

Port of Portland - Economic Impact Study



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- A Workforce Demographics and Equity (Fourth Economy Report)**
- B Methodology**

Executive Summary

Steer and Fourth Economy have undertaken an investigation into the Port of Portland's regional economic and equity impacts through conducting the following studies:

- An **Economic Impact Analysis (EIA)** that looks at the effect of the Port on regional employment and value added (local contribution to GDP);
- An investigation into the **Wider Economic Benefits**, which go beyond the scope of EIA by looking at the productivity gains to the region's firms and workers due to the presence of the Port; and
- A **Workforce Demographics and Equity** study that shines a light on the demographics of the workforce that is supported by the Port.

Each study is summarized below.

Economic Impact Analysis

Our analysis uses an industry-standard input-output modeling approach to find the Port's contribution to:

- **Employment:** This reflects the total number of jobs supported by the Port's operations, covering direct, indirect, and induced effects. It provides an indication of how many residents are employed because of the Port's activity within the region.
- **Labor income:** This represents the total compensation, including wages and benefits, earned by individuals employed directly or indirectly because of the Port's activities. It also includes the income of proprietors. It illustrates the Port's contribution to household incomes and living standards.
- **Value Added:** This is the net output of the Port's activities, equivalent to Gross Domestic Product (GDP) at the local or regional level. It measures the Port's direct contribution to economic growth.
- **Output:** This reflects the total value of goods and services produced as a result of the Port's operations and the value of intermediate products used by Port industries.

A high-level summary of the results of the analysis is shown on the next page:

Table ES.1: Total Economic Impacts of all Port Facilities

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Aviation	17,041	1,267	1,801	3,463
Visitors ¹	34,140	1,712	2,858	4,619
Capital Expenditure	3,849	321	406	775
Marine	12,696	930	1,480	3,201
Business Parks	29,689	2,255	3,198	5,862
Total	97,414	6,485	9,743	17,919

\$ values are in 2021 prices. Analysis based on employment data, revenue data and an input-output model representing 2021. Includes the direct, indirect and induced impacts.

Key findings:

- 97,000 jobs are dependent upon the ongoing operation of the Port.
- Of the 97,000 jobs, 62,000 jobs are from direct effects of employment at the Port, 19,000 jobs are from indirect effects which are associated with the supply chains of Port firms, and 16,000 jobs are from induced effects which are due to household spending resulting from income from the direct and indirect effects.
- The 62,000 direct jobs are equivalent to about 5% of employment in the Portland MSA.
- The Port contributes to public finances through a range of taxes, such as income, payroll and corporate taxes, as well as aviation industry specific taxes and taxes on property and transient visitor taxes applicable to overnight visitors. It is estimated that the Port contributes \$1.4 billion to the federal government, \$330m to the State of Oregon, \$50m to the State of Washington and \$200m to local jurisdictions.
- Visitor spending enabled by the aviation facilities contributes more jobs to the region than any of the three facilities alone.
- Each Port facility (aviation, marine and business parks) and their supply chains offer a large range of jobs to residents, including many jobs that do not require a 4-year college degree.

Wider Economic Benefits

The Wider Economic Benefits study involved an investigation into the economic benefits to the region beyond what can be shown through an Economic Impact Analysis.

The key findings of the study are:

- Investing in the Port's facilities directly boosts the productivity of surrounding businesses.
- Enhanced trade through the Port provides the region's businesses with access to a wider range of vital resources.

¹ Visitor spending has been highly affected by the Covid-19 pandemic. Visitor spending is represented by a 2022 base year, which is about 25% higher than 2021 would be. Labor income, value added and output resulting from visitor spending is shown 2021 prices.

- Clustering of businesses at the port, due to increased trade, sparks innovation and efficiency through knowledge sharing and a more specialized labor force.
- The airport facilities at the Port play a crucial role in promoting face-to-face business interactions, connecting Portland firms to firms in other major cities.
- Small businesses particularly benefit from container service at the Port.

The Wider Economic Benefits report also provides the means to enhance an economic case, such as that required for a funding application for investment, by providing a quantitative framework for estimation of wider economic benefits.

Workforce Demographics and Equity

Diversity

- Direct Employment in the Marine, Working Harbor and Business Parks are more diverse than the metropolitan area. Aviation is less diverse than the metropolitan area.
- Women are underrepresented in all Port related industries compared to their share of employment in the metropolitan area (48%). Women are most significantly underrepresented in the Marine and Worker Harbor industries, where women account for only 28% of the workforce.

Living Wages

Port-related industries overall do not pay living wages with two exceptions.

- Aviation provides a living wage for more American Indian or Alaska Native workers than the metro average.
- More Hispanic workers earn a living wage in the Working Harbor industries.

These problems are not unique to Portland. Industries vary widely in diversity with different races, ethnicities and sexes concentrated in certain industries. Across the United States, workers are struggling to earn living wages. The living wage in the United States was \$100,499 per year in 2021 before taxes for a family of four (two working adults, two children).²

Accurate statistics regarding the numbers of workers in the United States earning a living wage are challenging to ascertain given the number of variables across different regions,, however a recent reported noted that "...in nearly all U.S. counties, a typical worker's wage is less than what would be considered a living wage for one adult with two children for the area."³

² Glasmeier, A. K. (2023, February 1). *NEW DATA POSTED: 2023 Living Wage Calculator*. <https://livingwage.mit.edu>. Accessed September 25, 2023. Available from <https://livingwage.mit.edu/articles/103-new-data-posted-2023-living-wage-calculator>.

³ University of Wisconsin Population Health Institute. *County Health Rankings National Findings 2022*. Accessed September 25, 2023. Available from <https://www.countyhealthrankings.org/reports/2022-county-health-rankings-national-findings-report>.

1 Introduction

1.1 Economic Impact Analysis

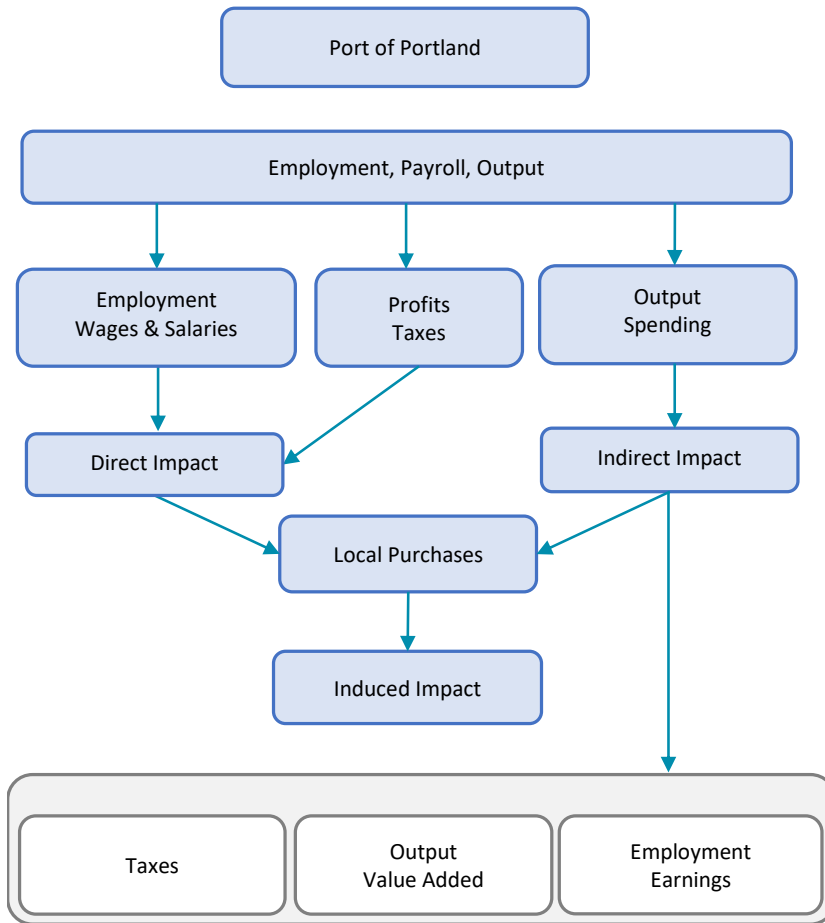
Today, the Port of Portland is a multifaceted government agency. The Port encompasses a broad range of facilities and services. It owns and manages four marine terminals, including Oregon's only deep-draft container port, three airports, the largest of which is Portland International Airport (PDX), and several business parks. These facilities form a critical nexus for regional, national, and international transportation and commerce, connecting Oregon to the wider global economy.

