# PROGRESS OF A REGION: THE METROPOLITAN PORTLAND ECONOMY IN THE 1990S

TECHNICAL REPORT OF THE

REGIONAL
CONNECTIONS
PROJECT

INSTITUTE OF PORTLAND METROPOLITAN STUDIES
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PORTLAND STATE UNIVERSITY

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## Acknowledgments

The Regional Connections project was developed to create a new understanding of the economy of the six-county Portland-Vancouver metropolitan area useful to decisionmakers, citizens, and economic and workforce development interests. The project develops a review of regional economic performance, a comparison of the performance of this region to other major metropolitan areas, a description of the key clusters of firms in the traded or export sector of the regional economy, and an analysis of the relationships within key clusters capable of securing the metropolitan area's hold on a place on the global economic map. The Regional Connections project is an ongoing project of the Institute of Portland Metropolitan Studies, located in the College of Urban and Public Affairs at Portland State University.

This project could not have occurred without the assistance and support of numerous partners. Funding for the project has come from the Regional Strategies Board of Multnomah and Washington Counties, through funds provided by the Oregon Economic Development Department. The Economic Development section of the Portland Development Commission has been, from the beginning, a central partner and critical participant in shaping the project. Morgan Pope (Portland State University), Marcy Jacobs (Oregon Economic Development Department), Eric Moore and Ken Lux (Oregon Employment Department), Amy Vander Vliet (Oregon Employment Department), Scott Bailey (Washington Employment Security Department), and especially John Hall and Mark Clemons (Portland Development Commission) who have provided ongoing assistance and advice, meeting twice each month to help develop the project.

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# EXECUTIVE SUMMARY

The economy of the Portland Metropolitan area has grown rapidly in the 1990's. Most area residents are aware that the region has a larger population, more businesses and more jobs than it did a few years ago. But the Portland economy of the late 1990's is not simply a larger version of the economy the region had twenty years ago, or even a decade ago. The purpose of the Regional Connections project is to explain the nature and the extent of these changes.

This report provides a summary of the economic analysis of the metropolitan region undertaken as part of the Regional Connections Project. Regional Connections is a project of the Institute of Portland Metropolitan Studies at Portland State University and the Portland Development Commission, and has received generous funding from the Regional Strategies Board of Multnomah and Washington Counties. This summary is part of a larger technical report that provides specific details about the sources and methods used in the first phase of the project.

The technical report is divided into four major parts, each of which is described below. First, we describe the background and objectives of the regional connections project. Second, we assay the region's recent economic performance, exploring a variety of measures of economic well-being. Third, we analyze the structure of the regional economy, identifying the main sources of regional economic growth. Fourth, we offer a preliminary identification and description of the region's key industrial clusters.

## 1. PROJECT BACKGROUND AND ECONOMIC SETTING

To begin our research effort, we considered alternative definitions of the boundaries of the regional economy. Economic activity in the region spills across municipal, county, and even state boundaries. Based on our analysis of urbanization patterns and worker commuting flows, we settled on the federally-designated six-county metropolitan statistical area including Columbia, Clackamas, Multnomah, Washington and Yamhill Counties in Oregon and Clark County Washington. As of 1997, the rough economic dimensions of this region were as follows:

- 1.7 million residents
- About 1 million workers
- About 50,000 businesses with a payroll

We estimate that the region's gross domestic product, the value of all the goods and services produced here is approximately $60 billion annually, making the Portland-Vancouver metro economy about the same size as that of the Czech Republic.
Closer to home, these estimates show that the Portland region's economy (including Clark County, Washington) is larger, measured by employment, wages and income, than the 31 Oregon counties outside the metro area combined.

## 2. Measuring Our Performance

Anyone who has lived in the Portland area during the 1990's has some awareness of the ongoing growth that has unfolded in the region. An analysis of economic data shows just how rapid regional growth has been:

Since 1992, the average rate of job growth in the metropolitan area has been over 4 percent per year. Over the past five years, the regional economy has added 180,000 new jobs, the equivalent of the entire economy of Lane County (the Eugene-Springfield Metropolitan Area). In 1997, the last full calendar year for which data are available, Portland metro area employment growth of approximately 40,000 jobs was equal to 80% of all of the job growth recorded in the state of Oregon.

