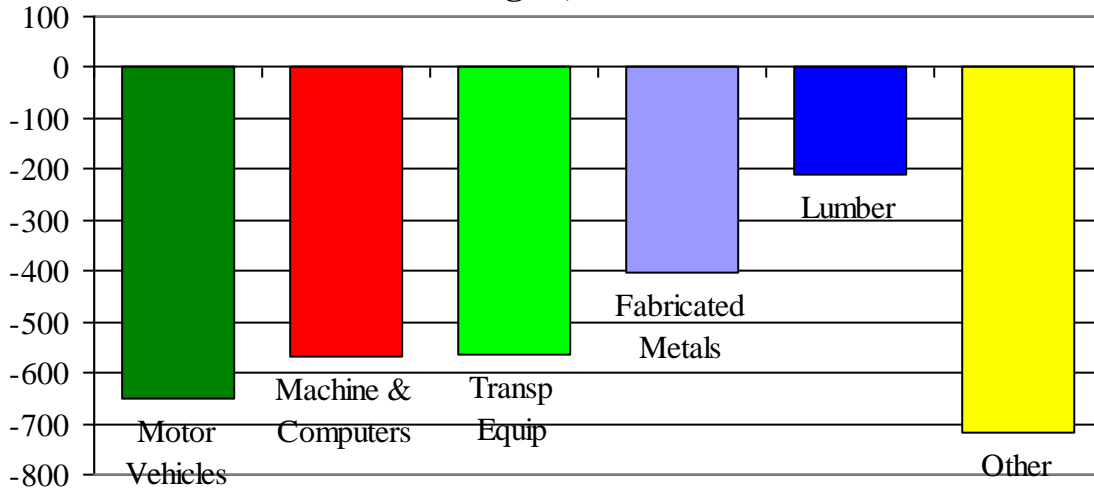


Figure 21: Manuf. Employment Impacts (Durables), Portland Closure - OR

**Manufacturing Employment Impacts (Non-Durables)
Port of Portland Closure
Oregon, 2010**

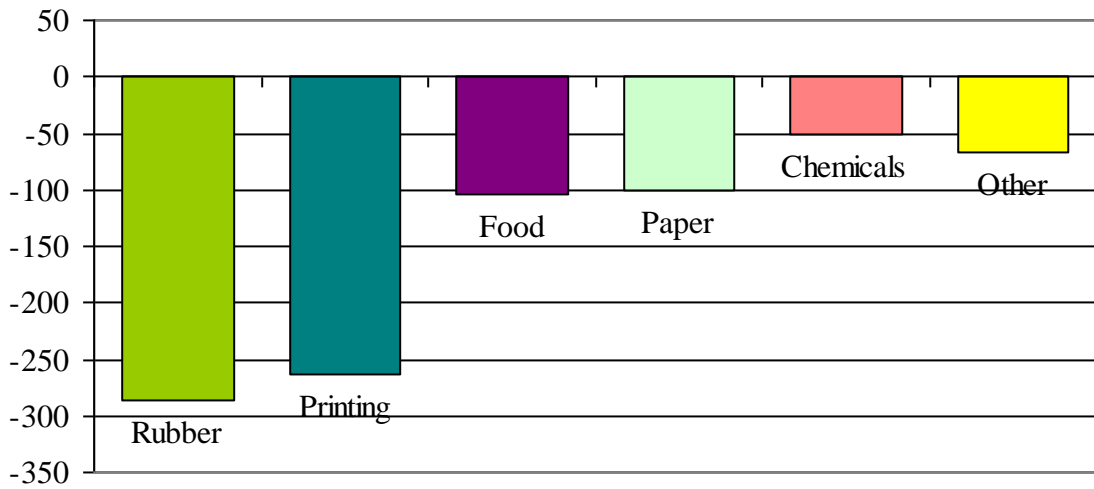


Figure 22: Manuf. Employment Impacts (Non-Durables), Portland Closure - OR

Whereas the Lumber industry is the largest Durables industry in Oregon (See section titled, *Baseline Conditions for Oregon*), the largest job losses resulting from the closure of the Port of Portland occur in Motor Vehicles (649), Machinery and Computers (567), and Transportation Equipment (564). These losses are based on absolute number of jobs.

When looking at percent job loss, Table 32 shows that the largest Durables industries impacted are Transportation Equipment (9.2%) and Motor Vehicles (6.1%).

Of the 872 (or 1.3%) of jobs lost in the Non-Durables industry, the specific industries with the largest job losses are Rubber (286 – 4.1%), Printing (263 – 1.3%), and Food (104 – 0.5%). Rubber, at 4.1%, is the only industry that stands out above the other industries in Table 32 based on percent job loss.

Figure 23 ranks the 2010 impacts to Oregon’s Non-Manufacturing industries resulting from the closure of the Port of Portland based on number of jobs. By the year the port is completely closed, Non-Manufacturing job losses (based on number of jobs) are the greatest in the Services (7,768), Transportation & Public Utilities (4,992), Retail Trade (4,388), and Construction (3,155) industries.

Based on percentage loss, the largest Non-Manufacturing industries impacted by the Port of Portland closure are: Transportation & Public Utilities (4.5%) and Construction (2.0%).

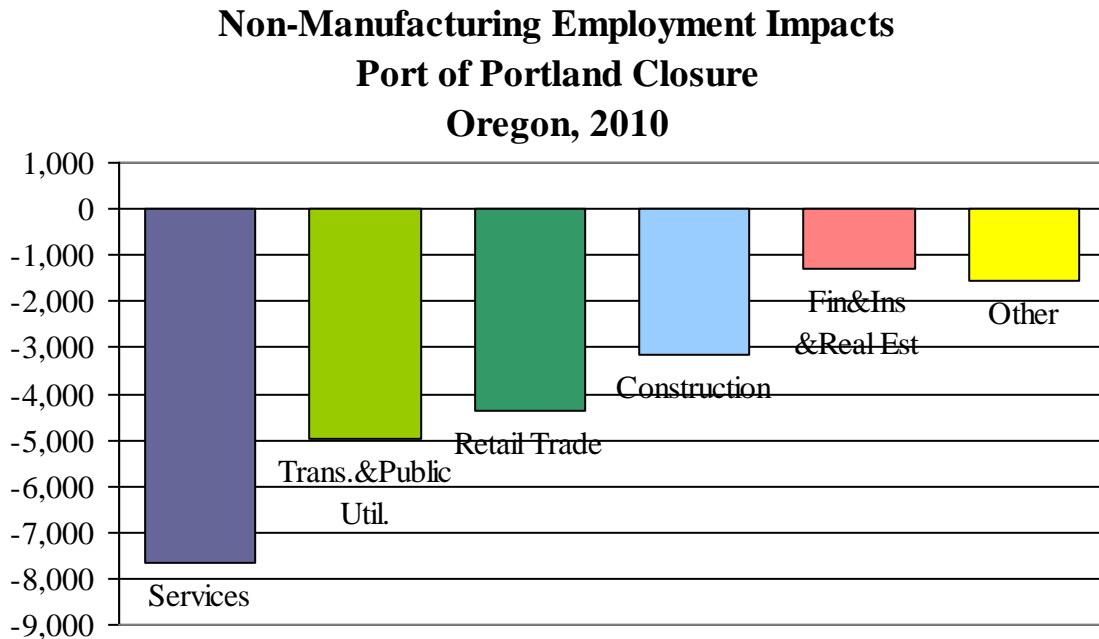


Figure 23: Non-Manufacturing Employment Impacts, Portland Closure - OR

Closure of Port of Portland - Washington Detail

Table 33 shows the impact to Washington of the gradual closure of the Port of Portland from 2004 to 2010. The impacts on Employment, Output, GRP, and Personal Income grow slightly each year as the trade through the port is reduced. Washington loses an average of 385 jobs per year with about 180 (47%) of those being Manufacturing jobs. Total labor-years lost is 10,325 jobs. Output declines by an average of \$80 million per year. GRP and Personal Income drop an average of \$38 million and \$26 million per year, respectively. Based on percentages, the impacts to Washington's economic indicators are all much less than 1%, indicating only a slight impact to the economy.

Impact to State of Washington Closure of Port of Portland								
	2004	2005	2006	2007	2008	2009	2010	7-year Total
Employment								
Total (Private, Non-Farm)	-359	-709	-1,066	-1,434	-1,808	-2,282	-2,667	-10,325
Manufacturing	-196	-385	-568	-746	-919	-1,110	-1,272	-5,195
Non-Manuf., excl. Transp.	-291	-579	-876	-1,186	-1,503	-1,897	-2,230	-8,562
Water Transportation	122	241	358	472	584	694	801	3,272
Truck, Rail, and Air Transp.	7	14	20	25	29	31	34	160
GRP (Bil Fixed 99\$)	-0.029	-0.059	-0.093	-0.129	-0.167	-0.215	-0.259	-0.950
Personal Income (Bil Nom \$)	-0.017	-0.035	-0.056	-0.079	-0.105	-0.140	-0.172	-0.603
Output (Bil Fixed 99\$)	-0.062	-0.128	-0.198	-0.274	-0.355	-0.453	-0.544	-2.014
Imports (Bil Fixed 99\$)	NA	NA	NA	NA	NA	NA	-0.178	NA
Exports (Bil Fixed 99\$)	NA	NA	NA	NA	NA	NA	-0.277	NA
Wage Rate (Thou. Nom \$)	-0.001	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	N/A
Export Price (\$/\$)	0.000	0.000	0.000	0.000	0.000	0.001	0.001	N/A
Percent Difference								
Employment								
Total	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	0.0%
Manufacturing	-0.1%	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%	-0.4%	-0.2%
Non-Manuf., excl. Transp.	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GRP	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Personal Income	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	0.0%
Output	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%
Imports	NA	NA	NA	NA	NA	NA	-0.2%	NA
Exports	NA	NA	NA	NA	NA	NA	-0.3%	NA
Wage Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	N/A
Export Price	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	N/A

Table 33: Impact to Washington, Closure of Port of Portland

Table 34 lists the impacts of the port closure on Washington's employment by type of industry. It includes both the number and percent of jobs impacted for each industry. Industries are listed in rank order, based on the number of jobs impacted.

By 2010 Washington's Manufacturing sector loses 0.4% (1,272) of its jobs compared to the Base Case. Within Manufacturing, the Durables industry is impacted slightly more than Non-Durables based on percent of jobs lost - Durables lose 0.5% of jobs (1,075) compared to 0.2% of jobs (197) in Non-Durables.

Impact on Employment in State of Washington, 2010 Closure of Port of Portland		
	Number	Percent
<i>Total</i>	-2,667	-0.1%
Manufacturing	-1,272	-0.4%
Durables	-1,075	-0.5%
Transp Equip	-647	-0.8%
Machine&Computers	-84	-0.5%
Primary Metals	-81	-0.9%
Fabricated Metals	-63	-0.4%
Lumber	-62	-0.1%
Motor Vehicles	-51	-0.9%
Instruments	-21	-0.2%
Stone,Clay,Etc.	-18	-0.2%
Misc. Manufact	-17	-0.2%
Electric Equip	-17	-0.2%
Furniture	-13	-0.3%
Non-Durables	-197	-0.2%
Rubber	-62	-0.8%
Food	-47	-0.1%
Paper	-30	-0.2%
Printing	-23	-0.1%
Chemicals	-17	-0.3%
Apparel	-12	-0.3%
Petro Products	-4	-0.2%
Textiles	-1	-0.2%
Leather	-1	-0.3%
Tobacco Manuf	0	0.0%
Non-Manufacturing	-162	0.0%
Services	-102	0.0%
Retail Trade	-74	0.0%
Construction	-42	0.0%
Wholesale Trade	-35	0.0%
Fin&Ins&Real Est	-21	0.0%
Agri&For&Fish Serv	-8	0.0%
Mining	-1	0.0%
Trans.&Public Util.	119	0.1%

Table 34: Impact on Employment in Washington, Closure of Port of Portland

Figure 15 and Figure 16 illustrate the largest impacts based on number of jobs to Washington's Durables and Non-Durables industries.