In order to understand the economic impact of the Port's varied operations on the Portland region's economy and state economy, Steer was hired to conduct an economic impact study to measure and describe the Port's contributions to the regional economy through its aviation, marine, navigation, and real estate operations. These activities contribute to the local economy through employment, income, visitor spending, business output and tax revenue.

This analysis uses IMPLAN, an input-output model, to provide a comprehensive assessment of how Port enabled goods and services flow from one industry sector to another. In an input-output model, each industry is both a producer, creating output, and a consumer, using inputs from other sectors. For example, a boat builder might use inputs from a steel mill (such as sheet steel), an energy company (such as electricity) and the logistics sector (such as supply chain management). These inter-industry transactions form the basis of the input-output model.

Input-output modeling is particularly valuable for economic impact analysis. By tracing the flow of goods and services, it facilitates the estimation of the direct, indirect, and induced effects of a change in economic activity in one sector on other sectors. Direct effects are the initial changes in the sector under consideration, indirect effects are changes in the sectors that supply inputs to the initial sector, and induced effects are changes due to alterations in household spending resulting from changes in income in both the direct and indirect sectors of the economy.

Figure 1.1: Direct, Indirect and Induced Economic Impacts

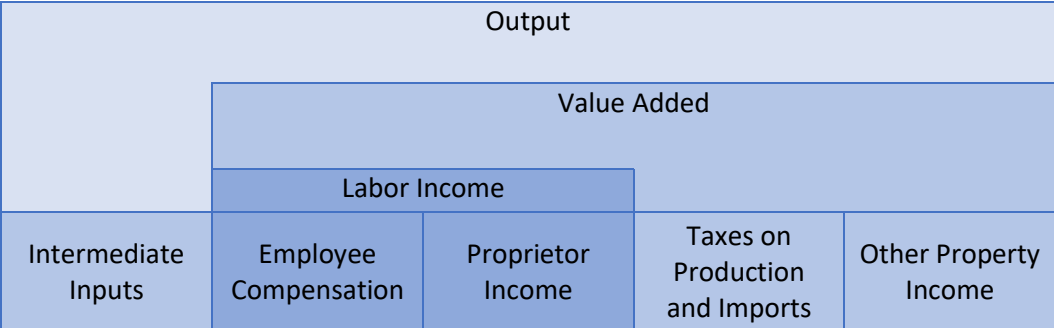


The results of the economic impact analysis highlight the significant contributions of the Port of Portland's operations to the local, regional, and state economies. By leveraging input-output and multi-region modeling, we have captured a comprehensive picture of these impacts. The results are presented across four key dimensions: employment, wages, value added, and output, each being influenced by direct, indirect, and induced effects. The results can be understood as follows:

- **Employment:** This reflects the total number of jobs supported by the Port's operations, covering direct, indirect, and induced effects. It provides an indication of how many residents are employed because of the Port's activity within the region.
- **Labor income:** This represents the total compensation, including wages and benefits, earned by individuals employed directly or indirectly because of the Port's activities. It also includes the income of proprietors. It illustrates the Port's contribution to household incomes and living standards.
- **Value Added:** This is the net output of the Port's activities, equivalent to Gross Domestic Product (GDP) at the local or regional level. It measures the Port's direct contribution to economic growth.
- **Output:** This reflects the total value of goods and services produced as a result of the Port's operations and the value of intermediate products used by Port industries.

Taken together these four dimensions provide a comprehensive view of the economic footprint of the Port of Portland, demonstrating its pivotal role in driving economic activity and prosperity in the region. Figure 1.2 shows the relationship between output, value added and labor income.

Figure 1.2: Output, Value Added and Labor Income



2 Economic Impact Results for All Facilities

2.1 Introduction

The overall economic impacts for all Port facilities are shown in this section. The results include all ongoing operations from the aviation facilities, marine facilities and business parks, and also includes impacts from capital expenditure at Portland International Airport (PDX) and the impacts from spending by visitors arriving at the Port's airports.

The economic impact analysis represents a 2021 base year and all values of labor income, value added and output are shown in 2021 prices. This means that changes in economic activity that have occurred since 2021 will not be represented in the analysis. However, as visitor spending has been highly affected by the Covid-19 pandemic, visitor spending is represented by a 2022 base year, which is about 25% higher than 2021 would be. Labor income, value added and output resulting from visitor spending is shown 2021 prices.

The economic impacts have been assessed using a combination of the following input survey data:

- QCEW Data - The Quarterly Census of Employment and Wages (QCEW) provides an understanding of employment levels within the Port's facilities. As our primary data source, it provides a robust and reliable picture of employment statistics for firms in the region. By using this data, we have accurately estimated the total number of jobs directly supported by the Port's operations. This information forms a key input to our economic impact analysis, helping us to quantify the direct employment impacts of the Port's activities.
- Tennant Survey - To complement and validate the QCEW data, we conducted surveys among business tenants at the Port's aviation, marine, and business park facilities. Key aspects of the surveys included questions on employment and wage levels. We utilized tenant lists provided by the Port to plan and conduct these surveys.
- PDX Passenger Survey - Passenger surveys conducted at PDX were carried out via both WiFi and in-person interviews and provided valuable insights into visitor spending habits. Using the results of the passenger surveys, we were able to estimate average visitor expenditure across different categories, providing an understanding of the broader economic impacts of passenger travel through the Port's airports.

2.2 Economic Impact of All Facilities

Table 2.1 shows the direct, indirect, and induced impacts of all Port facilities.

Table 2.1: Economic Impacts of All Port Facilities

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	62,329	3,937	5,519	10,416
Indirect	19,206	1,527	2,378	4,502
Induced	15,879	1,021	1,846	3,001
Total	97,414	6,485	9,743	17,919

The Port directly supports 62,329 jobs and this grows to 97,414 jobs when taking into account the indirect and induced impacts. For context, the directly supported 62,329 jobs alone represent around 5% of employment in the Portland MSA. The Port contributes to the economy by providing a total of \$6.5 billion of labor income and \$9.7 billion of value added, when taking full account of the direct, indirect and induced impacts.

Table 2.2 summarizes the total of all direct, indirect, and induced impacts of the Port.

Table 2.2: Total Economic Impacts of all Port Facilities

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Aviation	17,041	1,267	1,801	3,463
Visitors	34,140	1,712	2,858	4,619
Capital Expenditure	3,849	321	406	775
Marine	12,696	930	1,480	3,201
Business Parks	29,689	2,255	3,198	5,862
Total	97,414	6,485	9,743	17,919

The Port supports 97,414 jobs in the region when taking into account the indirect and induced impacts. 17,041 jobs are supported by aviation operations, 34,140 jobs are supported by spending of visitors passing through the aviation facilities, 3,840 jobs are supported by capital expenditure at the aviation facilities, 12,696 jobs are supported by the marine facilities, and 29,689 jobs are supported by the business parks.

Table 2.3 shows gross tax impacts at federal, state and local levels.