A key factor associated with this growth has been the expansion of exports. Measured by the volume of exports through the region, Portland is the tenth largest exporting metropolitan area in the United States, with total exports of $9 billion per year. A leading factor in export growth has been high technology products, which have doubled to $3 billion per year in the past three years.

The growth of high tech and other manufactured exports has transformed Oregon's export base from that of a resource-extracting economy in the 1980's (66% of exports tied to lumber, grain and other natural resources) to a value added manufacturer in the 1990's (60% of exports from high tech and manufacturing).

At a time when manufacturing employment has been weak or declining nationally, it has been growing robustly in the Portland metropolitan area. The region now has more than 150,000 manufacturing workers, and ranks as the 20th largest industrial center in the

United States, outstripping historic centers of industrial production like Pittsburgh, Baltimore, Cincinnati and Kansas City.

Human capital and worker skills are critical ingredients in today's economy. One of the most dramatic changes in the regional economy has been the huge increase in educational attainment. Data for 1996 show that more than one-third of Portland area adults have a four year college degree, up from only 26% in 1990. The rate of increase over these six years is roughly triple the national rate of improved educational attainment, ranking Oregon among the top five of the nation's fifty largest metro areas for educational attainment.

Coupled with the increase in jobs and the improving education of the workforce, the region's average wages have grown rapidly. Over the past decade, wages in Portland have risen by 9%, after adjusting for inflation, compared with only a 1.6% increase in the remainder of the nation's metropolitan areas. The average worker in the Portland metro area now earns nearly $30,000 per year, about $6,500 more than workers in Salem and Eugene, and about $7,500 more than workers in other parts of the state.

While Portland area wages have always been higher than in the rest of Oregon, the gap between Portland wages and rural Oregon has widened from 13% in the late 1970's to 32% today. The region's rapid growth has helped push unemployment rates down to levels not seen since the late 1960's. Portland's 1997 unemployment rate was just 4.3%, well below the national and state averages.

Rising wages and low unemployment rates have engineered a significant rebound in the region's relative per capita income. During the long recession that struck Oregon in the early 1980's, state and metropolitan per capita incomes declined sharply relative to the nation. As recently as 1988, Portland's per capita income was slightly below the US average. Since then, income has risen rapidly, and the Portland region's per capita income is now 7% above the US average, and slightly above the average for all US metro areas.

The region's strong economy and income growth has played a critical role in helping to pay for the costs of state government services. While the region accounts for less than 40 percent of the exemptions claimed on income tax returns (a proxy for the taxpaying population), it pays more than 52% of all state income taxes. This contribution has been particularly important as Oregon has shifted from property taxes to income taxes to pay for K-12 education since the passage of Measure 5 in 1990.

# 3. Regional Economic Structure

A major objective of the Regional Connections project is to build the basis for a better understanding of the region's recent economic performance. Our research efforts focused on examining the region's economic base and beginning the process of identifying key industry clusters.

The project's underlying economic framework draws on economic base theory. Traded sectors of the regional economy--businesses that sell goods or services in markets for which their is national or international competition--draw income into the region, which in turn is respect in local sectors of the economy, fueling the region's economic growth. Over time, the growth (or stagnation) of traded sectors plays a key role in determined whether, and how fast the region's economy grows.

To begin to understand the breadth of change in the region's economic structure, we analyzed the direct hiring impact of job changes in the region's fifty largest firms. We tracked the employment records of the region's fifty largest employers in 1986 for ten years. Over that decade, these fifty firms accounted for only about 2 percent of the region's employment growth.

A cursory examination of regional employment statistics classified by industry shows that a few industrial classifications account for the bulk of the region's traded sector employment. Among the region's largest traded industries are high technology (SIC 357, 36, 38 and 737), and metals, machinery and transportation equipment (SIC 33, 34, 35 and 37).

Our performance analysis showed that Portland's economy was growing faster than the nation as a whole. To determine which sectors were driving that growth, we examined patterns of employment and earnings growth by sector in the region and the nation. This analysis showed that in six major sectors– electronics, air transportation, construction, transportation equipment, agricultural services and business services–Portland's growth outpaced national counterparts. Other segments lagged behind national growth patterns, including utilities, government and health care.