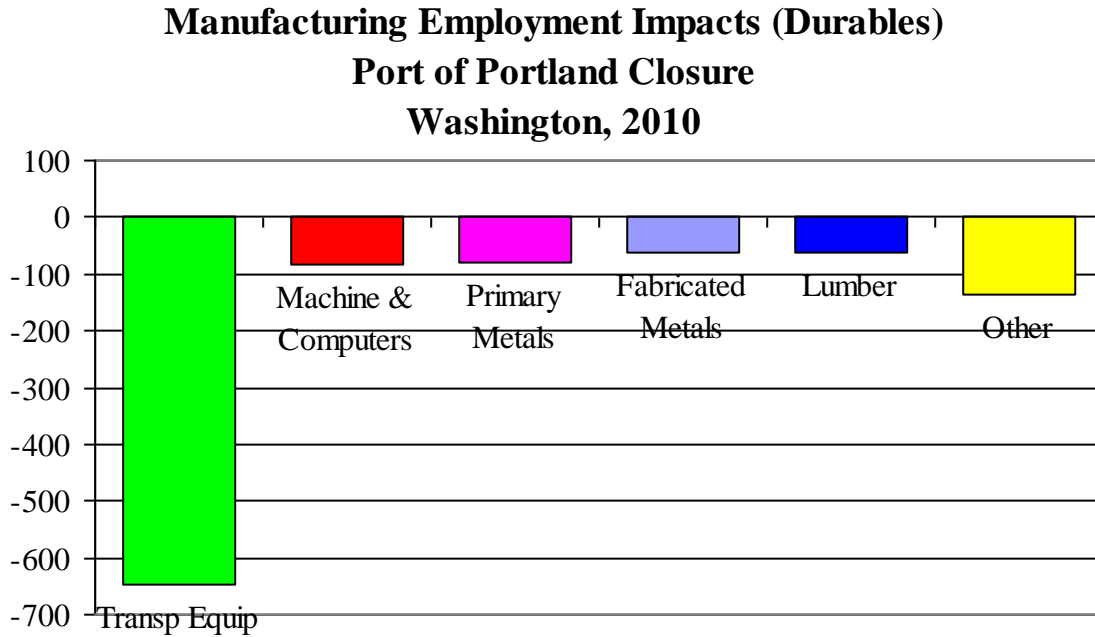


Figure 24: Manuf. Employment Impacts (Durables), Portland Closure - WA

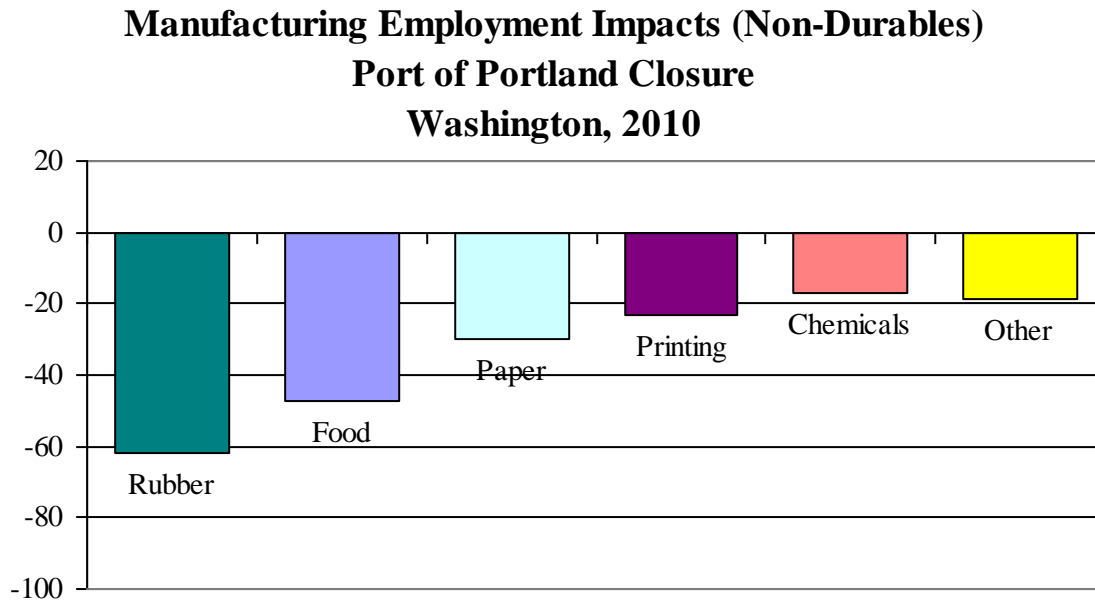


Figure 25: Manuf. Employment Impacts (Non-Durables), Portland Closure - WA

In the Washington’s Durables industry, the largest job losses resulting from the closure of the Port of Portland occur in Transportation Equipment (647 jobs - 0.8%). Employment in the Transportation Equipment industry makes up about 40% of Washington’s Durables employment (see section *Baseline Conditions for State of Washington*) and accounts for about 60% of the job losses.

Of the 197 (or 0.2%) of jobs lost in the Non-Durables industry, the specific industries with the largest job losses are Rubber (62 – 0.8%), Food (47 – 0.1%), and Paper (30 - 0.2%).

Figure 26 ranks the 2010 impacts to Washington’s Non-Manufacturing industries resulting from the closure of the Port of Portland based on number of jobs. Whereas, the percent change from the Base Case is negligible, the losses to Non-Manufacturing jobs are greatest in the Services (102) and Retail Trade (72) industries. The Transportation & Public Utilities industry gains 119 jobs (0.1%). This increase is reflective of an increase in port employment and trucking in Washington caused by handling a portion of the diverted trade from the Port of Portland.

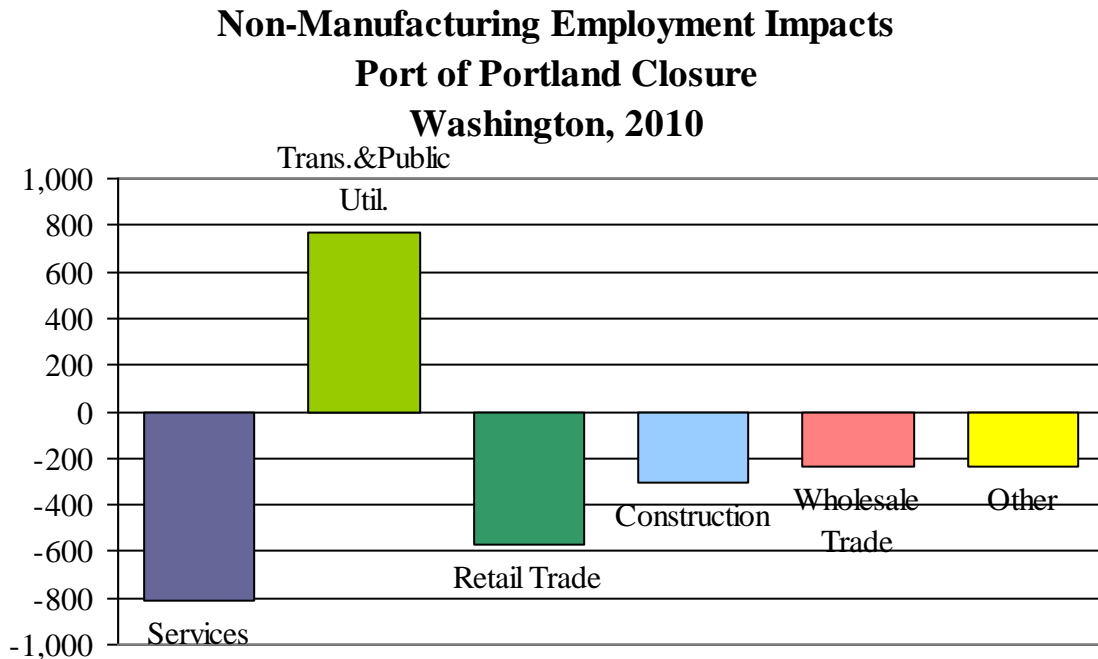


Figure 26: Non-Manufacturing Employment Impacts, Portland Closure - WA

Impact to Alaska of Immediate Closing the Alaska Ports

In this scenario all the ports in Alaska are closed for the entire year of 2004. This closure necessitates diverting Alaska's waterborne imports and exports to either trucking or air transport. Portions of Alaska (Southwest and Southeast Alaska) are not accessible by truck due to the lack of coastal highways (Pacific Alaska Forwarders, Inc. website). As a result, we assume that trade typically going through Southeast or Southwest Alaska ports are transported by air. The rest of the trade, we assume to be trucked.

With the closure of the Alaska ports, we also suspend the exporting of crude oil based on the assumption that it would be too expensive to acquire and utilize the trucks needed to move the crude oil. This results in a significant reduction in the production of crude oil in Alaska.

As with the other scenarios, the port closure creates an increase in transportation costs, a reduction in port employment, and an increase in Trucking, Rail, and Air revenues. The diverting of trade to trucking or air increases the cost of goods and the cost of exporting goods due to the added transportation expense. The increase in the cost of goods, in turn, increases the cost of production for industries using those goods. In addition to costs increasing, revenues from trucking and air increase. See the Methodology section for a detailed description of the assumptions made when simulating the closure of the Ports of Alaska.

Closure of Alaska Ports: Overview Results

This section reports an overview of the impacts of the closure of the Alaska Ports on the State of Alaska. Impacts to other areas are also included as a reference. Table 35 provides a summary of the impact of the closure on several primary economic indicators by area. Impacts are defined as differences from the REMI model's base case conditions.

As Table 35 indicates, closing the ports of Alaska significantly impacts Alaska's economy. Employment levels decrease by over 16% (53,901 jobs) in the year of the closure. Of the total jobs lost in Alaska, 2,791 jobs are in the Manufacturing sector, translating into a 17.8% loss in Manufacturing. Direct job losses (port-related jobs) total 2,758.

The closure of the ports further affects Alaska's Economic Output, dropping by 23.2% or \$7.5 billion. GRP declines by 16.6% or \$3.9 billion, and Personal Income drops by 9.7% or \$2.3 billion.

Wage rates in Alaska drop \$2,300 or 8.2%. Imports and Exports drop significantly at 31.2% and 38.2%, respectively.

Washington State is also negatively impacted by the shutdown of the Alaska ports. This impact makes sense because most waterborne trade with Alaska goes through the Port of Seattle/Tacoma. Total Employment in Washington drops 4,660 or 0.1%. This includes the loss of 429 Manufacturing jobs and 1,289 port-related jobs. Whereas there is an increase in Trucking, Rail, and Air employment of 657, this does not make up for the overall losses (See Table 35).

Impact on Economic Indicators by Area, Year 2004						
Closure of Alaska Ports						
	Alaska	Washington	Oregon	California	British Columbia	Rest of US
Employment						
Total	-53,901	-4,660	-1,142	-6,642	-901	-2,293
Manufacturing	-2,791	-429	-237	-913	-164	-2,465
Non-Manuf., excl. Transp.	-47,581	-3,599	-878	-5,623	-698	-381
Water Transportation	-2,758	-1,289	-5	-18	-12	+68
Truck, Rail, and Air Transp.	-771	+657	-22	-87	-27	+485
GRP (Bil Fixed 99\$)	-3.924	-0.252	-0.060	-0.347	-0.049	-0.051
Personal Income (Bil Nom \$)	-2.349	-0.251	-0.056	-0.419	-0.027	-0.115
Output (Bil Fixed 99\$)	-7.502	-0.455	-0.130	-0.674	-0.101	-0.375
Imports (Bil Fixed 99\$)	-2.697	-0.225	-0.077	-0.502	-0.075	-1.787
Exports (Bil Fixed 99\$)	-3.016	-0.091	-0.037	-0.124	-0.030	-0.009
Wage Rate (Thou. Nom \$)	-2.302	-0.016	-0.002	-0.002	-0.001	0.000
Export Price (\$/\$)	+0.161	0.000	0.000	0.000	0.000	0.000
Percent Difference						
Employment						
Total	-16.4%	-0.2%	-0.1%	0.0%	0.0%	0.0%
Manufacturing	-17.8%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%
Non-Manuf., excl. Transp.	-16.4%	-0.1%	-0.1%	0.0%	0.0%	0.0%
Water Transportation	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	-4.6%	+0.8%	0.0%	0.0%	0.0%	0.0%
GRP	-16.6%	-0.1%	0.0%	0.0%	0.0%	0.0%
Personal Income	-9.7%	-0.1%	0.0%	0.0%	0.0%	0.0%
Output	-23.2%	-0.1%	-0.1%	0.0%	-0.1%	0.0%
Imports	-31.2%	-0.3%	-0.2%	-0.2%	-0.2%	-0.1%
Exports	-38.2%	-0.1%	-0.1%	0.0%	-0.1%	0.0%
Wage Rate	-8.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Export Price	+1.3%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 35: Impact on Economic Indicators by Area, Closure of Alaska Ports

Table 36 shows the impact of the port closure on trade flows in 2004. This table shows the impacts to supply sources for each region. For example, looking at the first column, we see that closing the port causes Alaska's Demand to drop by \$7.8 billion. This decrease in Demand translates into a decrease in Alaska's self-supply as well as its level of Imports. Alaska's self-supply decreases by \$5.1 billion, and its Imports drop by \$55 million from Washington, \$47 million from Oregon, \$249 million from California, \$35 million from British Columbia, \$1.6 billion from the Rest of the United States and Canada, and \$ 710million from the Rest of the World.

From the table, we see that closing the Alaska Ports causes a significant drop in both total Imports and Exports. Total Imports to Alaska decrease by \$2.7 billion (31.2%) and total Exports decrease by \$3.0 billion (38.2%). Closing the Alaska Ports also impacts Imports to and Exports from other areas. Total Imports drop by 0.3% in Washington, 0.2% in Oregon, California, and British Columbia, and 0.1% in the Rest of the United States and Canada. Total Exports from Washington, Oregon, and British Columbia all decrease by 0.1%, and Exports from the Rest of the United States and Canada drop by 0.2%. Impacts to California are negligible, based on percent impacts.

Impact on Trade Flows (Bil. Fixed \$99) Closure of Alaska Ports, 2004									
	Alaska	Washington	Oregon	California	British Columbia	Rest of US & Canada	Rest of World	Output	Exports
Alaska	-5.120	-0.073	-0.035	-0.352	-0.048	-1.999	-0.509	-8.136	-3.016
Washington	-0.055	-0.345	-0.004	-0.005	-0.003	0.041	-0.064	-0.436	-0.091
Oregon	-0.047	-0.014	-0.088	-0.005	-0.002	0.032	0.000	-0.125	-0.037
California	-0.249	-0.019	-0.006	-0.498	-0.004	0.152	0.002	-0.622	-0.124
BC	-0.035	-0.011	-0.002	-0.003	-0.070	0.021	0.000	-0.101	-0.030
Rest of US&CN	-1.600	-0.066	-0.017	-0.077	-0.011	-0.366	-0.005	-2.141	-1.775
Rest of World	-0.710	-0.041	-0.013	-0.060	-0.008	-0.066			
Demand	-7.817	-0.570	-0.165	-1.000	-0.146	-2.185			
Imports	-2.697	-0.225	-0.077	-0.502	-0.075	-1.819			
Percent Difference from Base Case									
	Alaska	Washington	Oregon	California	British Columbia	Rest of US & Canada	Rest of World	Output	Exports
Alaska	-20.9%	-37.5%	-34.2%	-41.8%	-33.3%	-37.2%	-41.3%	-25.1%	-38.2%
Washington	-18.3%	-0.2%	-0.1%	0.0%	0.0%	0.1%	-0.3%	-0.2%	-0.1%
Oregon	-30.2%	-0.2%	-0.1%	-0.1%	0.0%	0.1%	0.0%	-0.1%	-0.1%
California	-26.2%	-0.2%	-0.1%	0.0%	-0.1%	0.1%	0.0%	0.0%	0.0%
BC	-25.9%	-0.2%	-0.1%	0.0%	0.0%	0.1%	0.0%	-0.1%	-0.1%
Rest of US&CN	-32.0%	-0.2%	-0.1%	0.0%	-0.1%	0.0%	0.0%	0.0%	-0.2%
Rest of World	-33.8%	-0.2%	-0.1%	0.0%	-0.1%	0.0%			
Demand	-23.6%	-0.2%	-0.1%	-0.1%	-0.1%	0.0%			
Imports	-31.2%	-0.3%	-0.2%	-0.2%	-0.2%	-0.1%			

Table 36: Impact on Trade Flows, Closure of Alaska Ports

Closure of Alaska Ports: Alaska Detail

Table 37 shows the impact of the closure of the Alaska ports in 2004 on the Alaska economy for the years 2005-2010. The table shows a nearly immediate recovery of

Employment with a significant, but not complete recovery of Output, GRP, and Personal Income in 2005. Output is still \$176 million or 0.5% below the Base Case levels in 2005. This loss is reduced to \$92 million or 0.3% by 2010. For GRP the 2005 difference is \$167 million or 0.7%, which drops to \$100 million or 0.4% loss in 2010. Personal Income has the most trouble recovering. It still has a 1.2% or \$300 million reduction in 2005, which only drops to a 0.7% or \$219 million loss in 2010. Since Wage Rates are actually above the Base Case by 2007, the reduction in Personal Income is explained by changes in population due to economic migration during the 2004 closure of the ports.