Table 2.3: Tax Impacts of all Port Facilities

Tax Impact	Tax (\$m)
Federal	1,408
State of Oregon	332
State of Washington	50
Local	196

The taxation analysis includes an assessment of the main applicable taxes, such as income, payroll and corporate taxes, as well as aviation industry specific taxes and taxes on property and transient

visitor taxes applicable to overnight visitors. However, there are taxes that are not included, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, and TRIMET district tax.

Further information on the economic impacts for each of the facilities, is provided in the following sections of this report.

3 Economic Impact Results for Aviation Facilities

3.1 Introduction

The Port’s aviation facilities, comprising Portland International Airport (PDX), and Hillsboro (HIO) and Troutdale (TTD) general aviation airports, are vital economic engines for the region. As the largest airport in Oregon, PDX facilitates the majority of the state's air travel and cargo operations, serving as a gateway for a wide range of economic activities and a significant source of employment.

PDX is also home to the Oregon Air National Guard base thereby contributing to the region's defense sector. This military presence not only provides jobs but also infuses the local economy with federal defense spending. In addition to this, HIO is home to the Oregon international airshow which attracts tourists from around the region, state and beyond. Hillsboro Airport (HIO), and Troutdale Airport (TTD) contribute to the regional economy by supporting a wide range of activities, including private aviation, flight training, and business aviation.

For the aviation facilities, we have assessed the facilities as a whole, and then separately for each airport. We show economic impacts of the ongoing operations, visitor spending and capital spending where appropriate.

3.2 Economic Impacts of All Aviation Facilities

3.2.1 Ongoing Operations for all Aviation Facilities

The aviation facilities’ ongoing operations are the everyday activities necessary to keep the airports running, including terminal operations, administration, air traffic control and security. These operations support a wide range of jobs, both directly at the airports and indirectly throughout the region and beyond, and generate substantial economic activity. Table 3.1 shows the direct, indirect, and induced impacts of the airport operations.

Table 3.1: Economic Impacts of all Aviation Operations

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	10,549	789	1,031	2,066
Indirect	3,812	310	469	909
Induced	2,680	167	301	488
Total	17,041	1,267	1,801	3,463

The airport operations directly support 10,549 jobs and this grows to 17,041 jobs when taking into account the indirect and induced impacts. Airport operations contribute to the economy by

providing a total of \$1.3 billion of labor income and \$1.8 billion of value added, when taking full account of the direct, indirect, and induced impacts.

Top direct industries include air transportation, support services for transportation, and couriers and messengers. There are a range of retail industries at the aviation facilities that have significant operations, including restaurants, food and beverage stores, and health and personal care stores. There are also an array of building services that are important to the on-going operation of the facilities. Top occupations include material moving workers, air transportation workers, and motor vehicle operators. Through the supply chain, passenger operations support a range of service and air transportation industries, while cargo operations support industries like manufacturing, e-commerce, and logistics. Both passenger and cargo operations indirectly impact many other industries through linked supply chains. The diversity of jobs offered by the aviation facilities contributes to the stability and resilience of the local economy. The connections to other cities in the US and internationally also enable all businesses in the region to have better access to their domestic and overseas suppliers and partners.

Table 3.2 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 3.2: Total Economic Impacts of all Aviation Operations by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	15,627	1,145	1,562	2,943
East County	350	26	34	57
Portland MSA in Washington	877	75	116	181
Total Portland MSA	16,504	1,220	1,678	3,124
Rest of Oregon	132	7	13	24
Rest of Washington	405	39	110	315
Total	17,041	1,267	1,801	3,463

The airport operations support a total of 16,504 jobs in Portland MSA, 132 jobs in the rest of Oregon and 405 jobs in the rest of Washington. Of the 16,504 jobs in Portland MSA, 15,627 are in Oregon, including 350 in East County, and 877 are in Washington. Airport operations contribute to the economy through \$1.7 billion of value added in Portland MSA, \$13 million of value added in the rest of Oregon and \$110 million of value added in the rest of Washington.

Table 3.3 shows gross tax impacts at federal, state and local levels.

Table 3.3: Tax Impacts of all Aviation Operations

Tax Impact	Tax (\$m)
Federal	383
State of Oregon	81
State of Washington	10
Local	17

The taxation analysis includes an assessment of the main applicable taxes, such as income, payroll and corporate taxes, as well as aviation industry specific taxes and taxes on property and transient visitor taxes applicable to overnight visitors. However, there are taxes that are not included, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, and TRIMET district tax.

3.2.2 Visitor Spending for all Aviation Facilities

Another significant contributor to the airport's economic impact is visitor spending. Every year, the airports facilitate the arrival of a large number of visitors to the region, who contribute to the local economy through their spending. We have estimated the economic impacts of visitor spending through a series of passenger surveys conducted both in-person and as an electronic survey when a passenger accessed the airport's public Wi-Fi service.

It was estimated that there were 2.8 million visitors arriving in 2022 through the aviation facilities. The average party size was found to consist of 1.6 people and roughly 30% of parties traveled for business purposes with the remaining 70% of parties traveling for leisure or other purposes. We found that accommodation was the largest spending item for visitors, accounting 36% of their spend, followed by food and drink (15%), transportation (14%), retail (13%), entertainment (12%), and other services and products (11%).

It's important to note that these impacts are above and beyond those generated by the airport's own operations. These impacts are also different from other measures of visitor spend in the region as only visitors who used Portland's airports are captured. Table 3.4 shows the direct, indirect, and induced impacts of visitor spending throughout the region.

Table 3.4: Economic Impacts of Visitor Spending

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	23,717	969	1,589	2,443
Indirect	4,751	356	566	1,029
Induced	5,672	386	703	1,148
Total	34,140	1,712	2,858	4,619

Visitor spending directly supports 23,717 jobs and this grows to 34,140 jobs when taking into account the indirect and induced impacts. Visitor spending contributes to the economy by providing a total of \$1.7 billion of labor income and \$2.9 billion of value added, when taking full account of the direct, indirect and induced impacts.

The high volume of visitors to the region passing through the Port's airports has a ripple effect on the regional economy, stimulating growth in sectors like hospitality, retail, and transportation. The top industries include hotels and motels, restaurants, museums and historical sites, amusement and recreation industries, car rental, and transit and ground passenger transportation. The top occupations supported includes food and beverage servers, retail sales workers, cooks and food preparation workers, motor vehicle operators, and building cleaners.

3.2.3 Capital Expenditure for all Aviation Facilities

We have considered the effects of capital expenditures, particularly those undertaken in 2021 that are part of the PDX Next project. The investment level reflected in the table below represents roughly \$465 million in investment but does not capture the impacts of the full project. PDX Next represents a series of major improvements planned at the airport, aimed at modernizing facilities and enhancing the passenger experience. The project involves significant capital investment, which generates additional economic activity. Unlike regular operational spending, which maintains the current level of service, this capital project represents a significant expansion of the airport's capacity and therefore provides an important additional economic stimulus. We have therefore conducted a separate analysis to capture the direct, indirect, and induced impacts of the PDX Next project. Table 3.5 shows the direct, indirect, and induced impacts of the capital expenditure.

Table 3.5: Economic Impacts of PDX Next Capital Expenditure

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	2,440	219	234	466
Indirect	763	62	100	192
Induced	646	40	72	117
Total	3,849	321	406	775

The Port’s investment in capital expenditure directly supports 2,440 jobs and this grows to 3,849 jobs when taking into account the indirect and induced impacts. The capital expenditure contributes to the economy by providing a total of \$321 million of labor income and \$406 million of value added when taking full account of the direct, indirect, and induced impacts.

Top industries supported includes construction, building materials and truck transportation and top occupations supported includes construction trades workers, installation and maintenance workers, material moving workers and motor vehicle operators. Construction jobs are important to the region as they are well-paid and account for a disproportionate share of both quality and pathways to quality jobs for workers without college degrees.