We also undertook a shift-share analysis of industrial sectors. Shift-share looks at how Portland's share of national earnings in any industry changes over time, and is roughly analogous to market share in a private sector context. Overall, Portland's share of national earnings declined slightly from 1975 to 1985 and increased sharply from 1985 to 1995. Declines in wood products, construction, and transportation equipment led the downturn from 1975 to 1985. A huge increase in electronics (Portland tripled its share in a decade) and smaller increases in construction, air transportation, and other sectors led the rebound in the latter period.

We developed location quotients for this region, a means for showing which industries are most concentrated in this area relative to the nation. An industry with a location quotient of 1 makes up the same share of a local economy as it does the national economy. Portland has high location quotients in several industries–footwear wholesaling, electronics, computers, nursery products, wood products and others.

We combined our analysis of employment levels, growth rates and location quotients into a strategic analysis of the contribution of various sectors to regional growth patterns. In general, electrical equipment, nursery products, software and machinery segments seem to be key drivers in growth, while some traditional sectors like primary metals, instruments and lumber and wood products are lagging.

## 4. Identifying Portland's Industry Clusters

The objective of the Regional Connections project is to go beyond simply cataloguing employment growth rates by industry to developing a clear understanding of the interconnections between different segments of the regional economy. Traded sectors of the local economy contribute to local economic expansion, not only by wage payments to workers, but by purchases of inputs from local suppliers. In some cases, where there is a sufficient concentration of firms in a single industry and their suppliers, there may be an agglomeration or a cluster of businesses. Drawing on the work of Michael Porter at the Harvard Business School, we begin the process of identifying the region's key industry clusters.

Porter's analysis, summarized in The Competitive Advantage of Nations, argues that groups of similar and related firms concentrated in a small geographic area, often a particular city, can exhibit what he calls a diamond of competitive advantage. There are four aspects to this diamond: the structure of the industry and rivalries between firms; the presence of demanding local customers; the availability of world class suppliers; and access to specialized inputs, particularly labor. Where all of these elements are present, Porter finds, a cluster generates a dynamic process of ongoing improvement and innovation that can sustain the cluster's success for a prolonged period.

To identify Portland's clusters, we combined Porter's diamond model with our own analysis of the regional economy. We set out four criteria for what constitutes a cluster:

- that the industry should export (outside the region) much of its output;
- that it should consist of multiple firms;

- that it display some evidence of concentration in Portland compared to other locations; and

- that it demonstrate each of the aspects of a cluster in Porter's diamond.

Based on these criteria, we identified two groups of candidate industry clusters. The first is evident clusters, groups of firms that our currently available data show meet the cluster criteria. The second group is latent clusters, groups of businesses that meet some criteria, but will require further analysis to determine whether they are truly a cluster.

## Evident Clusters

Our analysis shows that Portland has five evident clusters of economic activity:

- Electronics and High Technology: Embracing computers, electrical equipment, instruments and software, this cluster of firms directly employs nearly 60,000 in the region. Portland has high location quotients in many electronics sub-sectors and important concentrations of suppliers in business services, engineering, chemicals, plastics and fabricated metals.

- Metals, Machinery and Transportation Equipment: The region has nearly 41,000 workers in these sectors, with significant concentrations in primary ferrous and non-ferrous metals, titanium, heavy trucks, railcars, shipbuilding and specialized machinery.

- Lumber and Wood Products: Despite the restructuring of production in rural Oregon, Portland remains an important administrative, manufacturing and wholesaling center for the wood products industry. Wood products firms employ more than 23,000 in the region, and Portland has high location quotients for secondary wood products and wood products wholesaling.

- Nursery Products: The fastest growing component of the state's agricultural sector, nursery products production–including greenhouse plants, ornamental trees and shrubs, and flowers and bulbs–is concentrated in the metropolitan area. This sector employs over 5,000 in nursery products, and nearly 3,600 more in related landscaping.

- Specialty Food/Craft Beverages: Portland is an important center for a variety of specialty food products, including fresh and processed fruit, premium wines, craft beers and ales, and other niche products. Collectively firms in these segments employed nearly 3,500 workers.

## Latent clusters requiring additional study include:

- Creative and Professional Services: More than 40,000 regional residents work in legal, engineering, accounting, management, and creative services. Portland has a significant location quotient for engineering and architectural services, motion picture production, and advertising. Many of these, and other professional services are closely related to other clusters, and the boundaries and size of this cluster cannot be determined based solely on published data.