Impact on Economic Indicators for Alaska Closure of Alaska Ports							
	2004	2005	2006	2007	2008	2009	2010
Employment							
Total (Private, Non-Farm)	-53,901	-1,271	-1,268	-1,023	-852	-743	-661
Manufacturing	-2,791	-93	-83	-66	-54	-45	-38
Non-Manuf., excl. Transp.	-47,581	-1,118	-1,125	-907	-756	-661	-590
Water Transportation	-2,758	-2	-4	-3	-3	-3	-3
Truck, Rail, and Air Transp.	-771	-58	-56	-46	-39	-34	-30
GRP (Bil Fixed 99\$)	-3.924	-0.167	-0.158	-0.138	-0.122	-0.110	-0.100
Personal Income (Bil Nom \$)	-2.349	-0.306	-0.285	-0.262	-0.244	-0.230	-0.219
Output (Bil Fixed 99\$)	-7.502	-0.176	-0.170	-0.140	-0.119	-0.104	-0.092
Imports (Bil Fixed 99\$)	-2.697	NA	NA	NA	NA	NA	NA
Exports (Bil Fixed 99\$)	-3.016	NA	NA	NA	NA	NA	NA
Wage Rate (Thou. Nom \$)	-2.302	-0.041	-0.006	0.019	0.036	0.048	0.055
Export Price (\$/\$)	0.161	-0.002	0.006	0.006	0.006	0.006	0.006
Percent Difference							
Employment							
Total	-16.4%	-0.4%	-0.4%	-0.3%	-0.3%	-0.2%	-0.2%
Manufacturing	-17.8%	-0.6%	-0.5%	-0.4%	-0.4%	-0.3%	-0.3%
Non-Manuf., excl. Transp.	-16.4%	-0.4%	-0.4%	-0.3%	-0.3%	-0.2%	-0.2%
Water Transportation	NA	NA	NA	NA	NA	NA	NA
Truck, Rail, and Air Transp.	-4.6%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%	-0.2%
GRP	-16.6%	-0.7%	-0.7%	-0.6%	-0.5%	-0.4%	-0.4%
Personal Income	-9.7%	-1.2%	-1.1%	-0.9%	-0.8%	-0.7%	-0.7%
Output	-23.2%	-0.5%	-0.5%	-0.4%	-0.4%	-0.3%	-0.3%
Imports	-31.2%	NA	NA	NA	NA	NA	NA
Exports	-38.2%	NA	NA	NA	NA	NA	NA
Wage Rate	-8.2%	-0.1%	0.0%	0.1%	0.1%	0.1%	0.2%
Export Price	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 37: Impact on Economic Indicators for Alaska, Closure of Alaska Ports

Table 38 shows which of Alaska's industries are most affected by the shutdown of the Alaska ports. It includes both the number and percent of jobs impacted for each industry. Industries are listed in rank order, based on the number of jobs impacted.

Impact on Employment in Alaska, 2004 Closure of Alaska		
	Number	Percent
<i>Total</i>	-53,900	-16.4%
Manufacturing	-2,791	-17.8%
Durables	-1,031	-23.4%
Lumber	-416	-18.2%
Misc. Manufact	-139	-27.5%
Stone,Clay,Etc.	-132	-32.4%
Fabricated Metals	-121	-31.5%
Transp Equip	-95	-18.8%
Machine&Computers	-54	-57.7%
Furniture	-33	-32.3%
Primary Metals	-20	-41.3%
Electric Equip	-13	-29.7%
Instruments	-4	-28.2%
Motor Vehicles	-3	-40.1%
Non-Durables	-1,760	-15.6%
Food	-1,199	-14.4%
Printing	-291	-14.7%
Petro Products	-148	-38.5%
Chemicals	-63	-27.3%
Apparel	-27	-12.4%
Paper	-14	-20.8%
Rubber	-10	-25.6%
Textiles	-3	-19.9%
Leather	-3	-23.0%
Tobacco Manuf	-2	-13.6%
Non-Manufacturing	-51,110	-16.3%
Services	-14,710	-11.6%
Mining	-9,286	-91.8%
Retail Trade	-8,481	-13.0%
Construction	-8,012	-33.3%
Trans.&Public Util.	-4,839	-14.0%
Fin&Ins&Real Est	-3,143	-13.0%
Wholesale Trade	-1,931	-18.9%
Agri&For&Fish Serv	-711	-3.8%

Table 38: Impact on Employment in Alaska, Closure of Alaska Ports

The most dramatic impact is on the Oil Mining industry (in the Non-Manufacturing sector), which loses almost 92% (9,286 jobs) of its employment. In terms of percent losses, there are also dramatic reductions in Petroleum Products (38%), Construction

(33%), Stone and Clay (32%), and Fabricated Metals (32%). Although both Machinery & Computer and Primary Metals are small industries, they still have losses of 58% and 41% of their respective employment.

Figure 27 and Figure 28 illustrate graphically the largest impacts to Alaska’s Durables and Non-Durables industries (in Manufacturing sector) in terms of absolute drops in employment.

In Alaska’s Durables industry, the largest impact based on number of jobs is to Lumber. The Lumber industry loses 416 jobs (18.2%) in the year of the port closure. The next largest losses occur in Miscellaneous Manufacturing (139), Stone and Clay(132), and Fabricated Metals (121).

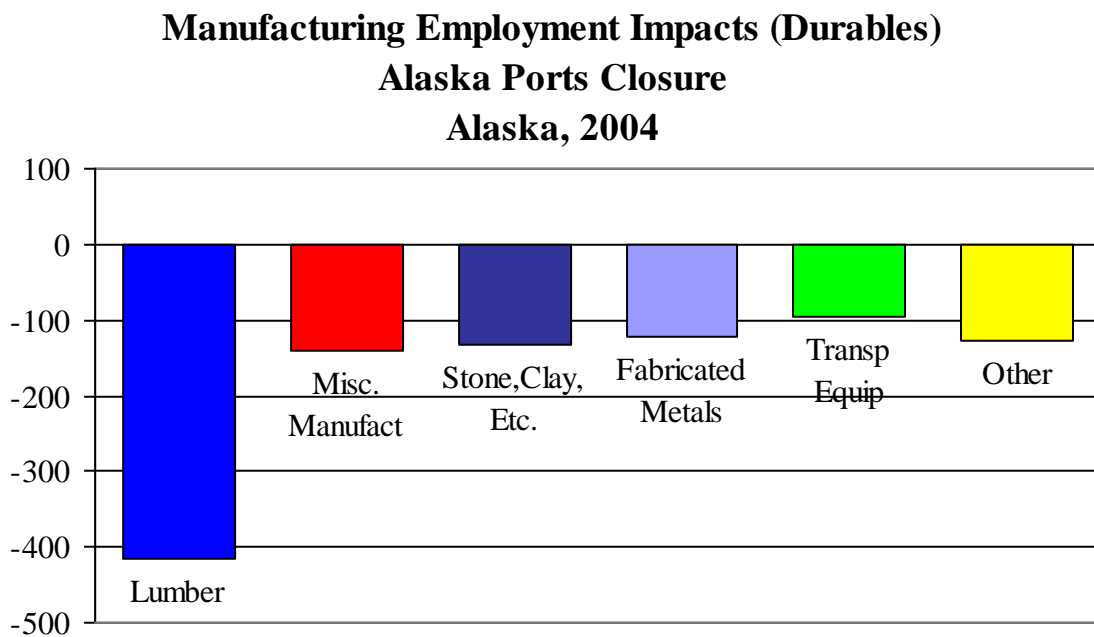


Figure 27: Manuf. Employment Impacts (Durables), Alaska Closure - AK

In Alaska’s Non-Durables industry (Figure 28), the largest impacts based on number of jobs are to Food (1,199 jobs), Printing (291 jobs), and Petroleum Products (148).

**Manufacturing Employment Impacts (Non-Durables)
Alaska Ports Closure
Alaska, 2004**

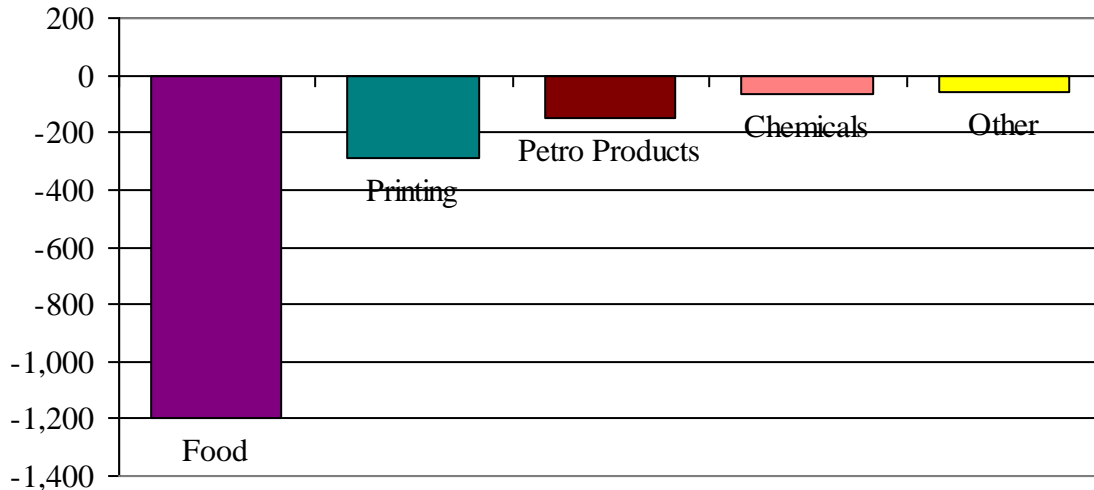


Figure 28: Manuf. Employment Impacts (Non-Durables), Alaska Closure - AK

For the Non-Manufacturing sector (Figure 29), the largest employment declines occur in Services (14,710), Mining (9,286), Retail Trade (8,481), and Construction (8,012).

**Non-Manufacturing Employment Impacts
Alaska Ports Closure
Alaska, 2004**

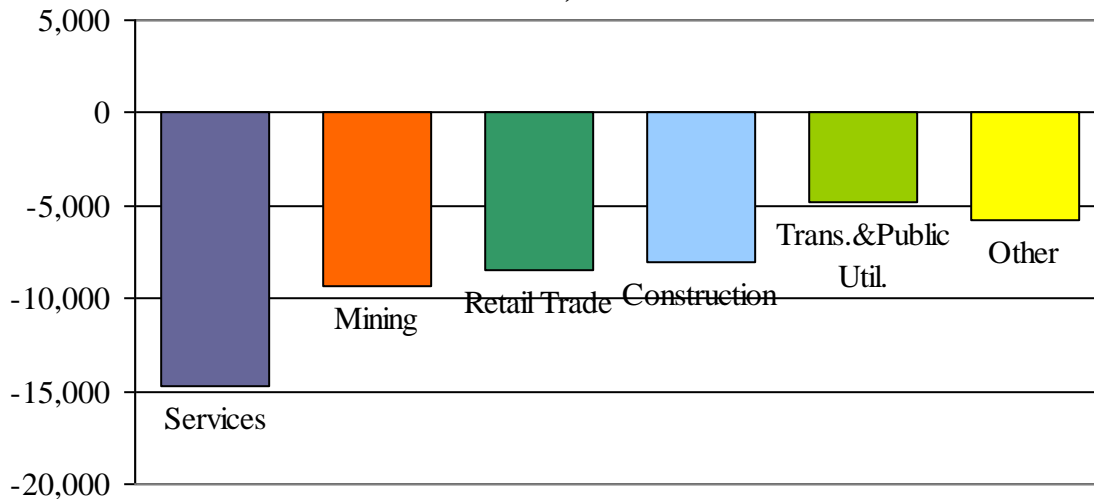


Figure 29: Non-Manufacturing Employment Impacts, Alaska Closure - AK

Conclusion

The economy of the Pacific Northwest is significantly impacted if any of the major seaports is shut down. If a seaport is closed, foreign and domestic trade that typically goes through that port needs to be diverted to an alternative port. This diversion of traffic results in higher transportation costs to producers of goods. Higher transportation costs result in higher production costs for industries that use the goods. Higher transportation costs also results in higher export costs. Several industries increase their revenues due to the port shutting down. These industries are the Trucking, Railroad, and Airline industry and the Water Transportation industry of the neighboring areas (that is, other seaports). These industries handle the trade that needs to be rerouted. Whereas there is a positive impact to these transportation industries, the impact is not enough to offset the overall negative impact to the regional economy.

Closing a major port results in increased costs, which impact the economy. This study measures impacts to the economy in terms of Employment, GRP, Personal Income, Output, Imports, Exports, Wage Rates and Prices. The four study questions examined in this report are listed below including conclusions for each.