Table 3.6 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 3.6: Total Economic Impacts of PDX Next Capital Expenditure by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	3,397	289	346	655
East County	55	4	7	12
Portland MSA in Washington	233	16	30	53
Portland MSA	3,629	305	376	708
Rest of Oregon	86	5	9	19
Rest of Washington	134	11	22	48
Total	3,849	321	406	775

The Port’s investment in capital expenditure supports a total of 3,630 jobs in Portland MSA, 86 jobs in the rest of Oregon and 134 jobs in the rest of Washington. Of the 3,630 jobs in Portland MSA, 3,397 are in Oregon, including 55 in East County, and 233 are in Washington. Capital expenditure contributes to the economy through \$376 million of value added in Portland MSA, \$9 million of value added in the rest of Oregon and \$22 million of value added in the rest of Washington.

3.3 Economic Impacts of Portland International Airport (PDX)

3.3.1 Ongoing Operations for PDX

The ongoing operations at PDX are the everyday activities necessary to keep the airport running, including terminal operations, administration, air traffic control and security. These operations support a wide range of jobs, both directly at the airport and indirectly throughout the region and beyond, and generate substantial economic activity. Table 3.7 shows the direct, indirect, and induced impacts of the airport operations.

Table 3.7: Economic Impacts of PDX Operations

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	9,572	732	963	1,938
Indirect	3,532	291	441	862
Induced	2,477	155	280	454
Total	15,581	1,178	1,684	3,254

PDX operations directly support 9,572 jobs and this grows to 15,581 jobs when taking into account the indirect and induced impacts. PDX operations contribute to the economy by providing a total of \$1.2 billion of labor income and \$1.7 billion of value added, when taking full account of the direct, indirect, and induced impacts.

Top industries include air transportation, support services for transportation, and couriers and messengers. There are a range of retail industries at the aviation facilities that have significant operations, including restaurants, food and beverage stores, and health and personal care stores. There are also an array of building services that are important to the on-going operation of the facilities. Top occupations include material moving workers, air transportation workers, and motor vehicle operators. Passenger operations support a range of service and air transportation industries, while cargo operations support industries like manufacturing, e-commerce, and logistics. Both passenger and cargo operations indirectly impact many other industries through linked supply chains. The diversity of jobs offered by the aviation facilities contributes to the stability and resilience of the local economy. The connections to other cities in the US and internationally also enable all businesses in the region to have better access to their domestic and overseas suppliers and partners.

Table 3.8 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 3.8: Total Economic Impacts of PDX Operations by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	14,223	1,061	1,455	2,757
East County	313	22	31	50
Portland MSA in Washington	864	75	114	179
Total Portland MSA	15,086	1,136	1,570	2,935
Rest of Oregon	120	7	12	22
Rest of Washington	374	36	103	297
Total	15,581	1,178	1,684	3,254

PDX operations support a total of 15,086 jobs in Portland MSA, 120 jobs in the rest of Oregon and 374 jobs in the rest of Washington. PDX operations contribute to the economy through \$1.6 billion of value added in Portland MSA, \$12 million of value added in the rest of Oregon and \$103 million of value added in the rest of Washington. Top industries include air transportation, support services for transportation, and couriers and messengers. Top occupations include material moving workers, air transportation workers, and motor vehicle operators.

Table 3.9 shows gross tax impacts at federal, state and local levels.

Table 3.9: Tax Impacts of PDX Operations

Tax Impact	Tax (\$m)
Federal	359
State of Oregon	74
State of Washington	9
Local	15

The taxation analysis includes an assessment of the main applicable taxes, such as income, payroll and corporate taxes, as well as aviation industry specific taxes and taxes on property and transient visitor taxes applicable to overnight visitors. However, there are taxes that are not included, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, and TRIMET district tax.

3.3.2 Visitor Spending for PDX

Another significant contributor to the airport's economic impact is visitor spending. Every year, the airport facilitates the arrival of a large number of visitors to the region, who contribute to the local economy through their spending on accommodation, food and drink, retail, transportation, entertainment, and other services and products. We have estimated the economic impacts of visitor spending through a series of passenger surveys conducted both in-person and as an electronic survey when a passenger accessed the airport's public Wi-Fi service. It's important to note that these impacts are above and beyond those generated by the airport's own operations. These impacts are also different from other measures of visitor spend in the region as only visitors

who used Portland’s airports are captured. Table 3.10 shows the direct, indirect, and induced impacts of visitor spending throughout the region.

Table 3.10: Economic Impacts of Visitor Spending

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	23,337	954	1,564	2,403
Indirect	4,674	351	557	1,012
Induced	5,581	380	691	1,129
Total	33,592	1,685	2,812	4,545

Visitor spending directly supports 23,337 jobs and this grows to 33,592 jobs when taking into account the indirect and induced impacts. Visitor spending contributes to the economy by providing a total of \$1.7 billion of labor income and \$2.8 billion of value added, when taking full account of the direct, indirect and induced impacts.

The high volume of visitors to the region passing through PDX has a ripple effect on the regional economy, stimulating growth in sectors like hospitality, retail, and transportation. The top industries include hotels and motels, restaurants, museums and historical sites, amusement and recreation industries, car rental, and transit and ground passenger transportation. The top occupations supported includes food and beverage servers, retail sales workers, cooks and food preparation workers, motor vehicle operators, and building cleaners.

3.3.3 Capital Expenditure at PDX

We have considered the effects of capital expenditures, particularly those related to the PDX Next project. PDX Next represents a series of major improvements planned at the airport, aimed at modernizing facilities and enhancing the passenger experience. The project involves significant capital investment, which generates additional economic activity. Unlike regular operational spending, which maintains the current level of service, this capital project represents a significant expansion of the airport's capacity and therefore provides an important additional economic stimulus. We have therefore conducted a separate analysis to capture the direct, indirect, and induced impacts of the PDX Next project. Table 3.11 shows the direct, indirect, and induced impacts of the capital expenditure.

Table 3.11: Economic Impacts of PDX Next Capital Expenditure

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	2,440	219	234	466
Indirect	763	62	100	192
Induced	646	40	72	117
Total	3,849	321	406	775

The Port’s investment in capital expenditure directly supports 2,440 jobs and this grows to 3,849 jobs when taking into account the indirect and induced impacts. The capital expenditure contributes

to the economy by providing a total of \$321 million of labor income and \$406 million of value added, when taking full account of the direct, indirect, and induced impacts.

Top industries supported includes construction, building materials and truck transportation and top occupations supported includes construction trades workers, installation and maintenance workers, material moving workers and motor vehicle operators. Construction jobs are important to the region as they are well-paid and account for a disproportionate share of both good and promising jobs for workers without college degrees.

Table 3.12 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 3.12: Total Economic Impacts of PDX Next Capital Expenditure by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	3,397	289	346	655
East County	55	4	7	12
Portland MSA in Washington	233	16	30	53
Portland MSA	3,629	305	376	708
Rest of Oregon	86	5	9	19
Rest of Washington	134	11	22	48
Total	3,849	321	406	775

The Port’s investment in capital expenditure supports a total of 3,630 jobs in Portland MSA, 86 jobs in the rest of Oregon and 134 jobs in the rest of Washington. Of the 3,630 jobs in Portland MSA, 3,397 are in Oregon, including 55 in East County, and 233 are in Washington. Capital expenditure contributes to the economy through \$376 million of value added in Portland MSA, \$9 million of value added in the rest of Oregon and \$22 million of value added in the rest of Washington.

3.4 Economic Impacts of Hillsboro (HIO)

3.4.1 Ongoing Operations for HIO

The ongoing operations at HIO are the everyday activities necessary to keep the airport running, including terminal operations, administration, air traffic control and security. These operations support a wide range of jobs, both directly at the airport and indirectly throughout the region and beyond, and generate substantial economic activity. Table 3.13 shows the direct, indirect, and induced impacts of the airport operations.