- Transportation and Distribution: Nearly 100,000 of the region's workers are employed in transportation and wholesaling activities. The region has high location quotients in many aspects of the transportation and wholesale sectors. It is clear however, that important segments of the wholesale sector are part of other clusters–i.e. wood products wholesaling, electronics wholesaling, metal service centers and scrap. Ascertaining the boundaries and role of this cluster will require further analysis.

- Temporary Employment: Nearly 24,000 people work as temporary employees in the metro area. Temporary employment is one of the region's fastest growing categories, and the region has a high location quotient for this sector. It appears that many of these workers are employed in other clusters. Temporary employment is an important supplier of labor in the region; determining its role will be a future task.

- Tourism: Slightly fewer than 10,000 people work in the region's hotels and motels. Location quotients for this sector suggest that Portland is relatively weak in this area. Important elements of demand for tourism are related to other clusters–business travel and conventions, for example. Again, connecting this sector to other clusters will be a future research task.

***Contact Us!***

The Regional Connections project has now entered its second phase. We will be doing additional research on our evident and latent clusters to determine whether and to what extent the firms within them engage each other in a manner that can support future innovation. In addition, we will be creating maps of the clusters in order to better describe the economic geography of the metropolitan area. For additional information, please call the Institute of Portland Metropolitan Studies, 503-725-5170.

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# I. PROJECT BACKGROUND

The past decade has witnessed the rapid growth of Portland's economy and population. Underlying this growth and not yet fully understood is a fundamental transformation of the region's economic base. The objective of this project is to document these changes with the breadth and clarity that will be useful and accessible to the region's citizens and leaders.

***What is making our economy grow – what are our "clusters" of activities?***

Regional Connections seeks a clear picture of the region's economy: its links and interrelationships between industry clusters, workers, and communities, and how those links relate to changes in the region. A central piece identifies "clusters"—groupings of industries with similar and related activities, and shaped by common business or development needs. Regional Connections seeks to improve the popular understanding of the health, function, and dynamics of our regional economy.

***How do these activities interrelate, and what is their geography?***

The Regional Connections project has developed a one-year work plan and a three-year vision. The first year plan includes the following components:

***Why should we care about regional connections – what are the effects on workers and communities?***

- The development of a technical report based on an analysis of existing data (this report). This report describes the economy in terms of its clusters (industry and geographic) and the connections of clusters to one another, and to the residents of the region. The baseline report also identifies data or information that is not available, but is needed in order to develop a systematic way of evaluating changes to the regional economy.

***What does it all add up to – what are our regional strengths and advantages?***

- The creation of a steering committee of interested parties to provide advice and feedback.

- The hosting of a regional forum that explores the possibilities and usefulness of a framework that describes the connections within the regional economy.

The three-year vision is straightforward: to provide regular analysis of the regional economy. Specifically, the project examines the major factors likely to impact the regional economy and influence growth and success of the region; provides detailed analysis of the region and its industry clusters; maps out supply and geographic linkages, and competitive strengths and weaknesses;

establishes an annual cycle of forums on the regional economy; and builds broad public and private sector support for the project.

## A. PROJECT PARTNERS

The Institute of Portland Metropolitan Studies at Portland State University manages this project. Initial partners for funding and technical resources include the Metro Regional Strategies Board and the Portland Development Commission. Over the next year, the project will be seeking a wide array of involvement and support from private sector and economic development organizations in the region to ensure the project provides valuable and practical information that can assist regional leaders in making informed decisions or exploring opportunities that capitalize on the region's economic advantages.

### Regional Strategies and Other Sponsors

The Regional Connections Project is made possible through a grant from the Washington and Multnomah Counties' Regional Strategies Fund. The Multnomah and Washington Counties Regional Strategies Board provides grant monies for local economic development activities. The Board is comprised of ten appointed volunteers, a majority of whom represents the private sector. Board funds come from the Oregon Lottery through the Oregon Economic Development Department, and are administered locally through the Portland Development Commission. Additional funding for the project was provided by Portland State University and the Portland Development Commission.