1) WHAT IS THE ECONOMIC IMPACT TO WASHINGTON AND OREGON OF AN IMMEDIATE CLOSURE OF THE PORT OF SEATTLE/TACOMA OCCURRING IN 2004 AND LASTING FOR ONE YEAR?

As a result of the closure, both Washington and Oregon experience significant negative impacts to their economies. Manufacturing employment is hit harder than Non-Manufacturing based on percent loss in each of the states. However, Non-Manufacturing is hit harder based on actual number of jobs. Other economic indicators, including GRP, Output, Personal Income, and Wage Rates, drop in both of the states as well.

Whereas both Washington and Oregon experience a significant hit to their economies in the year 2004, the economies of surrounding areas, such as California and British Columbia experience an overall positive impact. This is due to the diversion of trade to the other areas.

With respect to specific Manufacturing industries impacted by closing the Port of Seattle/Tacoma, the Durables industry is larger and loses more jobs than Non-Durables. However, both Durables and Non-Durables industries lose jobs. In Washington, Machinery & Computers and Motor Vehicles are the hardest hit based on percent loss. Transportation Equipment loses the most based on number of jobs. In Oregon, the largest percent losses occur in Machinery & Computers, Transportation Equipment and Motor Vehicles. Based on number, the greatest losses occur in Machinery and Computers and Electrical Equipment.

There is no significant long-term impact from the closure of the Port of Seattle/Tacoma. From 2005 through 2010, the only impact is caused by an investment bounce in the years following the port closure, creating a slightly positive impact to the economy.

2) WHAT IS THE ECONOMIC IMPACT TO ALASKA OF AN IMMEDIATE CLOSURE OF THE PORT OF SEATTLE/TACOMA OCCURRING IN 2004 AND LASTING FOR ONE YEAR?

The closure of the Port of Seattle/Tacoma has a negative impact on Alaska's economy in the year of the closure. Because Alaska's domestic waterborne trade primarily goes through the Port of Seattle/Tacoma, Alaska needs to reroute its goods through another port thereby increasing transportation costs.

The industries in Alaska most impacted by the closure of the Port of Seattle/Tacoma are, for the most part, the industries with the largest employment. No industry stands out as being hit significantly harder than the others on a percentage basis. The Manufacturing industries with the largest number of job losses are Food and Lumber. The Non-Manufacturing jobs hardest hit include Services, Retail Trade, and Construction.

After 2005, when the port is reopened, the impact to Alaska is very slight, indicating that, long term, there is almost a full recovery of Alaska's economy by 2010.

3) WHAT IS THE ECONOMIC IMPACT TO WASHINGTON AND OREGON OF A GRADUAL SHUT DOWN OF THE PORT OF PORTLAND BEGINNING IN 2004 AND BE COMPLETED BY 2010?

The gradual closure of the Port of Portland negatively impacts both the economies of Oregon and Washington.

Impacts to the states are less than they would be with an immediate closure because the gradual closure allows for time to adjust. When considering total-labor years lost across the seven years, Oregon loses a total of 111,585 labor-years and Washington loses 10,325 labor-years.

The specific Manufacturing industries that are hardest in Oregon in 2010 occur in Motor Vehicles, Machinery and Computers, and Transportation Equipment. In Washington, the Manufacturing industry with the greatest losses in 2010 is in Transportation Equipment. Employment in the Transportation Equipment industry makes up about 40% of Washington's Durables employment and accounts for about 60% of the job losses.

The impact to Oregon of gradually closing the Port of Portland grows each year from 2004 through 2010 as the trade through the port is reduced. There is no evidence of any new economic growth filling the gap left by the closure of the port. The Employment loss is about 4,000 jobs per year with about 600 (15%) of those being Manufacturing jobs. Output declines by over \$500 million per year with GRP dropping over \$250 million per year and Personal Income dropping over \$200 million per year. These losses are essentially a permanent impact of the closure of the Port of Portland.

Between 2004 and 2010, Washington's economic indicators all decline by approximately 0.1%, indicating a slight long-term impact to Washington's economy. The surrounding regions (British Columbia and California) show a slight increase in economic activity but less than the losses in Oregon and Washington.

4) WHAT IS THE ECONOMIC IMPACT TO ALASKA OF AN IMMEDIATE CLOSURE OF ALL ALASKA PORTS OCCURRING IN 2004 AND LASTING FOR ONE YEAR?

Alaska is highly dependent on its seaports and closing the ports of Alaska dramatically affects its economy. When shutting down the Alaska Ports, the Oil Mining industry takes the biggest hit. This is due to crude oil exports being suspended based on the assumption that it would be too expensive to acquire and utilize the trucks needed to move the crude oil. This results in a significant reduction in the production of crude oil in Alaska.

Employment in the Oil Mining industry drops by almost 92%. In terms of percent losses, there are also dramatic reductions in the industries of Petroleum Products, Construction, Stone and Clay, and Fabricated Metals.

Long-term, there is a nearly immediate recovery of Employment with a significant, but not complete recovery of Output, GRP, and Personal Income in 2005.

Methodology

Overview

The REMI regional macroeconomic model is used to simulate the Pacific Northwest port closures. First, a baseline forecast of the regional economy is produced with the REMI model. Second, a set of REMI's cost and revenue variables are modified to mirror the expected changes of a port closure. Third, the REMI model is rerun using these costs and revenues as inputs. Finally, the results from these runs are compared to the baseline to determine the economic impact of the port closures on each region.

To simulate the closure of a port, we revise the REMI model's cost and revenue variables as follows:

- 1) Eliminate the expected water transportation revenues of the port that is closed;
- 2) Increase port revenues of other west coast seaports due to rerouting of goods (for shutdown of Seattle/Tacoma and Portland ports only);
- 3) Increase revenues of trucking, railroads and airlines created by using alternative routes;
- 4) Increase production costs for industries that use goods that typically come through the closed port;
- 5) Increase foreign export costs due to the increased cost of transporting goods to alternative ports; and
- 6) For the shutdown of the Alaska ports only, eliminate the revenues from oil production.

Essentially the same method is used to simulate each of the port closures. Depending on which port is being shut down, slight modifications are made to the methodology and are noted throughout this section. One major difference among the methods is the number of years over which the shutdown takes place. The closure of the Port of Portland differs from the other two closures in that the level of traffic declines linearly from 2004 to 2010. For both the closure of the Port of Seattle/Tacoma and the Alaska ports, the shutdown is an immediate one-year closure in 2004.

Primary Data

This section describes the primary data used in calculations of the changes to REMI's cost and revenue variables. These data are obtained from outside sources and include port flows, freight rates, destination of goods coming through the port, and splits between trucking, rail and air.

1. Port Data

Port Flows

The "port flow" is the value of all goods moving through the port. This includes foreign imports and exports and domestic receipts and shipments. The port flow is computed by multiplying the trade flows (in tons) times the commodity prices (\$/ton) for each type of commodity.

Trade flows (in tons) for each port are available from the U.S. Army Corps of Engineers publication, titled *Waterborne Commerce of the United States*. This document contains statistics on the commercial movement of foreign and domestic cargo by port and commodity. The Waterborne Commerce data are categorized by the Standard Transportation Commodity Classification (STCC) system. This Waterborne Commerce data is only available by shipping weight, not value. Thus, we had to obtain estimates for commodity prices (\$/ton) from other sources to obtain the value of the port flows.

Trade flows (in both dollars and tons) for selected commodities (by SITC categories) were obtained from the U.S. Census Bureau, Foreign Trade Division. From this data, we compute a national average price per ton for each commodity. These prices per ton by commodity (in SITC categories) are then mapped into the Waterborne Commerce data's STCC categories. The resulting prices are then applied to the Waterborne Commerce shipping weight data to obtain the value of goods through the port. The results are then mapped into the REMI categories.

The port flows for Seattle/Tacoma (Table 39), Portland (Table 40), and Alaska (Table 41) are shown below. This inbound port traffic is used estimate the increase in transportation revenues from the trucking, rail, and air industries. The values are also used to reconcile to import values in REMI.

Port of Seattle/Tacoma Port Flows by Commodity, Year 2000					
(Thousands \$)					
REMI Commodity	Foreign		Domestic		Total
	Exports	Imports	Shipments	Receipts	
Lumber	494,300	255,308	582,740	263,423	1,595,771
Furniture	.	.	.	.	0
Stone, Clay, Etc.	96,712	192,548	133,512	2,712	425,484
Primary Metals	1,888,418	965,537	7,459	0	2,861,414
Fabricated Metals	323,888	1,417,615	481,333	39,250	2,262,086
Machinery & Computers	1,739,269	10,508,035	257,724	121,336	12,626,364
Electrical Equipment	.	.	.	.	0
Motor Vehicles	403,051	8,668,311	621,370	279,623	9,972,355
Rest of Trans Equip	260,071	1,597,099	7,189	0	1,864,359
Instruments	.	.	.	.	0
Misc. Manufact	1,763,823	8,862,982	13,659,093	1,739,748	26,025,646
Food	3,536,576	570,344	648,757	577,184	5,332,861
Tobacco Manuf	43,713	3,709	0	0	47,422
Textiles	15,763	1,927	0	0	17,690
Apparel	134,591	4,094,303	4,641	8,356	4,241,891
Paper	687,868	228,654	83,169	2,292	1,001,983
Printing	.	.	.	.	0
Chemicals	1,233,304	843,268	74,574	60,628	2,211,774
Petro Products	27,404	50,684	299,149	990,603	1,367,840
Rubber	69,065	736,341	8,288	0	813,694
Leather	.	.	.	.	0
Mining	123,689	92,140	8,021	278,431	502,281
Public Utilities	.	.	.	.	0
Agr, Forestry, and Fish Svcs	42,170	4,100	3,374	2,050	51,694
<i>Total</i>	<i>12,883,675</i>	<i>39,092,905</i>	<i>16,880,393</i>	<i>4,365,636</i>	<i>73,222,609</i>

Table 39: Port of Seattle/Tacoma Port Flows by Commodity, Year 2000

Source: US Army Corps of Engineers, *2000 Waterborne Commerce of the United States (WCUS) Waterways and Harbors on the Pacific Coast, Alaska and Hawaii*

Port of Portland Port Flows by Commodity, Year 2000					
(Thousand \$)					
REMI Commodity	Foreign		Domestic		Total
	Exports	Imports	Shipments	Receipts	
Lumber	332,599	138,048	27,134	19,287	517,068
Furniture	.	.	.	.	0
Stone,Clay,Etc.	65,118	46,780	0	0	111,898
Primary Metals	451,071	283,972	22,402	0	757,445
Fabricated Metals	103,464	535,646	0	0	639,110
Machin & Comput	698,395	1,256,007	17,771	27,697	1,999,870
Electrical Equip	.	.	.	.	0
Motor Vehicles	319,082	8,649,026	0	0	8,968,108
Rest Trans Equip	0	113,848	0	0	113,848
Instruments	.	.	.	.	0
Misc. Manufact	157,775	489,141	0	61,227	708,143
Food	1,971,468	135,464	4,432	712,539	2,823,903
Tobacco Manuf	0	0	0	0	0
Textiles	0	0	0	0	0
Apparel	51,052	217,249	0	0	268,301
Paper	554,412	43,804	1,852	44,740	644,808
Printing	.	.	.	.	0
Chemicals	1,346,387	167,578	13,566	15,534	1,543,065
Petro Products	11,439	176,730	804,530	1,537,349	2,530,048
Rubber	55,252	46,627	154,706	948,864	1,205,449
Leather	.	.	.	.	0
Mining	162,736	135,416	204,978	16,042	519,172
Public Utilities	0	0	30332	362	30,694
Agr, Forestry, and Fish Svcs	57,352	8,201	0	4,100	69,653
<i>Total</i>	<i>6,337,602</i>	<i>12,443,537</i>	<i>1,281,703</i>	<i>3,387,741</i>	<i>23,450,583</i>

Table 40: Port of Portland Port Flows by Commodity, Year 2000

Source: US Army Corps of Engineers, *2000 Waterborne Commerce of the United States (WCUS) Waterways and Harbors on the Pacific Coast, Alaska and Hawaii*

Ports in State of Alaska Port Flows by Commodity, Year 2000 (Thousand \$)					
REMI Commodity	Foreign		Domestic		Total
	Exports	Imports	Shipments	Receipts	
Lumber	62,415	3,115	17,345	203,777	286,652
Furniture	.	.	.	.	0
Stone,Clay,Etc.	0	3,825	34,397	64,394	102,616
Primary Metals	0	678	0	678	1,356
Fabricated Metals	0	11,544	40,486	161,617	213,647
Machin & Comput	0	13,848	157,432	139,459	310,739
Electrical Equip	.	.	.	.	0
Motor Vehicles	0	0	193,129	646,026	839,155
Rest Trans Equip	14,377	0	0	12,291	26,668
Instruments	.	.	.	.	0
Misc. Manufact	8,127	5,076	1,591,392	5,434,430	7,039,025
Food	603,985	409	361,983	744,557	1,710,934
Tobacco Manuf	0	0	0	0	0
Textiles	0	0	0	0	0
Apparel	0	0	0	8,356	8,356
Paper	4,166	0	0	40,063	44,229
Printing	.	.	.	.	0
Chemicals	32,679	17,842	28,778	53,212	132,511
Petro Products	74,378	44,539	175,041	179,617	473,575
Rubber	0	0	0	2,331	2,331
Leather	.	.	.	.	0
Mining	349,462	58,467	8,388,108	1,431	8,797,468
Public Utilities	0	0	0	0	0
Agr, Forestry, and Fish Svcs	0	0	0	0	0
<i>Total</i>	<i>1,149,589</i>	<i>159,343</i>	<i>10,988,091</i>	<i>7,692,239</i>	<i>19,989,262</i>

Table 41: Port Flows by Commodity for Alaska Ports, 2000

Source: US Army Corps of Engineers, *2000 Waterborne Commerce of the United States (WCUS) Waterways and Harbors on the Pacific Coast, Alaska and Hawaii*

Size of Port (\$)

The port flows from the above tables are summed across foreign imports and exports and domestic receipts and shipments to produce a measure of the size of the port. The sizes of the ports that correspond to REMI's 11 regions are contained in Table 42.