Table 3.13: Economic Impacts of HIO Operations

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	946	60	71	133
Indirect	260	20	28	48
Induced	193	12	22	35
Total	1,399	92	121	217

HIO operations directly support 946 jobs and this grows to 1,399 jobs when taking into account the indirect and induced impacts. HIO operations contribute to the economy by providing a total of \$92 million of labor income and \$121 million of value added, when taking full account of the direct, indirect, and induced impacts.

Table 3.14 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 3.14: Total Economic Impacts of HIO Operations by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	1,345	87	111	195
East County	6	0	1	1
Portland MSA in Washington	11	1	1	2
Total Portland MSA	1,357	88	112	197
Rest of Oregon	12	1	1	2
Rest of Washington	30	3	7	18
Total	1,399	92	121	217

HIO operations support a total of 1,357 jobs in Portland MSA, 12 jobs in the rest of Oregon and 30 jobs in the rest of Washington. HIO operations contribute to the economy through \$112 million of value added in Portland MSA, \$1 million of value added in the rest of Oregon and \$7 million of value added in the rest of Washington.

3.4.2 Visitor Spending for HIO

Another significant contributor to the airport's economic impact is visitor spending. Visitors arrive at HIO on corporate and chartered flights and contribute to the local economy through their spending on accommodation, food and drink, retail, transportation, entertainment, and other services and products. We have estimated the economic impacts of visitor spending through a series of passenger surveys conducted both in-person and as an electronic survey when a passenger accessed the airport’s public Wi-Fi service. It's important to note that these impacts are above and beyond those generated by the airport's own operations. These impacts are also different from other measures of visitor spend in the region as only visitors who used Portland’s airports are captured. Table 3.15 shows the direct, indirect, and induced impacts of visitor spending throughout the region.

Table 3.15: Economic Impacts of Visitor Spending

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	380	16	26	39
Indirect	76	6	9	17
Induced	91	6	11	18
Total	548	27	46	74

Visitor spending directly supports 380 jobs and this grows to 548 jobs when taking into account the indirect and induced impacts. Visitor spending contributes to the economy by providing a total of \$27 million of labor income and \$46 million of value added, when taking full account of the direct, indirect and induced impacts.

The visitors to the region passing through HIO has a ripple effect on the regional economy, stimulating growth in sectors like hospitality, retail, and transportation. The top industries include hotels and motels, restaurants, museums and historical sites, amusement and recreation industries, car rental, and transit and ground passenger transportation. The top occupations supported includes food and beverage servers, retail sales workers, cooks and food preparation workers, motor vehicle operators, and building cleaners.

3.5 Economic Impacts of Troutdale (TTD)

3.5.1 Ongoing Operations for TTD

The ongoing operations at TTD are the everyday activities necessary to keep the airport running, including administration, air traffic control, security and various other activities that take place at the airport including flight training and scenic flights. These operations support a wide range of jobs, both directly at the airport and indirectly throughout the region and beyond, and generate substantial economic activity. Table 3.16 shows the direct, indirect, and induced impacts of the airport operations.

Table 3.16: Economic Impacts of TTD Operations

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	31	3	2.9	6.5
Indirect	6	1	0.8	1.4
Induced	8	0	0.9	1.4
Total	44	4	4.5	9.3

TTD operations directly support 31 jobs and this grows to 44 jobs when taking into account the indirect and induced impacts. TTD operations contribute to the economy by providing a total of \$3.8 million of labor income and \$4.5 million of value added, when taking full account of the direct, indirect, and induced impacts.

Table 3.17 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 3.17: Total Economic Impacts of TTD Operations by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	41	3.5	4.0	8.4
East County	32	2.8	3.0	6.7
Portland MSA in Washington	2	0.2	0.3	0.5
Total Portland MSA	43	3.7	4.3	8.9

Rest of Oregon	0	0.0	0.0	0.1
Rest of Washington	1	0.1	0.2	0.4
Total	44	3.8	4.5	9.3

TTD operations support a total of 43 jobs in Portland MSA and 1 job in the rest of Washington. TTD operations contribute to the economy through \$4.3 million of value added in Portland MSA, a negligible amount of value added in the rest of Oregon and \$0.2 million of value added in the rest of Washington.

Visitor Spending for TTD

While TTD provides scenic flights and other services that attract visitors, there are not a significant number of visitors arriving into the region through TTD and therefore we have not assessed visitor spending for this airport.

4 Economic Impact Results for Marine Facilities

4.1 Introduction

The Port of Portland's marine facilities play a vital role in the regional, national, and international economy, providing a critical link in the movement of goods and commodities. With its prime location along the Columbia and Willamette Rivers, the Port's terminals offer easy access to freight rail lines, interstate highways, and river barges, allowing for efficient, multimodal transport of cargo.

The active marine terminals include:

Terminal 4, responsible for bulk products including soda ash and fertilizers, and automobiles

Terminal 5, managing grain, potash and other mineral bulks

Terminal 6, the primary ocean container terminal on the Columbia River, also handles automobiles

We have estimated separately the impacts of economic activity that is dependent upon the Port's own terminals and the Portland Working Harbor which also includes economic activity that depends upon the use of privately owned docks which are reliant upon the Port's dredging operation.

4.2 Economic Impacts of Portland Working Harbor

We have estimated the economic impacts of the Port of Portland's ongoing operation of the marine facilities and dredging activity to maintain the viability of the Columbia River for maritime transportation. The impacts below include operations at both the public and private terminals. From the handling of commodities and cargo to the provision of essential services to the shipping industry, the ongoing operation of these facilities contributes significantly to the regional economy. These operations support a wide range of jobs, both directly at the marine facilities and indirectly throughout the region and beyond, and generate substantial economic activity.

Portland Working Harbor incorporating both public and private terminals, supports a wide variety of industries. Major exports include grain, soda ash, potash, automobiles, and hay, while imports consist of automobiles, steel, machinery, mineral bulks, and a broad assortment of other products. The marine terminals of the Port of Portland are not just hubs of transport and trade, but also significant sources of employment. Table 4.1 shows the direct, indirect, and induced impacts of the marine facilities of the Portland Working Harbor.

Table 4.1: Economic Impacts of the Portland Working Harbor

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	7,526	537	833	2,005
Indirect	3,145	267	420	828
Induced	2,024	126	227	368
Total	12,696	930	1,480	3,201

The marine facilities directly support 7,526 jobs and this grows to 12,696 jobs when taking into account the indirect and induced impacts. The marine facilities contribute to the economy by providing a total of \$2.0 billion of labor income and \$1.5 billion of value added, when taking full account of the direct, indirect and induced impacts.

Table 4.2 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 4.2: Total Economic Impacts by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	11,136	810	1,266	2,756
East County	268	22	33	60
Portland MSA in Washington	890	66	116	208
Portland MSA	12,026	877	1,382	2,964
Rest of Oregon	260	17	25	57
Rest of Washington	410	36	73	180
Total	12,696	930	1,480	3,201

The marine facilities support a total of 12,026 jobs in Portland MSA, 260 jobs in the rest of Oregon and 410 jobs in the rest of Washington. Of the 12,026 jobs in Portland MSA, 11,136 are in Oregon, including 268 in East County, and 890 are in Washington. The marine facilities contribute to the economy through \$1.4 billion of value added in Portland MSA, \$25 million of value added in the rest of Oregon and \$73 million of value added in the rest of Washington.

Top industries include boat building, iron and steel mills, and couriers and messengers. Beyond the immediate activity around the marine terminals there are extensive supply chains support business across the region in industries such as truck transportation, wholesale machinery and business support services industries. Top occupations at the marine terminals include material moving workers, metal and plastic workers, and motor vehicle operators, while the supply chain also includes occupations such as motor vehicle operators, business operations specialists and computer occupations.

Table 4.3 shows gross tax impacts at federal, state and local levels.