Estimated Value of Total Foreign and Domestic Trade Through Port	
Port	Total Trade (2000 B\$)
Ports of Seattle/Tacoma	73.6
Other Washington ports	6.0
Port of Portland	23.5
Other Oregon ports	0.5
Ports of Long Beach/Los Angeles	227.9
Ports of Oakland/San Francisco	43.0
Other California ports	8.8
Alaska ports	20.0
British Columbia (Port of Vancouver)	29.0

Table 42: Estimated Value of Total Foreign and Domestic Trade Through Port

Source: US Army Corps of Engineers Waterborne Commerce data combined with national average \$/ton by commodity obtained from US Census Bureau, Foreign Trade Division.

The sizes of the ports are used in determining the increase in port revenues from water transportation. Specifically, the sizes of the ports are used to allocate the flow of the closed port to alternative ports.

State-to-State Port Flows (Tons)

The origin and destination of goods flowing through each port is needed in order to compute the increase in transportation costs by commodity. State- to-state port flow data are available from from the U.S. Army Corps of Engineers’ Public Domain Database. The database contains origin port to destination port flows (in tons) at an aggregated level of commodities (aggregations are because of confidentiality concerns).

The state-to-state flows (in tons) of a given commodity are applied to estimated relative costs (\$/ton) of transporting goods between regions to get a total transportation cost (\$) by commodity.

The state-to-state port flows used in this analysis are listed in Table 43, Table 44, and Table 45.

State to State Port Flows By Commodity (Short Tons)						
State of Origin Port	State of Destination Port	Coal, Lignite, and Coal Coke	Crude Petroleum	Petroleum Products	Chemical Fertilizers	Chemicals excluding Fertilizers
Washington	Alaska	0	0	240,305	0	20,991
Washington	California	0	0	2,521,774	0	114,515
Washington	Canada	0	0	953,420	0	184,609
Washington	Foreign	547	57,504	862,525	183,210	1,134,708
Washington	Oregon	0	0	5,100,421	0	125,028
Washington	Rest of US	0	0	126,971	0	137,982
Washington	Washington	0	0	11,022,752	0	79,054
Oregon	Alaska	0	0	0	0	0
Oregon	California	0	0	0	0	0
Oregon	Canada	0	0	4,325	0	0
Oregon	Foreign	0	0	55,790	1,746,119	2,398,257
Oregon	Oregon	0	0	711,182	0	0
Oregon	Rest of US	0	0	0	0	0
Oregon	Washington	0	0	2,289,239	0	48,969
Alaska	Oregon	0	0	46,996	0	0
California	Oregon	0	0	1,803,025	0	0
Canada	Oregon	0	0	325,473	0	19,705
Foreign	Oregon	7,165	307,092	344,922	92,969	145,565
Oregon	Oregon	0	0	711,182	0	0
Rest of US	Oregon	0	0	0	0	0
Washington	Oregon	0	0	5,100,421	0	0
Alaska	Washington	0	21,889,332	533,259	0	11,765
California	Washington	0	127,549	432,294	0	0
Canada	Washington	160,410	121,528	328,850	17	23,317
Foreign	Washington	15,536	1,094,534	362,186	89,979	396,471
Oregon	Washington	0	0	2,289,239	0	48,969
Rest of US	Washington	0	0	0	0	66,756
Washington	Washington	0	0	11,022,752	0	79,054
Alaska	Alaska	0	0	0	0	1,670
California	Alaska	0	0	53,919	0	0
Canada	Alaska	0	0	117,999	33,536	33,536
Foreign	Alaska	285,558	638,354	247,106	67	67
Oregon	Alaska	0	0	0	0	0
Rest of US	Alaska	0	0	0	0	0
Washington	Alaska	0	0	240,305	0	20,991

Table 43: State-to-State Port Flows by Commodity

Source: US Army Corps of Engineers, Public Domain Database, 2000.

State to State Port Flows By Commodity (Short Tons)						
State of Origin Port	State of Destination Port	Lumber, Logs, Wood Chips, and Pulp	Sand, Gravel, Shells, Clay, Salt, and Slag	Iron Ore, Iron, and Steel Waste and Scrap	Non-Ferrous Ores and Scrap	Primary Non-Metal Products
Washington	Alaska	88,120	12,634	0	0	106,808
Washington	California	418,490	0	0	0	0
Washington	Canada	323,187	16,512	55	245	9,222
Washington	Foreign	5,086,991	324,506	143,315	1,165,884	1,165,884
Washington	Oregon	586,089	473,570	0	0	0
Washington	Rest of US	0	0	0	0	0
Washington	Washington	4,271,312	3,068,318	29,801	0	79,234
Oregon	Alaska	0	0	0	0	0
Oregon	California	0	0	0	0	0
Oregon	Canada	13,261	0	0	0	0
Oregon	Foreign	2,113,728	86,342	74,103	19,689	417,974
Oregon	Oregon	421,255	2,186,861	0	0	0
Oregon	Rest of US	0	0	0	0	0
Oregon	Washington	480,669	236,435	0	0	0
Alaska	Oregon	0	0	0	0	0
California	Oregon	0	0	0	0	0
Canada	Oregon	105,173	541,383	0	0	1,200
Foreign	Oregon	125,987	443,605	28,135	537,337	495,949
Oregon	Oregon	421,255	2,186,861	0	0	0
Rest of US	Oregon	0	0	0	0	0
Washington	Oregon	586,089	473,570	0	0	0
Alaska	Washington	81,496	0	31,977	0	1,604
California	Washington	0	0	0	0	0
Canada	Washington	1,079,555	2,616,619	2,000	509,044	732,502
Foreign	Washington	180,750	1,114,165	31,732	1,564,572	570,586
Oregon	Washington	480,669	236,435	0	0	0
Rest of US	Washington	227,534	0	0	0	0
Washington	Washington	4,271,312	3,068,318	29,801	0	79,234
Alaska	Alaska	1,510,193	220,690	0	0	239,248
California	Alaska	0	0	0	0	0
Canada	Alaska	3,664	33,062	0	0	18,499
Foreign	Alaska	0	5	0	0	109,703
Oregon	Alaska	0	0	0	0	0
Rest of US	Alaska	0	0	0	0	0
Washington	Alaska	88,120	12,634	0	0	106,808

Table 44: State-to-State Port Flows by Commodity

Source: US Army Corps of Engineers, Public Domain Database, 2000.

State to State Port Flows By Commodity (Short Tons)					
State of Origin Port	State of Destination Port	Primary Metal Products	Food and Food Products	Manufactured Goods	Unknown and Not Elsewhere Classified Products
Washington	Alaska	81,155	419,507	1,468,577	33,885
Washington	California	0	0	0	133,864
Washington	Canada	12,758	3,066	77,642	33,488
Washington	Foreign	464,324	19,218,992	459,431	153,225
Washington	Oregon	0	2,746,390	7,446	283,766
Washington	Rest of US	0	0	295,939	484,509
Washington	Washington	4,911	1,763,724	19,998	54,299
Oregon	Alaska	0	0	0	7,783
Oregon	California	0	0	0	313,091
Oregon	Canada	50	0	0	0
Oregon	Foreign	52,232	8,784,031	105,805	9,386
Oregon	Oregon	0	389,392	215,774	56,174
Oregon	Rest of US	0	0	0	127,906
Oregon	Washington	0	294,926	2,758	15,318
Alaska	Oregon	0	0	0	73,644
California	Oregon	0	0	0	58,632
Canada	Oregon	347	16	4,599	10
Foreign	Oregon	667,501	82,344	683,324	5,451
Oregon	Oregon	0	389,392	215,774	56,174
Rest of US	Oregon	0	465,936	0	90,304
Washington	Oregon	0	2,746,390	7,446	283,766
Alaska	Washington	11,293	172,787	270,285	18,934
California	Washington	2,854	0	85,187	10,114
Canada	Washington	293,433	25,311	73,014	171
Foreign	Washington	1,394,019	513,126	4,885,016	255,452
Oregon	Washington	0	294,926	2,758	15,318
Rest of US	Washington	0	430,553	33,357	219,812
Washington	Washington	4,911	1,763,724	19,998	54,299
Alaska	Alaska	3,806	42,802	117,856	842,945
California	Alaska	0	0	0	14,314
Canada	Alaska	354	4,401	325	629
Foreign	Alaska	6,081	267	2,866	0
Oregon	Alaska	0	0	0	7,783
Rest of US	Alaska	0	0	0	37,877
Washington	Alaska	81,155	419,507	1,468,577	33,885

Table 45: State-to-State Port Flows by Commodity

Source: US Army Corps of Engineers, Public Domain Database, 2000.

2. Freight Rates of Trucking, Water and Air

The relative rates between different modes of transportation and different ports are used in calculating the increase of transportation costs. In order to obtain relative freight rates, we designed a hypothetical freight package to be shipped and obtained rate quotes from freight forwarders. The hypothetical package is designed to fit in one 20-foot container. The package consists of 82 boxes of computer equipment, weighing 4,100 lbs, with a volume of 997 cubic feet. Several freight forwarders were contacted to estimate the cost

of shipping that package between selected ports for different modes of transportation. These rates are translated into a cost/ton basis and are shown in Table 46.

Freight Rates for a Hypothetical Shipment		
By Truck		
Origin	Destination	\$/Ton
Seattle/Tacoma	Alaska	\$2,795
Seattle/Tacoma	San Francisco, CA	\$480
Seattle/Tacoma	Los Angeles, CA	\$720
Seattle/Tacoma	Portland, OR	\$320
Seattle/Tacoma	Rest of US (Chicago, IL)	\$980
Portland OR	San Francisco, CA	\$480
Portland OR	Rest of US (Chicago, IL)	\$980
Portland OR	Los Angeles, CA	\$480
By Water		
Seattle/Tacoma	Alaska	\$1,508
Seattle/Tacoma	Foreign (Japan)	\$446
Los Angeles, CA	Foreign (Japan)	\$446
Portland OR	Foreign (Japan)	\$1,324
Oakland, CA	Foreign (Japan)	\$446
By Air		
Seattle/Tacoma	Juneau	\$4,393

Table 46: Freight Rates for a hypothetical Shipment

Source: Rates obtained from freight forwarders: Pacific Alaska Rate Forwarders, Golden Gate Air Freight Forwarders, APX International: www.freight-calculator.com; and EZFreightRates Online Quote Service: www.ezfreightrates.com.

In the closure of the Alaska Ports, it is assumed that imports to Southeast or Southwest Alaska ports will have to be brought in by air, since due to the lack of coastal highways these areas are not accessible by truck. According to the Waterborne Commerce data in 2000, foreign and domestic imports to the ports of Southeast and Southwest Alaska make up about 33% of Alaska’s total imports based on weight. Thus 33% of foreign and domestic imports are assumed to be brought in by air, while the rest of the imports are assumed to be trucked.

3. Destination of Goods

The destination of goods that typically coming through the closed port is used to calculate the increase in revenues for trucking, rail and air.

To estimate the destination of goods that come through the Port of Seattle/Tacoma, preliminary data from the Washington State Freight Truck Origin and Destination Study

(Jessup and Casavant, 2003) were used. This freight study samples trucks on Washington State highways to determine information about their cargo, such as what it is, its origin, and its destination. Those trucks sampled carrying cargo that originated at one of the ports in the Seattle/Tacoma region are identified, and their destinations are assumed to be representative of the population of trucks originating in the Port of Seattle/Tacoma region. The distribution of destinations of trucks originating in the Port of Seattle/Tacoma is shown in Table 47. The sample was too small to break these destinations out by commodity. Thus, this distribution of destinations is used for all commodities originating in the Port of Seattle/Tacoma.

Destination of Goods from Ports of Seattle and Tacoma, by Truck (%)	
Destination	All Commodities
Seattle/Tacoma Region	15.3%
Rest of WA	23.7%
Port of Portland Region	6.8%
Rest of OR	7.8%
California	10.2%
Rest of US	20.2%
British Columbia	15.4%
Rest of Canada	0.7%
Total	100.0%

Table 47: Destination of Goods from Ports of Seattle and Tacoma, by Truck

Source: Preliminary Data from Washington State Freight Truck Origin and Destination Study.

To obtain destinations of goods originating at the Port of Portland, we modified the results of the Washington State Freight Truck Origin and Destination Study. With the exception of two commodities, we assigned a higher proportion of goods to remain in the Portland region. The two exceptions are for Motor Vehicles and the Rest of Transportation Equipment. Motor vehicles are the Port of Portland’s largest import. It is assumed that the rest of the United States is the destination for a large portion of this commodity. The resulting destinations of goods coming through the Port of Portland are shown in Table 48.

For the shutdown of the Alaska ports, it is assumed that 100% of goods coming into one of the seaports of Alaska remain in Alaska.

Destination of Goods from Port of Portland, by Truck (%)			
	Commodities (excl Motor Vehicles & Trans Equip)	Motor Vehicles	Rest of Transportation Equipment
Seattle/Tacoma Region	2.0%	2.0%	2.0%
Rest of WA	20.0%	5.0%	5.0%
Port of Portland Region	40.0%	25.0%	10.0%
Rest of OR	30.0%	25.0%	10.0%
California	2.0%	2.0%	2.0%
Rest of US	6.0%	41.0%	71.0%
British Columbia	0.0%	0.0%	0.0%
Rest of Canada	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

Table 48: Destination of Goods from Port of Portland, by Truck

Source: Author estimations.

4. Truck, Rail and Air Splits

The splits between the trucking, railroad and airline industries are used to calculate expected increases in trucking, railroad, and airline revenues when a port is closed. REMI's projected 2004 Output in the Port of Seattle/Tacoma region is used as the basis for the splits of each region except Alaska. For the air freight split, air freight is broken out from total air transportation output. In 2001, the percent of airline revenues that came from freight was 11% (Office of Airline Information, 2002). This percent is applied to REMI's air transportation output to obtain estimated splits for the region (Table 49).