Table 4.3: Tax Impacts of the Portland Working Harbor

Tax Impact	Tax (\$m)
Federal	184
State of Oregon	64
State of Washington	9
Local	12

The taxation analysis includes an assessment of the main applicable taxes, such as income, payroll and corporate taxes, as well as taxes on property. However, there are taxes that are not included, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, and TRIMET district tax.

4.3 Economic Impacts of Port of Portland Terminals

We have estimated the economic impacts of the Port of Portland's own marine terminals. Economic activity includes the handling of commodities and cargo to the provision of essential services to the shipping industry, the ongoing operation of these facilities contributes significantly to the regional economy. These operations support a wide range of jobs, both directly at the marine facilities and indirectly throughout the region and beyond, and generate substantial economic activity. Table 4.4 shows the direct, indirect, and induced impacts of the marine facilities of the Port of Portland marine terminals.

Table 4.4: Economic Impacts of the Port of Portland’s Marine Terminals

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	4,889	321	465	1,174
Indirect	1,768	151	237	468
Induced	1,194	74	134	217
Total	7,850	546	836	1,858

The Port of Portland’s marine terminals directly support 4,889 jobs and this grows to 7,850 jobs when taking into account the indirect and induced impacts. The marine facilities contribute to the economy by providing a total of \$546 million of labor income and \$836 million of value added, when taking full account of the direct, indirect and induced impacts.

Top industries include boat building, iron and steel mills, and couriers and messengers. Beyond the immediate activity around the marine terminals there are extensive supply chains support business across the region in industries such as truck transportation, wholesale machinery and business support services industries. Top occupations at the marine terminals include material moving workers, metal and plastic workers, and motor vehicle operators, while the supply chain also includes occupations such as motor vehicle operators, business operations specialists and computer occupations. Table 4.5 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 4.5: Total Economic Impacts by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	6,922	475	711	1,603
East County	158	13	20	36
Portland MSA in Washington	543	41	71	127
Portland MSA	7,465	515	783	1,730
Rest of Oregon	156	10	15	34
Rest of Washington	229	20	39	95
Total	7,850	546	836	1,858

The Port of Portland’s marine terminals support a total of 7,465 jobs in Portland MSA, 156 jobs in the rest of Oregon and 229 jobs in the rest of Washington. Of the 7,465 jobs in Portland MSA, 6,922 are in Oregon, including 158 in East County, and 543 are in Washington. The marine facilities contribute to the economy through \$783 million of value added in Portland MSA, \$15m of value added in the rest of Oregon and \$39 million of value added in the rest of Washington.

Table 4.6 shows tax impacts at federal and state level, however it should also be noted that there are significant tax contributions the local level as well.

Table 4.6: Tax Impacts the Port of Portland’s Marine Terminals

Tax Impact	Tax (\$m)
Federal	109
State of Oregon	38
State of Washington	5
Local	8

The taxation analysis includes an assessment of the main applicable taxes, such as income, payroll and corporate taxes, as well as taxes on property. However, there are taxes that are not included, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, and TRIMET district tax.

5 Economic Impact Results for Business Parks

5.1 Introduction

The Port of Portland's business parks serve as strategic locations for a range of businesses. The Port has developed industrial parks across the metropolitan area, each providing unique opportunities for businesses to thrive. The Port's business parks include:

- Swan Island Industrial Park
- Rivergate Industrial District
- Troutdale Reynolds Industrial Park
- The Portland International Center
- Gresham Vista

In addition to these established business parks, the Port of Portland and the Oregon Mass Timber Coalition were awarded a U.S. Economic Development Administration award that includes development of the Port's Terminal 2 into a mass timber campus. While the project was not included in this economic impact assessment, this project and other future business parks developed by the Port will support economic development, businesses, and provide residents jobs in the future.

The business parks provide space for businesses to operate and grow, thereby creating jobs and contributing to personal income, business revenue, and tax generation in the region. The business parks not only support businesses directly located within them, but also indirectly impact other firms in the region through linked supply chains. Their existence allows nearby businesses easier access to goods and services, thereby increasing overall productivity.

5.2 Economic Impacts of the Business Parks

We have estimated the economic impacts of the business parks developed by the Port of Portland. The business parks host a diverse range of businesses, support innovation and contribute significantly to the regional economy. The business parks support a wide range of jobs, both directly at the business parks and indirectly throughout the region and beyond, and generate substantial economic activity. Table 5.1 shows the direct, indirect, and induced impacts of the business parks.

Table 5.1: Economic Impacts of the Business Parks

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Direct	18,097	1,422	1,831	3,437
Indirect	6,735	531	824	1,545
Induced	4,856	302	543	881
Total	29,689	2,255	3,198	5,862

The business parks directly support 18,097 jobs and this grows to 29,689 jobs when taking into account the indirect and induced impacts. The business parks contribute to the economy by providing a total of \$2,255 million of labor income and \$3.2 billion of value added, when taking full account of the direct, indirect and induced impacts.

Top industries include warehousing and storage, wholesale of nondurable goods, investigation and security services, and a range of manufacturing. We found through the survey of tenants that there a range of businesses from non-profit and religious organizations to government entities and private companies located at the business parks. There are also many diverse industries located at the business parks, including childcare services, insurance agencies, financial investment activities and medical facilities. The supply chains supporting these industries are even more diverse, ranging from advertising and public relations to legal services and computer systems design services. Top occupations include business operations specialists, information and record clerks, and dispatching and distribution workers. While these are the top occupations, there is a actually a huge range of jobs provided by the tenants of the business parks including jobs in high-tech industries and non-profits. Importantly, these jobs are not limited to individuals with college degrees, enabling a wider section of the community to benefit from the economic activity generated by the Port.

Table 5.2 shows how the total economic impacts are geographically distributed to Portland MSA, the rest of Oregon and the rest of Washington.

Table 5.2: Total Economic Impacts by Region

Economic Impact	Employment (Jobs)	Labor Income (\$m)	Value Added (\$m)	Output (\$m)
Portland MSA in Oregon	27,492	2,100	2,927	5,340
East County	2,345	133	207	338
Portland MSA in Washington	1,402	96	166	290
Portland MSA	28,894	2,196	3,094	5,629
Rest of Oregon	390	23	38	78
Rest of Washington	404	35	67	155
Total	29,689	2,255	3,198	5,862

The business parks support a total of 28,894 jobs in Portland MSA, 390 jobs in the rest of Oregon and 404 jobs in the rest of Washington. Of the 28,894 jobs in Portland MSA, 27,492 are in Oregon, including 2,345 in East County, and 1,402 are in Washington. The business parks contribute to the

economy through \$3.1 billion of value added in Portland MSA, \$38 million of value added in the rest of Oregon and \$67 million of value added in the rest of Washington.

Table 5.3 shows gross tax impacts at federal, state and local levels.

Table 5.3: Tax Impacts of the Business Parks

Tax Impact	Tax (\$m)
Federal	459
State of Oregon	153
State of Washington	15
Local	30

The taxation analysis includes the main applicable taxes, however there are taxes that are not included, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, TRIMET district tax.

A Economic Impact Analysis Methodology

A1 Introduction

The economic impact study involved the collection of economic activity data and measurement of how the Port's facilities contributed to the Portland regional economy in 2021. These contributions are estimated for the business activity, employment, and expenditure arising from the Port's aviation, marine and business park facilities. They are also derived indirectly from products and services provided by local firms that support the Port's operations and businesses.

Air travelers that visit the Portland region additionally contribute to the local economy through their spending on ground transportation, lodging, restaurants, entertainment, retail and other services. The consumer expenditures from employees and visitors generate tax revenue and multiplier effects, such that the total economic impact from the Port is far greater than the direct impacts that are generated within the Port's facilities.

To inform the methodology, Steer completed a review of economic impact studies for the Port and other relevant data and reports. We also conducted a literature review on more recent economic impact analysis research and highlight areas of improvement and additional areas of analysis to consider. After reviewing inputs, outputs, and assumptions used in the preparation of previous economic impact reports, we developed the modeling approach outlined in this document.