Alaska splits are different because REMI does not include rail as a mode of transportation in Alaska. Furthermore, the major portions of the Southeast and Southwest areas of Alaska are not accessible by truck. As a result, air is the only alternative mode of shipping for those areas. According to the Waterborne Commerce data in 2000, foreign and domestic imports to the ports of Southeast and Southwest Alaska make up about 33% of Alaska's total imports based on weight. Consequently, the splits between trucking and air are: truck - 67% air- 33%.

Distribution of Trucking, Railroads, and Airline Sales (%)		
	All Regions, Except Alaska	Alaska
Trucking	76%	67%
Railroad	15%	0%
Air	9%	33%
Total	100%	100%

Table 49: Distribution of Trucking, Railroads, and Airline Sales

Source: Author calculations based on 2004 transportation output for Seattle/Tacoma region, REMI model, Version 5.2. Eleven percent (11%) of total air output was assumed to be air freight based on 2001 air freight to total air revenues (Office of Airline Information, 2002).

Transportation Costs

The closure of a port will increase transportation costs of all commodities that go through the port due to goods being rerouted to alternative ports or needing to use more expensive modes of transportation. This section describes the method used to estimate the increase in transportation costs for each commodity. This increase in transportation cost is used to calculate the increase in transportation revenues of trucking, rail, and air as well as the increase in the cost of production to industries that use the products that typically come through the port.

To estimate the increase in transportation costs, normal costs of transporting each commodity through the port when it is opened are compared to transportation costs when the port is closed. Normal transportation costs are estimated by applying the shipping rates in \$/ton (see Section on *Freight Rates* in *Primary Data*) to the quantity in tons that comes through the port. This calculation is done for each commodity. The transportation cost when the port is closed is the normal cost plus the extra cost of an alternative route. The difference between the transportation cost when the port is open and the transportation cost when the port is closed yields the increase in transportation cost shown in Table 50. (*Spreadsheet reference: 'Transportation Cost Increase'; Transportation Cost.xls*).

Increase in Transportation Costs Due to Port Closure				
(%)				
REMI Commodity	Increase in WA & OR due to Seattle/Tacoma Shutdown	Increase in Alaska due to Seattle/Tacoma Shutdown	Increase in WA & OR due to Portland Shutdown	Increase in Alaska due to Alaska shutdown
Lumber	162.5%	81.9%	13.4%	118.7%
Furniture	116.7%	85.1%	30.9%	118.8%
Stone, Clay, Etc.	157.8%	38.8%	31.0%	132.4%
Primary Metals	136.5%	79.0%	31.1%	120.8%
Fabricated Metals	136.5%	79.0%	31.1%	120.8%
Mach & Computers	116.7%	85.1%	30.9%	118.8%
Electrical Equip	116.7%	85.1%	30.9%	118.8%
Motor Vehicles	116.7%	85.1%	30.9%	118.8%
Rest of Trans Equip	116.7%	85.1%	30.9%	118.8%
Instruments	116.7%	85.1%	30.9%	118.8%
Misc Manuf	116.7%	85.1%	30.9%	118.8%
Food	119.5%	84.4%	2.3%	118.7%
Tobacco Manuf	119.5%	84.4%	2.3%	118.7%
Textiles	119.5%	84.4%	2.3%	118.7%
Apparel	116.7%	85.1%	30.9%	118.8%
Paper	157.8%	38.8%	31.0%	132.4%
Printing	157.8%	38.8%	31.0%	132.4%
Chemicals	119.6%	32.8%	30.1%	118.8%
Petroleum Products	156.3%	31.1%	4.5%	129.7%
Rubber	116.7%	85.1%	30.9%	118.8%
Leather	116.7%	85.1%	30.9%	118.8%
Mining	141.9%	0.0%	31.1%	0.0%
NonManufacturing	0.0%	0.0%	0.0%	0.0%

Table 50: Increase in Transportation Costs Due to Port Closure

Allocation of Trade to Alternative Ports

For the shutdown of both the Port of Portland and Seattle/Tacoma, it is assumed that foreign and domestic trade flows are rerouted to alternative West Coast seaports. The allocation of trade flows to alternative ports is based on the size of the port in dollar value (see Table 42 in *Size of Port (\$)* section of *Primary Data*). The selected ports exclude Alaska since it is deemed to be a poor substitute for Portland or Seattle/Tacoma. For the Alaska shutdown, goods are not rerouted to an alternative port. Instead, they are shipped via an alternative mode of transportation. Table 51 below shows the allocation of trade flows to other ports for each of the port shutdowns. This allocation of trade is used in calculations for increase in port revenues as well as increase in trucking, rail, and air revenues. (*Spreadsheet reference: 'Other Seaports'; Transportation Cost.xls*)

Allocation of Foreign and Domestic Trade to Alternative Ports (%)			
	Reallocation of Seattle & Tacoma Trade	Reallocation of Port of Portland Trade	Reallocation of Alaska Trade
Port of Seattle/Tacoma	0.0%	18.9%	0.0%
Other Washington Ports	1.8%	1.5%	0.0%
Port of Portland	6.9%	0.0%	0.0%
Other Oregon ports	0.1%	0.1%	0.0%
Ports of Long Beach/Los Angeles	67.3%	58.6%	0.0%
Ports of Oakland/San Francisco	12.7%	11.1%	0.0%
Other California Ports	2.6%	2.3%	0.0%
Alaska Ports	0.0%	0.0%	0.0%
Rest of US	0.0%	0.0%	0.0%
British Columbia (Port of Vancouver)	8.6%	7.5%	0.0%
Total	100.0%	100%	0.0%

Table 51: Allocation of Foreign and Domestic Trade to Alternative Ports

Prices

The closure of a port will increase the prices of goods that come through the port. These price increases are due to the increase in transportation costs of goods. Estimates of price increases are needed for calculating the increase in revenues for trucking, railroads and airlines as well as calculating the increase in production costs for industries that use rerouted goods. This section summarizes how we calculate the increase in the prices of goods for each region.

The increase in prices for each region and commodity varies depending on how much of each commodity is brought into in the region through the port. The increases also depend on the levels of increases in regional transportation costs for that commodity. For a given region, inbound port flows (from Table 39, Table 40, and Table 41), destinations of goods through the port (Table 47 and Table 48), and the region's foreign and domestic imports of each good (from REMI) are combined to get the proportion of goods that come through the port. Increases in transportation costs for each commodity and region were shown in the section, titled Transportation Costs, Table 50. The increase in transportation costs for each commodity is applied to the quantity of each commodity in a region that came through the port. Finally, we apply a transportation input-output (IO) coefficient indicating how much of each dollar used to produce this commodity was allocated to transportation. The transportation IO coefficient is taken from the 2004 IO table in the REMI model. The price increases for each commodity are listed in Table 52 for the Seattle/Tacoma shutdown, Table 53 for the Portland shutdown, and Table 54 for the Alaska shutdown. (*Spreadsheet reference: 'Prices'; Changes to REMI.xls*)

Price Increase for Year 2004 (\$/\$)					
Port of Seattle/Tacoma Shutdown					
	Seattle	Other WA	Portland	Other OR	Alaska
Lumber	0.0042	0.0073	0.0029	0.0030	0.0291
Furniture	0.0047	0.0119	0.0029	0.0039	0.0153
Stone, Clay, Etc.	0.0053	0.0096	0.0031	0.0041	0.0123
Primary Metals	0.0050	0.0229	0.0040	0.0075	0.0291
Fabricated Metals	0.0035	0.0090	0.0034	0.0034	0.0160
Mach & Computers	0.0034	0.0082	0.0026	0.0035	0.0076
Electrical Equip	0.0021	0.0066	0.0013	0.0023	0.0075
Motor Vehicles	0.0138	0.0321	0.0086	0.0115	0.0191
Rest of Trans Equip	0.0016	0.0037	0.0024	0.0033	0.0103
Instruments	0.0019	0.0040	0.0016	0.0021	0.0067
Misc Manuf	0.0028	0.0149	0.0038	0.0064	0.0146
Food	0.0018	0.0028	0.0013	0.0014	0.0199
Tobacco Manuf	0.0000	0.0001	0.0000	0.0000	0.0060
Textiles	0.0168	0.0530	0.0117	0.0214	0.0181
Apparel	0.0080	0.0370	0.0098	0.0176	0.0117
Paper	0.0025	0.0050	0.0019	0.0027	0.0180
Printing	0.0013	0.0016	0.0009	0.0010	0.0075
Chemicals	0.0030	0.0052	0.0020	0.0025	0.0038
Petroleum Products	0.0048	0.0099	0.0038	0.0044	0.0035
Rubber	0.0055	0.0124	0.0039	0.0048	0.0126
Leather	0.0169	0.0407	0.0063	0.0230	0.0149
Mining	0.0006	0.0005	0.0004	0.0006	0.0000
NonManufacturing	0.0000	0.0000	0.0000	0.0000	0.0000

Table 52: Price Increase for Year 2004 Port of Seattle/Tacoma Shutdown

Price Increase for Year 2004 (\$/\$)					
Port of Portland Shutdown					
	Seattle	Other WA	Portland	Other OR	Alaska
Lumber	0.0000	0.0002	0.0004	0.0003	0.0000
Furniture	0.0000	0.0001	0.0002	0.0002	0.0000
Stone, Clay, Etc.	0.0000	0.0004	0.0009	0.0007	0.0000
Primary Metals	0.0000	0.0013	0.0016	0.0019	0.0000
Fabricated Metals	0.0000	0.0006	0.0017	0.0011	0.0000
Mach & Computers	0.0000	0.0002	0.0005	0.0004	0.0000
Electrical Equip	0.0000	0.0001	0.0001	0.0001	0.0000
Motor Vehicles	0.0003	0.0011	0.0051	0.0059	0.0000
Rest of Trans Equip	0.0001	0.0004	0.0020	0.0024	0.0000
Instruments	0.0000	0.0000	0.0001	0.0001	0.0000
Misc Manuf	0.0000	0.0002	0.0003	0.0003	0.0000
Food	0.0000	0.0000	0.0001	0.0001	0.0000
Tobacco Manuf	0.0000	0.0000	0.0000	0.0000	0.0000
Textiles	0.0000	0.0000	0.0001	0.0001	0.0000
Apparel	0.0000	0.0004	0.0008	0.0009	0.0000
Paper	0.0000	0.0003	0.0008	0.0008	0.0000
Printing	0.0000	0.0001	0.0004	0.0003	0.0000
Chemicals	0.0000	0.0002	0.0006	0.0005	0.0000
Petroleum Products	0.0000	0.0004	0.0011	0.0008	0.0000
Rubber	0.0003	0.0037	0.0082	0.0066	0.0000
Leather	0.0000	0.0005	0.0005	0.0012	0.0000
Mining	0.0000	0.0000	0.0002	0.0002	0.0000
NonManufacturing	0.0000	0.0000	0.0000	0.0000	0.0000

Table 53: Price Increase for Year 2004, Port of Portland Shutdown

Price Increase for Year 2004 (\$/4)					
Alaska Ports Shutdown					
	Seattle	Other WA	Portland	Other OR	Alaska
Lumber	0.0000	0.0000	0.0000	0.0000	0.0437
Furniture	0.0000	0.0000	0.0000	0.0000	0.0213
Stone, Clay, Etc.	0.0000	0.0000	0.0000	0.0000	0.0922
Primary Metals	0.0000	0.0000	0.0000	0.0000	0.0478
Fabricated Metals	0.0000	0.0000	0.0000	0.0000	0.0263
Mach & Computers	0.0000	0.0000	0.0000	0.0000	0.0106
Electrical Equip	0.0000	0.0000	0.0000	0.0000	0.0104
Motor Vehicles	0.0000	0.0000	0.0000	0.0000	0.0265
Rest of Trans Equip	0.0000	0.0000	0.0000	0.0000	0.0144
Instruments	0.0000	0.0000	0.0000	0.0000	0.0094
Misc Manuf	0.0000	0.0000	0.0000	0.0000	0.0203
Food	0.0000	0.0000	0.0000	0.0000	0.0282
Tobacco Manuf	0.0000	0.0000	0.0000	0.0000	0.0084
Textiles	0.0000	0.0000	0.0000	0.0000	0.0256
Apparel	0.0000	0.0000	0.0000	0.0000	0.0163
Paper	0.0000	0.0000	0.0000	0.0000	0.0636
Printing	0.0000	0.0000	0.0000	0.0000	0.0267
Chemicals	0.0000	0.0000	0.0000	0.0000	0.0358
Petroleum Products	0.0000	0.0000	0.0000	0.0000	0.0395
Rubber	0.0000	0.0000	0.0000	0.0000	0.0480
Leather	0.0000	0.0000	0.0000	0.0000	0.0208
Mining	0.0000	0.0000	0.0000	0.0000	0.0000
NonManufacturing	0.0000	0.0000	0.0000	0.0000	0.0000

Table 54: Price Increase for Year 2004, Alaska Ports Shutdown

Method of Estimating Costs and Revenues used to Model a Port Closure

This section provides more detailed methodology related to estimating cost and revenue changes to be input to REMI in simulating a port closure. As stated previously, the changes to REMI include 1) Eliminating the revenue of the closed port; 2) Increasing port revenues of other ports; 3) Increasing revenues of trucking, railroads and airlines; 4) Increasing production costs of industries that use rerouted goods; 5) Increasing foreign export costs; and 6) Eliminating revenues from oil production (for shutdown of Alaska ports only).