A2 Input-Output Modeling

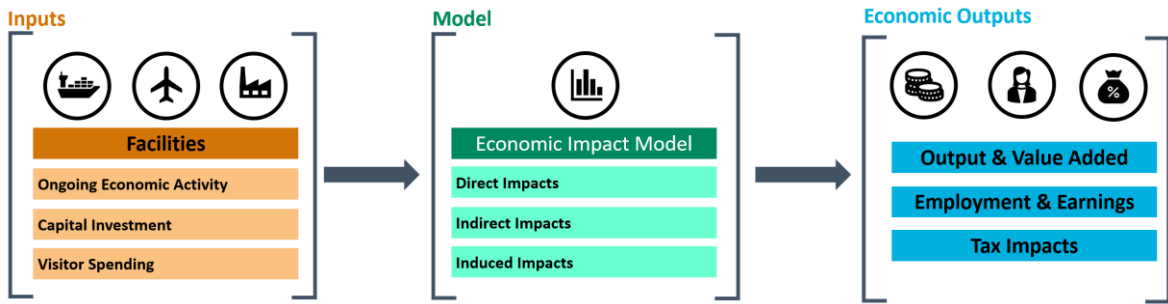
Input-output modeling is a critical tool used in economics to capture the interactions between different sectors within an economy. It was pioneered by the Nobel Prize-winning economist Wassily Leontief in the mid-20th century. At its core, an input-output model describes the interdependencies between various industries or sectors in an economy, providing a comprehensive view of how goods and services flow from one sector to another.

In an input-output model, each industry is both a producer, creating output, and a consumer, using inputs from other sectors. For example, a boat builder might use inputs from a steel mill (such as sheet steel), an energy company (such as electricity) and the logistics sector (such as supply chain management). These inter-industry transactions form the basis of the input-output model.

Each row in the input-output matrix represents the distribution of an industry's output to other industries, while each column shows the inputs required by an industry from others. The balance between the total output and total input of each sector provides a snapshot of the economy's equilibrium state.

Input-output modeling is particularly valuable for economic impact analysis. By tracing the flow of goods and services, it facilitates the estimation of the direct, indirect, and induced effects of a change in economic activity in one sector on other sectors. Direct effects are the initial changes in the sector under consideration, indirect effects are changes in the sectors that supply inputs to the initial sector, and induced effects are changes due to alterations in household spending resulting from changes in income in both the direct and indirect sectors of the economy. Figure A.1 shows a high-level overview of input-output modeling for economic impact analysis.

Figure A.1: Economic Impact Analysis Approach



In regional economic input-output (I-O) analysis, economic impacts are typically divided into direct, indirect, and induced impacts. The interaction between these levels is defined below.

- **Direct Impacts** – Are the initial effects from all spending associated with business services and activities at the Port’s airports, seaports and industrial park businesses. Direct impacts account for jobs, wages and salaries, and capital investments to maintain, upgrade or expand Port facilities. They also include local spending by out-of-town passengers who use Portland International Airport (PDX) to visit the Portland region.
- **Indirect Impacts** – are derived from the purchases between businesses to support their operations and supply chain. The effect from the expenditures to sustain Port businesses and operations, as well as the industrial parks tenants’ operations will be accounted in these impacts. The indirect impacts will be estimated using data from the operations expenditures of Port businesses, as well as purchases made by industrial park tenants. Industry-specific multipliers from IMPLAN will be applied to these expenditures to estimate the total indirect impacts.
- **Induced Impacts** – result from multiplier effects of consumer expenditure from the wages and salaries of direct and indirect employment (after taxes, savings, and commuter income) within the economy. For example, the income of employees produces further economic impacts as the workers spend on goods and services in the region.

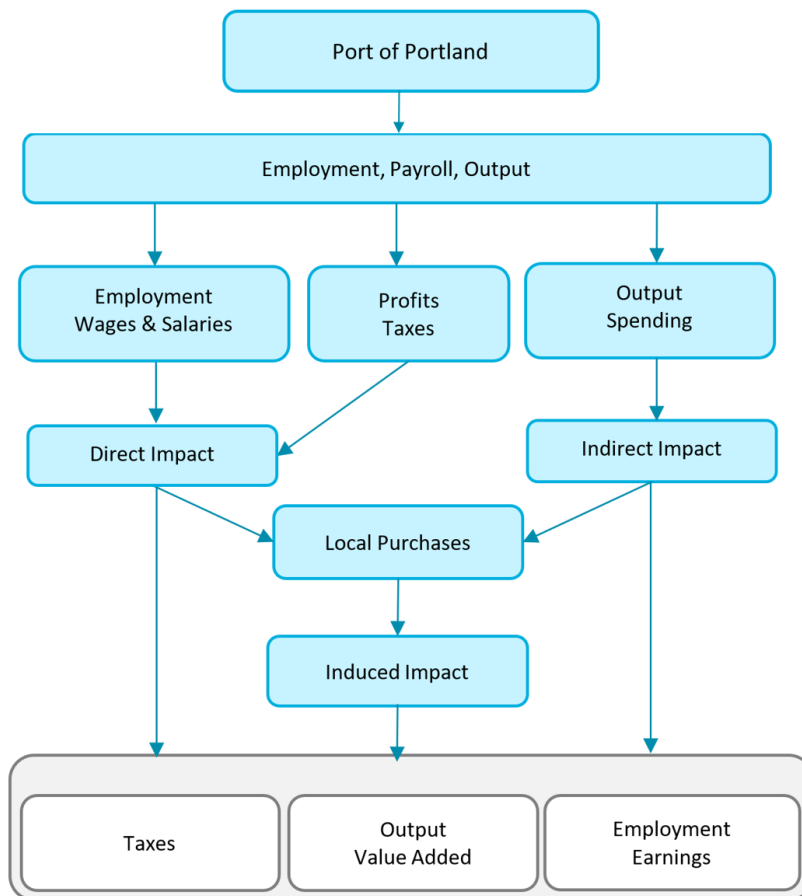
The main measures of economic impact include business revenue (output), value added, employment, personal earnings, and tax revenues. These measures are not additive and each one presents a unique way of measuring economic impacts:

- (a) **Business revenue (output)** represents the total value of goods and services produced by the Port’s businesses, including visitor spending, average annual gross sales, and average annual operating and capital expenditures.

- (b) **Value added** represents contributions to Gross Domestic Product (GDP) and is calculated as the difference between output and the cost of intermediate inputs.
- (c) **Employment** includes jobs that are created from direct, indirect, and induced economic impacts from the Port’s operations, development, and business activities. Employment accounts for the total full-time or part-time jobs of individuals related with the Port.
- (d) **Personal earnings (payroll)** include the personal incomes earned from the salaries, wages and benefits associated with the jobs created by the Port’s economic impact.
- (e) **Tax revenue** represents the federal, state, county, and local tax revenues generated by the economic activity associated with the Port’s businesses and tenants.

Figure A.2 shows an overview of the input-output model, flowing from the economic activity at the port through to the tax, employment and value-added outputs that incorporate direct, indirect and induced impacts.

Figure A.2: Direct, Indirect and Induced Economic Impacts



A2.1 Modeling Software

IMPLAN software has been used to conduct the economic impact analysis. It is a widely-used software for conducting economic impact analysis based on input-output modeling. IMPLAN is designed to provide comprehensive, accurate, and accessible economic impact information. One of

the key strengths of IMPLAN is its extensive data library, which provides detailed information on economic factors at the county, state, and national levels. This granularity allows for precise modeling of local economies and their unique characteristics. The software combines this data with input-output analysis, allowing users to calculate the wider economic impacts of changes in specific sectors.

IMPLAN also includes functionality for assessing the effects of economic activity in one user-defined region upon another. This is known as multi-regional input-output modeling.

A2.2 Multi-regional Input-Output Modeling

A multi-regional input-output (MRIO) model has been used for the analysis. While traditional input-output modeling provides valuable insights into the interdependencies within an economy, it is often constrained by its focus on a single, homogenous region. In contrast, multi-region input-output (MRIO) modeling extends the framework to capture economic interactions between multiple regions.

In a MRIO model, each region has its own set of inter-industry transaction matrices, reflecting the local structure of its economy. These are linked through trade matrices that capture the flow of goods and services between regions. This structure allows the MRIO model to account for the fact that a change in economic activity in one region can have ripple effects in others through inter-regional trade.

MRIO models allow for a more comprehensive understanding of the spatial distribution of economic impacts, taking into account not just the direct effects within the region of interest but also the indirect and induced effects that propagate across different regions.

Table A.1 shows the regions modeled.

Table A.1: Modeled Regions

Modeled Regions
Each Port Location
East County
Remainder of Portland MSA in Oregon
Portland MSA in Washington
Remainder of Oregon
Remainder of Washington

A3 Economic Impacts for Aviation, Marine and Business Park Facilities

A3.1 Direct Economic Activity

The direct economic activity at the Port was estimated separately for the aviation, marine and business park facilities using employment data by industry from the Bureau of Labor Statistics (BLS) and validated through surveys of tenants. The tenant surveys were also used to estimate economic activity for entities that are not included in the BLS data, such as the Oregon National Guard facility that is located at PDX.

A3.2 Input Data

Surveys form a key input to the economic impact analysis, providing a detailed snapshot of the economic activities at the Port's facilities. By using multiple sources of data, a comprehensive picture of the economic impacts associated with the Port's operations has been developed. Our survey sources for the direct economic activity occurring at the Port's aviation, marine and business park facilities are Quarterly Census of Employment and Wages (QCEW) and tenant surveys. Each provides us with a unique perspective on the economic activities associated with the Port.

QCEW Data

The Quarterly Census of Employment and Wages (QCEW) provides an understanding of employment levels within the Port's facilities. As our primary data source, it provides a robust and reliable picture of employment statistics for firms in the region. By using this data, we can accurately estimate the total number of jobs directly supported by the Port's operations. This information forms a key input to our economic impact analysis, helping us to quantify the direct employment impacts of the Port's activities.

Tenant Surveys

To complement and validate the QCEW data, we conducted extensive surveys among business tenants at the Port's aviation, marine, and business park facilities. Key aspects of the surveys included questions on employment and wage levels. We utilized tenant lists provided by the Port to plan and conducted these surveys. The surveys helped define salary ranges and expenditures on goods and services.

A3.3 Designation of Firms to Port Facilities

Firms were designated to the Port's aviation, marine and business park facilities primarily based on their location, the Port's own designation of land to facility and the historical build out of the Port. Exceptions to this are shown below:

- Several distribution centers in Portland International Center business park have been designated to the aviation facility as these firms are heavily dependent upon Portland International Airport.
- The National Guard is technically not on Port land, but is assigned to the aviation facility as it is dependent upon Portland international Airport.
- Firms that are not located on Port land, but have their own dock on the Willamette River or are heavily dependent upon the Port's public marine terminals have been designated to the marine facility and modeled as part of the "Working Harbor", due to their operation being contingent on the Port's ongoing operation of Dredge Oregon which ensures the navigability of the Willamette River.
- Several firms that are in Rivergate Industrial Park have been assigned to the marine facility as they are either dependent upon having their own dock on the Willamette River or are heavily dependent upon the public marine terminals.

A3.4 Treatment of potential double counting between Port Facilities

The Port's facilities have been strategically developed to form an inter-dependent eco-system, where economic activity in one facility depends upon the economic activity of the other facilities.

This leads to a potential issue in the estimation of economic impacts where, for example, the direct impacts at the business parks could be also counted as the indirect impacts of the marine facility as some of those businesses in the business parks help serve businesses at the marine terminals.

To avoid this potential double-counting, we have excluded the indirect impact of each facility where indirect impacts occur at another facility through identification using the multi-regional analysis that we have prepared, which is a key benefit of the multi-regional approach for this implementation.

A4 Capital Expenditure

To account for the significant investments the Port spends to build, and renovate its facilities, we have inspected the Port's Capital Investment Program and actual expenditures for 2021. The main capital expense in 2021 was for the PDX Next program. In 2021 there was roughly \$465 million of investment in PDX Next.

PDX Next represents a series of major improvements planned at the airport, aimed at modernizing facilities and enhancing the passenger experience. The project involves significant capital investment, which generates additional economic activity. Unlike regular operational spending, which maintains the current level of service, this capital project represents a significant expansion of the airport's capacity and therefore provides an important additional economic stimulus. We have therefore conducted a separate analysis to capture the direct, indirect, and induced impacts of the PDX Next project.

The method for assessing the economic impacts of the PDX Next program is essentially the same as for the Port's main facilities, except that the input data to the IMPLAN input-output model was based on revenue rather than employment.

A5 Visitor Spending

To estimate the direct impacts from visitor spending, we began with calculating the share of total passenger traffic that qualify as visitors to the Portland region. We then used a combination of existing 2022 Wi-Fi survey data and visitor spending specific surveys in 2022 and 2023 that were conducted in-person for this project to develop average passenger spending profiles. The spending data was then input into the IMPLAN model using appropriate industries for the classifications of spending from the surveys.

As visitor spending has been highly affected by the Covid-19 pandemic, visitor spending is represented by a 2022 base year (rather than 2021 as for the rest of the economic impact analysis), which is about 25% higher than 2021 would be.

A5.1 PDX Passenger Survey

Passenger surveys conducted at PDX were carried out via both Wi-Fi and in-person interviews and provided valuable insights into visitor spending habits. The in-person interviews were conducted in November 2022, January 2023 and March 2023 and approximately 1,200 interviews were conducted in total. Data for the following spending categories was collected: lodging, food and drink, rental car/ taxi/ other transportation, entertainment, retail items, and other.

Using the results of the passenger surveys, we were able to estimate average visitor expenditure across the different spending categories, providing an understanding of the broader economic impacts of passenger travel through the Port's airports.

A6 Estimation of Tax Contribution

The Port’s facilities each play a pivotal role not only as a transportation and business hub but also as significant economic contributors through various aviation-related and general taxes. These taxes are levied at the federal, state, and local levels, each providing unique contributions to their respective jurisdictions. At the federal level, aviation taxes are primarily channeled into the Airport and Airway Trust Fund, which supports both airport and airway improvement projects, while other taxes such as payroll and income taxes provide general funding for a range of government spending. At the state level, revenues support infrastructure development and general public spending. At the local level, the Port’s contributions help fund critical community projects and services.

When estimating the tax contributions of the Port there were two methodologies that were considered. The first method considered was to use tax outputs calculated directly in the IMPLAN model. While IMPLAN is a widely recognized economic modeling tool, its generic nature means it may not capture the nuance and specificity of the Port’s tax contribution in a comprehensive manner. For a more accurate, and tailored analysis, we conducted our own detailed analysis to provide a more comprehensive view of the Port’s tax contributions.

Table A.2 shows the taxes that were estimated.

Table A.2: Estimated Taxes

Taxing Jurisdiction	Estimated Taxes
Federal	Aviation Taxes Payroll Tax Personal Income Tax Corporate Income Tax
Oregon State	Payroll Tax Personal Income Tax Corporate Income Tax Gross Receipts Tax Transient Visitor Tax
Washington State	Payroll Tax Gross Receipts Tax Sales Tax
Local	Multnomah County Corporate Income Tax Multnomah County Property Tax Local Transient Visitor Taxes

It should be noted that there are taxes that are not included in the analysis, such as: import duties, business licenses, taxes on utilities, Multnomah County Preschool for All tax, and TRIMET district tax.