1. Eliminating Revenue of Closed Port

With the shutdown of a port, we remove all the port area's revenues that are generated from water transportation for the year(s) of the closure. These numbers had to be estimated because in Version 5.2 of REMI, the water transportation amounts are not available. Water transportation is a portion of Other Transportation. Previous REMI models that had water transportation were used to apply ratios and estimate the amount of Other Transportation that is Water Transportation. The decrease in water transportation revenues is shown in Table 55 for each of the port closures. (*Spreadsheet reference: 'Port Revenue'; Changes to REMI.xls*)

Reduction of Port Revenues (Billions 1999\$)			
	Shutdown of Port of Seattle/Tacoma	Shutdown of Port of Portland	Shutdown of Alaska Ports
Port of Seattle/Tacoma	-1.277	0.000	-0.130
Other Washington Ports	0.000	0.000	0.000
Port of Portland	0.000	-0.489	0.000
Other Oregon ports	0.000	0.000	0.000
Ports of Long Beach/Los Angeles	0.000	0.000	0.000
Ports of Oakland/San Francisco	0.000	0.000	0.000
Other California Ports	0.000	0.000	0.000
Alaska Ports	0.000	0.000	-0.244
Rest of US	0.000	0.000	0.000
British Columbia (Port of Vancouver)	0.000	0.000	0.000
Total	-1.277	-0.489	-0.374

Table 55: Reduction of Port Revenues

2. Increasing Port Revenues of Alternative Ports

Both foreign and domestic trade flows are rerouted to alternative West Coast seaports based on the size of the port (See Table 42 in section title, Size of Port (\$)). For the shutdown of Seattle and Portland, the selected ports exclude Alaska and the Columbia River ports since they are deemed to be poor substitutes for Seattle. The increase in the revenues of alternative port regions is shown in Table 56. (*'Other Seaports' in Transportation Cost.xls*).

Increase in Revenues of Alternative Ports			
(Billions 1999\$)			
	Shutdown of Port of Seattle/Tacoma	Shutdown of Port of Portland	Shutdown of Ports of Alaska
Port of Seattle/Tacoma	0.000	0.077	0.000
Rest of Washington	0.049	0.014	0.000
Port of Portland	0.106	0.000	0.000
Rest of Oregon	0.027	0.008	0.000
Rest of California	0.138	0.038	0.000
Ports of Long Beach/Los Angeles	0.670	0.186	0.000
Ports of Oakland/San Francisco	0.289	0.080	0.000
Ports of Alaska	0.000	0.000	0.000
Rest of US	0.000	0.000	0.000
British Columbia (Port of Vancouver)	0.425	0.118	0.000
Total	1.705	0.522	0.000

Table 56: Increase in Revenues of Alternative Ports

3. Increasing Revenues of Trucking, Railroads and Airlines

When goods cannot easily be rerouted to another port (as in the Alaska shutdown), revenues for transportation modes other than water increase due to the increased demand. When goods are rerouted to alternative ports (as in the shutdown of the Ports of Seattle/Tacoma and Portland), revenues for other transportation modes increase due to the need to transport these goods to and from an alternative port. This section describes the method used to estimate the quantity of increased revenues of trucking, railroad and airlines caused by the shutdown of a seaport.

The geographical distribution of added trucking, air, and rail revenues is based on the alternative port flows described in the section titled Allocation of Trade to Alternative Ports. The size (dollar value) of the revenue is based on the cost of transporting the

goods to the alternative ports. The allocation of revenues among trucking, rail and air is based on national modal splits.

The increase in prices is due exclusively to the increase in transportation costs. Therefore, to estimate the amount of revenues that trucking, railroads and airlines would experience, we use the increase in prices that are due to the cost of transportation. To get a dollar value, for a given commodity, we multiply the increase in price (\$/\$) of that commodity by the dollars of output. The total of all those increases of commodities gives us the total amount of revenues that trucking, railroads and airlines would experience.

The geographical distribution of the transportation revenues is based on the alternative port flows (see *Allocation of Trade to Alternative Ports*). The revenues are split equally between the origin port region and destination port region.

The allocation of these revenues among trucking, railroads and airlines is based on those splits listed in the section titled Truck, Rail and Air Splits.

The following example illustrates how transportation revenues are calculated. Lumber output is 1B\$ in a Seattle. For every dollar of output, the price increases by 0.0003\$. So price of lumber increases, $1,000,000,000 \times 0.0003$ is 3M\$. Sum up all the industries, and we get a total price increase in dollars for Seattle/Tacoma. Transportation revenues are the sum of the output from each industry times the changes in prices for that industry.

For the Alaska shutdown, all shipments originate in Seattle/Tacoma.

The increases in trucking, railroad, and airline revenues are reported in Table 57. (*Spreadsheet reference: 'Truck, Rail, Air Revenues'; Changes to REMI.xls*)

Increase in Trucking, Railroad and Airline Revenues				
(Billions 1999\$)				
Shutdown of Port of Seattle/Tacoma	Truck	Rail	Air	Total
Port of Seattle/Tacoma	0.08243	0.01620	0.00967	0.10830
Other Washington Ports	0.09379	0.01843	0.01101	0.12323
Port of Portland	0.05505	0.01082	0.00646	0.07233
Other Oregon ports	0.03739	0.00735	0.00439	0.04913
Ports of Long Beach/Los Angeles	0.16606	0.03264	0.01949	0.21819
Ports of Oakland/San Francisco	0.03133	0.00616	0.00368	0.04117
Other California Ports	0.00641	0.00126	0.00075	0.00843
Alaska Ports	0.00000	0.00000	0.00000	0.00000
Rest of US	0.00000	0.00000	0.00000	0.00000
British Columbia (Port of Vancouver)	0.02113	0.00415	0.00248	0.02776
Total	0.49360	0.09701	0.05792	0.64854
Shutdown of Port of Portland	Truck	Rail	Air	Total
Port of Seattle/Tacoma	0.00696	0.00137	0.00082	0.00914
Other Washington Ports	0.00450	0.00088	0.00053	0.00591
Port of Portland	0.01443	0.00284	0.00169	0.01896
Other Oregon ports	0.00968	0.00190	0.00114	0.01272
Ports of Long Beach/Los Angeles	0.01728	0.00340	0.00203	0.02271
Ports of Oakland/San Francisco	0.00326	0.00064	0.00038	0.00428
Other California Ports	0.00067	0.00013	0.00008	0.00088
Alaska Ports	0.00000	0.00000	0.00000	0.00000
Rest of US	0.00000	0.00000	0.00000	0.00000
British Columbia (Port of Vancouver)	0.00220	0.00043	0.00026	0.00289
Total	0.05898	0.01159	0.00692	0.07749
Shutdown of Alaska Ports	Truck	Rail	Air	Total
Port of Seattle/Tacoma	0.04435	0.00000	0.02157	0.06592
Other Washington Ports	0.00000	0.00000	0.00000	0.00000
Port of Portland	0.00000	0.00000	0.00000	0.00000
Other Oregon ports	0.00000	0.00000	0.00000	0.00000
Ports of Long Beach/Los Angeles	0.00000	0.00000	0.00000	0.00000
Ports of Oakland/San Francisco	0.00000	0.00000	0.00000	0.00000
Other California Ports	0.00000	0.00000	0.00000	0.00000
Alaska Ports	0.04435	0.00000	0.02157	0.06592
Rest of US	0.00000	0.00000	0.00000	0.00000
British Columbia (Port of Vancouver)	0.00000	0.00000	0.00000	0.00000
Total	0.08871	0.00000	0.04314	0.13185

Table 57: Increase in Trucking, Railroad and Airline Revenues

4. Increasing Production Costs for Industries That Use Rerouted Goods

Manufacturing industries that use the goods that typically go through the closed port will experience an increase in production costs. Their production costs increase due to prices of goods increasing caused by the added costs of shipping goods via alternative routes. This section describes how the increase in production costs for manufacturing industries is calculated.

Two inputs are used to estimate the increase in production costs: 1) Price increases by industry and region (see *Prices* Section, Table 52, Table 53, and Table 54) and 2) IO coefficients, from REMI, year 2004, Industry by Industry. The IO table provides a measure of how much a particular industry uses output from other industries in order to produce its output. Each industry uses a portion of many other industries in order produce its output. For one dollar of output for the given industry, the IO table indicates how many dollars of input from the other industries are used.

To calculate the increase in production costs for each industry, we first determine the increase in costs for each of the inputs required. To do this, we multiply the increase in price of the required input by the amount of that input that is used by the output industry (from the I-O coefficient). To get a total increase in production costs for the output industry, we sum up all the increase in costs for all required inputs. The increase in cost of production (%) is computed for each industry. Table 58 shows the increase in production costs for the shutdown of Seattle/Tacoma; Table 59 shows the increase in production costs for the shutdown of Portland; and Table 60 shows the increase in production costs for the shutdown of the Alaska ports. (*Spreadsheet reference: 'Production Costs'; Changes to REMI.xls. VB program: ProductionCosts.vbp*)

Increase in Cost of Production by Industry (%) Shutdown of Port of Seattle/Tacoma					
	Seattle	OtherWA	Portland	OtherOR	Alaska
Lumber	0.16%	0.30%	0.11%	0.12%	0.91%
Furniture	0.21%	0.60%	0.16%	0.23%	0.69%
Stone, Clay, Etc.	0.11%	0.22%	0.07%	0.09%	0.28%
Primary Metals	0.15%	0.60%	0.12%	0.21%	0.75%
Fabricated Metals	0.16%	0.60%	0.13%	0.21%	0.78%
Mach & Computers	0.14%	0.42%	0.10%	0.16%	0.49%
Electrical Equip	0.12%	0.34%	0.08%	0.12%	0.42%
Motor Vehicles	0.49%	1.24%	0.33%	0.45%	0.99%
Rest of Trans Equip	0.11%	0.31%	0.10%	0.15%	0.46%
Instruments	0.09%	0.26%	0.07%	0.10%	0.32%
Misc Manuf	0.13%	0.41%	0.11%	0.16%	0.49%
Food	0.06%	0.12%	0.05%	0.06%	0.41%
Tobacco Manuf	0.02%	0.03%	0.01%	0.01%	0.23%
Textiles	0.36%	1.02%	0.25%	0.42%	0.42%
Apparel	0.45%	1.43%	0.32%	0.60%	0.52%
Paper	0.12%	0.26%	0.09%	0.12%	0.57%
Printing	0.05%	0.10%	0.04%	0.05%	0.26%
Chemicals	0.10%	0.20%	0.07%	0.09%	0.20%
Petroleum Products	0.09%	0.15%	0.07%	0.09%	0.07%
Rubber	0.15%	0.34%	0.11%	0.15%	0.28%
Leather	0.49%	1.21%	0.22%	0.64%	0.68%
Mining	0.05%	0.11%	0.04%	0.05%	0.10%
Construction	0.14%	0.32%	0.10%	0.13%	0.51%
Railroad	0.06%	0.14%	0.05%	0.06%	0.15%
Trucking	0.04%	0.09%	0.03%	0.04%	0.05%
Local & Interurban	0.09%	0.20%	0.07%	0.08%	0.14%
Air Transp	0.06%	0.13%	0.05%	0.06%	0.08%
Other Transp	0.03%	0.07%	0.02%	0.03%	0.08%
Communication	0.02%	0.07%	0.02%	0.03%	0.09%
Public Utilities	0.04%	0.07%	0.03%	0.04%	0.07%
Banking	0.01%	0.01%	0.00%	0.01%	0.03%
Insurance	0.00%	0.01%	0.00%	0.00%	0.02%
Credit & Finance	0.00%	0.01%	0.00%	0.00%	0.01%
Real Estate	0.00%	0.01%	0.00%	0.00%	0.01%
Eating & Drinking	0.05%	0.09%	0.04%	0.04%	0.41%
Rest of Retail Trade	0.04%	0.09%	0.03%	0.04%	0.10%
Wholesale Trade	0.03%	0.07%	0.02%	0.03%	0.09%
Hotels	0.02%	0.05%	0.02%	0.02%	0.10%
Pers Svcs & Repair	0.04%	0.11%	0.03%	0.05%	0.11%
Private Household	0.00%	0.00%	0.00%	0.00%	0.00%
Auto Repair & Srvc	0.16%	0.37%	0.11%	0.14%	0.26%
Misc Business Svcs	0.02%	0.05%	0.02%	0.02%	0.07%
Amusement & Rec	0.02%	0.04%	0.01%	0.02%	0.07%
Motion Pictures	0.01%	0.03%	0.01%	0.01%	0.06%
Medical	0.03%	0.06%	0.02%	0.03%	0.08%
Misc Prof Services	0.01%	0.02%	0.01%	0.01%	0.03%
Education	0.01%	0.03%	0.01%	0.01%	0.05%
Non-Profit Org	0.02%	0.05%	0.02%	0.02%	0.10%
Agri, For, Fish Svcs	0.04%	0.09%	0.03%	0.04%	0.09%
Farm	0.05%	0.11%	0.04%	0.05%	0.21%
Federal Gov	0.01%	0.02%	0.01%	0.01%	0.02%
State & Local Gov	0.01%	0.02%	0.01%	0.01%	0.01%

Table 58: Increase in Cost of Production by Industry Closure of Seattle/Tacoma

Increase in Cost of Production by Industry (%)					
Shutdown of Port of Portland					
	Seattle	Other WA	Portland	Other OR	Alaska
Lumber	0.00%	0.01%	0.03%	0.02%	0.00%
Furniture	0.00%	0.03%	0.06%	0.05%	0.00%
Stone, Clay, Etc.	0.00%	0.01%	0.03%	0.02%	0.00%
Primary Metals	0.00%	0.03%	0.05%	0.05%	0.00%
Fabricated Metals	0.00%	0.04%	0.06%	0.06%	0.00%
Mach & Computers	0.00%	0.02%	0.04%	0.03%	0.00%
Electrical Equip	0.00%	0.02%	0.03%	0.03%	0.00%
Motor Vehicles	0.01%	0.06%	0.19%	0.20%	0.00%
Rest of Trans Equip	0.00%	0.02%	0.06%	0.07%	0.00%
Instruments	0.00%	0.01%	0.03%	0.02%	0.00%
Misc Manuf	0.00%	0.03%	0.05%	0.05%	0.00%
Food	0.00%	0.01%	0.03%	0.02%	0.00%
Tobacco Manuf	0.00%	0.00%	0.01%	0.01%	0.00%
Textiles	0.00%	0.01%	0.02%	0.02%	0.00%
Apparel	0.00%	0.01%	0.02%	0.01%	0.00%
Paper	0.00%	0.02%	0.05%	0.04%	0.00%
Printing	0.00%	0.01%	0.02%	0.02%	0.00%
Chemicals	0.00%	0.02%	0.04%	0.03%	0.00%
Petroleum Products	0.00%	0.01%	0.03%	0.02%	0.00%
Rubber	0.00%	0.03%	0.07%	0.05%	0.00%
Leather	0.00%	0.02%	0.04%	0.05%	0.00%
Mining	0.00%	0.00%	0.01%	0.01%	0.00%
Construction	0.00%	0.02%	0.04%	0.03%	0.00%
Railroad	0.00%	0.01%	0.02%	0.02%	0.00%
Trucking	0.00%	0.01%	0.02%	0.01%	0.00%
Local & Interurban	0.00%	0.01%	0.03%	0.03%	0.00%
Air Transp	0.00%	0.01%	0.02%	0.02%	0.00%
Other Transp	0.00%	0.00%	0.01%	0.01%	0.00%
Communication	0.00%	0.00%	0.00%	0.00%	0.00%
Public Utilities	0.00%	0.00%	0.01%	0.01%	0.00%
Banking	0.00%	0.00%	0.00%	0.00%	0.00%
Insurance	0.00%	0.00%	0.00%	0.00%	0.00%
Credit & Finance	0.00%	0.00%	0.00%	0.00%	0.00%
Real Estate	0.00%	0.00%	0.00%	0.00%	0.00%
Eating & Drinking	0.00%	0.00%	0.01%	0.01%	0.00%
Rest of Retail Trade	0.00%	0.00%	0.02%	0.02%	0.00%
Wholesale Trade	0.00%	0.00%	0.01%	0.01%	0.00%
Hotels	0.00%	0.00%	0.01%	0.01%	0.00%
Pers Srvcs & Repair	0.00%	0.00%	0.01%	0.01%	0.00%
Private Household	0.00%	0.00%	0.00%	0.00%	0.00%
Auto Repair & Srvc	0.00%	0.02%	0.06%	0.07%	0.00%
Misc Business Srvcs	0.00%	0.00%	0.01%	0.00%	0.00%
Amusement & Rec	0.00%	0.00%	0.01%	0.00%	0.00%
Motion Pictures	0.00%	0.00%	0.00%	0.00%	0.00%
Medical	0.00%	0.01%	0.01%	0.01%	0.00%
Misc Prof Services	0.00%	0.00%	0.00%	0.00%	0.00%
Education	0.00%	0.00%	0.01%	0.00%	0.00%
Non-Profit Org	0.00%	0.00%	0.01%	0.01%	0.00%
Agri, For, Fish Srvcs	0.00%	0.00%	0.01%	0.01%	0.00%
Farm	0.00%	0.00%	0.01%	0.01%	0.00%
Federal Gov	0.00%	0.00%	0.00%	0.00%	0.00%
State & Local Gov	0.00%	0.00%	0.00%	0.00%	0.00%

Table 59: Increase in Cost of Production by Industry Shutdown of Port of Portland

Increase in Cost of Production by Industry (%)					
Shutdown of Ports of Alaska					
	Seattle	OtherWA	Portland	OtherOR	Alaska
Lumber	0.00%	0.00%	0.00%	0.00%	1.55%
Furniture	0.00%	0.00%	0.00%	0.00%	1.34%
Stone, Clay, Etc.	0.00%	0.00%	0.00%	0.00%	1.55%
Primary Metals	0.00%	0.00%	0.00%	0.00%	1.42%
Fabricated Metals	0.00%	0.00%	0.00%	0.00%	1.44%
Mach & Computers	0.00%	0.00%	0.00%	0.00%	0.81%
Electrical Equip	0.00%	0.00%	0.00%	0.00%	0.82%
Motor Vehicles	0.00%	0.00%	0.00%	0.00%	1.72%
Rest of Trans Equip	0.00%	0.00%	0.00%	0.00%	0.79%
Instruments	0.00%	0.00%	0.00%	0.00%	0.66%
Misc Manuf	0.00%	0.00%	0.00%	0.00%	1.14%
Food	0.00%	0.00%	0.00%	0.00%	0.88%
Tobacco Manuf	0.00%	0.00%	0.00%	0.00%	0.46%
Textiles	0.00%	0.00%	0.00%	0.00%	1.26%
Apparel	0.00%	0.00%	0.00%	0.00%	0.82%
Paper	0.00%	0.00%	0.00%	0.00%	1.87%
Printing	0.00%	0.00%	0.00%	0.00%	0.94%
Chemicals	0.00%	0.00%	0.00%	0.00%	1.14%
Petroleum Products	0.00%	0.00%	0.00%	0.00%	0.52%
Rubber	0.00%	0.00%	0.00%	0.00%	1.34%
Leather	0.00%	0.00%	0.00%	0.00%	1.22%
Mining	0.00%	0.00%	0.00%	0.00%	0.28%
Construction	0.00%	0.00%	0.00%	0.00%	1.35%
Railroad	0.00%	0.00%	0.00%	0.00%	0.47%
Trucking	0.00%	0.00%	0.00%	0.00%	0.29%
Local & Interurban	0.00%	0.00%	0.00%	0.00%	0.53%
Air Transp	0.00%	0.00%	0.00%	0.00%	0.52%
Other Transp	0.00%	0.00%	0.00%	0.00%	0.23%
Communication	0.00%	0.00%	0.00%	0.00%	0.17%
Public Utilities	0.00%	0.00%	0.00%	0.00%	0.18%
Banking	0.00%	0.00%	0.00%	0.00%	0.08%
Insurance	0.00%	0.00%	0.00%	0.00%	0.05%
Credit & Finance	0.00%	0.00%	0.00%	0.00%	0.04%
Real Estate	0.00%	0.00%	0.00%	0.00%	0.04%
Eating & Drinking	0.00%	0.00%	0.00%	0.00%	0.69%
Rest of Retail Trade	0.00%	0.00%	0.00%	0.00%	0.24%
Wholesale Trade	0.00%	0.00%	0.00%	0.00%	0.23%
Hotels	0.00%	0.00%	0.00%	0.00%	0.23%
Pers Svcs & Repair	0.00%	0.00%	0.00%	0.00%	0.28%
Private Household	0.00%	0.00%	0.00%	0.00%	0.00%
Auto Repair & Srvc	0.00%	0.00%	0.00%	0.00%	0.58%
Misc Business Svcs	0.00%	0.00%	0.00%	0.00%	0.15%
Amusement & Rec	0.00%	0.00%	0.00%	0.00%	0.18%
Motion Pictures	0.00%	0.00%	0.00%	0.00%	0.14%
Medical	0.00%	0.00%	0.00%	0.00%	0.26%
Misc Prof Services	0.00%	0.00%	0.00%	0.00%	0.10%
Education	0.00%	0.00%	0.00%	0.00%	0.17%
Non-Profit Org	0.00%	0.00%	0.00%	0.00%	0.28%
Agri, For, Fish Svcs	0.00%	0.00%	0.00%	0.00%	0.42%
Farm	0.00%	0.00%	0.00%	0.00%	0.56%
Federal Gov	0.00%	0.00%	0.00%	0.00%	0.04%
State & Local Gov	0.00%	0.00%	0.00%	0.00%	0.06%

Table 60: Increase in Cost of Production by Industry Shutdown of Ports of Alaska

5. Increasing Cost of Foreign Exports

When a port is shut down, the cost of exporting goods internationally increases due to the increase in cost of transporting the goods via an alternative route. Therefore the increase in transportation unit costs is used as an estimate of the increase of foreign export costs.

Transportation unit costs are simply the percent increase in transportation costs for each commodity (see Table 50 in *Transportation Costs* Section) times the quantity of each commodity in a region that is typically supplied by the closed port. This yields the increase in transportation unit costs that is equivalent to the increase in foreign export costs. The resulting increases by product to each of the regions resulting from the closure of the Port of Seattle/Tacoma, the Port of Portland and the Ports of Alaska are shown in Table 61, Table 62, and Table 63 below. (*Spreadsheet reference: 'Transport Unit Cost'; Changes to REMI.xls*)

Increase in Foreign Export Costs (%) Shutdown of Port of Seattle/Tacoma						
	Seattle	Other WA	Portland	Other OR	Alaska Imports	Alaska Exports
Lumber	11%	20%	8%	8%	79%	0%
Furniture	26%	66%	16%	22%	85%	0%
Stone, Clay, Etc.	8%	14%	5%	6%	18%	0%
Primary Metals	13%	57%	10%	19%	73%	0%
Fabricated Metals	16%	41%	15%	16%	73%	0%
Mach & Computers	38%	91%	29%	39%	85%	0%
Electrical Equip	23%	75%	14%	26%	85%	0%
Motor Vehicles	62%	143%	38%	51%	85%	0%
Rest of Trans Equip	13%	31%	20%	27%	85%	0%
Instruments	24%	50%	20%	27%	85%	0%
Misc Manuf	16%	87%	22%	37%	85%	0%
Food	7%	12%	6%	6%	83%	0%
Tobacco Manuf	0%	1%	0%	0%	83%	0%
Textiles	77%	244%	54%	99%	83%	0%
Apparel	58%	268%	71%	127%	85%	0%
Paper	5%	10%	4%	6%	37%	0%
Printing	6%	8%	4%	5%	37%	0%
Chemicals	10%	17%	7%	8%	13%	0%
Petroleum Products	16%	32%	13%	14%	11%	0%
Rubber	13%	30%	10%	12%	31%	0%
Leather	96%	232%	36%	131%	85%	0%
Mining	5%	4%	3%	5%	0%	0%
NonManufacturing	0%	0%	0%	0%	0%	0%

Table 61: Increase in Foreign Export Costs Shutdown of Port of Seattle/Tacoma

Increase in Foreign Export Cost (%)					
Shutdown of Port of Portland					
	Seattle	Other WA	Portland	Other OR	Alaska
Lumber	0.0%	0.4%	1.1%	0.8%	0.0%
Furniture	0.0%	0.8%	1.3%	1.1%	0.0%
Stone, Clay, Etc.	0.0%	0.5%	1.2%	1.1%	0.0%
Primary Metals	0.1%	3.2%	3.9%	4.8%	0.0%
Fabricated Metals	0.2%	2.9%	7.6%	5.0%	0.0%
Mach & Computers	0.2%	2.5%	5.5%	4.9%	0.0%
Electrical Equip	0.0%	0.9%	1.2%	1.4%	0.0%
Motor Vehicles	1.3%	4.9%	22.6%	26.4%	0.0%
Rest of Trans Equip	1.0%	3.6%	16.1%	19.5%	0.0%
Instruments	0.0%	0.6%	1.6%	1.4%	0.0%
Misc Manuf	0.0%	1.0%	1.8%	2.0%	0.0%
Food	0.0%	0.1%	0.5%	0.3%	0.0%
Tobacco Manuf	0.0%	0.0%	0.0%	0.0%	0.0%
Textiles	0.0%	0.2%	0.3%	0.4%	0.0%
Apparel	0.1%	3.2%	5.9%	6.9%	0.0%
Paper	0.1%	0.7%	1.7%	1.6%	0.0%
Printing	0.1%	0.5%	1.9%	1.5%	0.0%
Chemicals	0.1%	0.7%	2.0%	1.6%	0.0%
Petroleum Products	0.1%	1.3%	3.5%	2.6%	0.0%
Rubber	0.6%	9.2%	20.1%	16.3%	0.0%
Leather	0.2%	2.7%	3.0%	7.0%	0.0%
Mining	0.1%	0.3%	1.5%	1.6%	0.0%
NonManufacturing	0.0%	0.0%	0.0%	0.0%	0.0%

Table 62: Increase in Foreign Export Cost Shutdown of Port of Portland

Increase in Foreign Export Cost (%)					
Shutdown of Ports of Alaska					
	Seattle	Other WA	Portland	Other OR	Alaska
Lumber	0%	0%	0%	0%	118%
Furniture	0%	0%	0%	0%	118%
Stone, Clay, Etc.	0%	0%	0%	0%	132%
Primary Metals	0%	0%	0%	0%	120%
Fabricated Metals	0%	0%	0%	0%	120%
Mach & Computers	0%	0%	0%	0%	118%
Electrical Equip	0%	0%	0%	0%	118%
Motor Vehicles	0%	0%	0%	0%	118%
Rest of Trans Equip	0%	0%	0%	0%	118%
Instruments	0%	0%	0%	0%	118%
Misc Manuf	0%	0%	0%	0%	118%
Food	0%	0%	0%	0%	118%
Tobacco Manuf	0%	0%	0%	0%	118%
Textiles	0%	0%	0%	0%	118%
Apparel	0%	0%	0%	0%	118%
Paper	0%	0%	0%	0%	132%
Printing	0%	0%	0%	0%	132%
Chemicals	0%	0%	0%	0%	118%
Petroleum Products	0%	0%	0%	0%	129%
Rubber	0%	0%	0%	0%	118%
Leather	0%	0%	0%	0%	118%
Mining	0%	0%	0%	0%	0%
NonManufacturing	0%	0%	0%	0%	0%

Table 63: Increase in Foreign Export cost Shutdown of Ports of Alaska

6. Eliminating Revenue from Oil Production (Alaska Shutdown Only)

For the shutdown of the Alaska ports, the export portion of the revenues from oil production is removed in the year 2004 due to the assumption that neither trucking nor air is a good alternative to shipping oil. Table 64 below reports the oil production revenues that were eliminated.

Remi Base Case Alaska Exports for Petroleum Products and Mining, 2004				
(Billions 1999\$)				
	Exports to Multiregions	Exports to Rest of Nation	Exports to Rest of World	Total Exports
Petroleum Products	0.088	0.008	0.029	0.125
Mining	2.104	0.287	0.100	2.491

Table 64: Alaska Exports for Petroleum Products & Mining

Source: REMI Model, Version 5.2

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