### Steering Committee

The Regional Connections Steering Committee has guided the culmination of the first phase of this project and helped develop the second and ongoing phases. Specifically, it reviews workplans and products, helps to identify audiences for this work and new sources of information, and assists with securing ongoing funding through grants, contracts, and donations.

The steering committee consists of twelve to twenty people from various businesses, government agencies, and other organizations that are focused on the regional economy. It meets no more than is necessary but no less than quarterly. Any subcommittees or work groups are developed as needed with specific assignments.

## B. RESEARCH APPROACH AND CALENDAR

This research project was undertaken by the Institute for Metropolitan Studies to develop a better understanding of the nature of the region's economic performance over the past decade and to more precisely characterize the nature of the structural changes occurring in the regional economy. Work on this project began in October 1997.

The approach to the project was broken into four major areas. First, we examined the available literature relevant to the project, reviewing previous studies of the Portland metro economy as well as studies that had recently been undertaken of the economies of other metropolitan areas around the United States. These studies helped us to identify the existing base data for measuring the performance and structure of the Portland metropolitan economy, and also to focus on research tasks that would extend rather than duplicate work that had already been accomplished by others. Our reading of studies recently undertaken by other metropolitan areas gave us some insights into questions and data sources that merited exploration in the Portland area. A brief summary of our review of other studies of the Portland metropolitan economy and other metropolitan areas is provided later in this section.

The second major area of inquiry for this project was assembling data on the region's economic performance. We have attempted to assemble a diverse range of indicators that describe various aspects of the economy. These indicators include a time series analysis of economic trends in the Portland metro area, as well as cross-sectional comparisons, both to the balance of the state of Oregon, and to the US economy as a whole. Where data were conveniently available, we have also examined Portland's rankings among US metropolitan areas according to various performance measures. Our general approach to this analysis has been to rely exclusively on data that had already been collected by others rather than to generate new primary data ourselves. Readers will note that nearly all of the data contained in this report refers to the six-county metropolitan statistical area as a whole. We have generally refrained from disaggregating data by county (or other geographic subdivision) to emphasize the collective performance of the region. The next phase of this project is designed to analyze the pattern of economic activity within the region. The results of our analysis of the region's economic performance are spelled out in Section II of the report.

The third part of our research was to begin to characterize the economic structure of the regional economy. We began with the hypothesis that industrial clusters played an important role in driving the growth of the regional economy. Relying heavily on the model of clusters developed by Michael Porter in *The Competitive Advantage of Nations*, and as applied to metropolitan areas in several of the studies examined in our literature review, we worked to identify groups of firms in the Portland metropolitan area that might plausibly be clusters. We had access to a variety of data on the industrial structure of the region, principally the Oregon Employment Department's firm level database of employment categorized according to the Standard Industrial Classification (SIC) code. We utilized this data to analyze the regional economy using a number of time-tested regional science measures, including location quotients and shift share analysis. We have also attempted to begin identifying inter-industry linkages among different sectors of the metropolitan economy by examining national level input-output data. Our analysis of the structure of the regional economy, and our identification of candidate industry clusters is described in Section III of the report.

The fourth part of our research will be to examine in detail the candidate industry clusters to see whether they meet the criteria for qualifying as a cluster as defined by Porter and others, and to determine the contribution these clusters make to the regional economy. This work will be completed as Part of Phase II of this project, which begins in October 1998. This work will dig deeper into the structure of industrial and geographic relationships among different parts of the regional economy to quantify and test information about clusters gathered in Phase I. This second phase will include interviews with industry participants and analysts in selected clusters, as well as mapping the location of firms within the region.

## C. Relationship to Previous Metropolitan Area Studies

There are multiple organizations that collect and report various economic data and trends. These reports, however, tend to be snapshots in time, static measures of our economy. This information is important, yet there is no systematic analysis of the connections among these trends, their impact on the regional economy, or identification of features which give the Portland metropolitan region a strategic advantage. Therefore, the objective of the Regional Connections project is to build on existing data [not duplicate it] to develop a clear framework that illustrates the dynamic workings of the regional economy.

Table 1.1 compares the work of Regional Connections to that of other projects in the area on the Portland metropolitan economy. In comparing the work and products of these other projects to Regional Connections we see that many of the other projects focus on understanding and/or predicting the performance of the economy in general or a specific industry. Only Regional Connections uses existing data to identify, define, and understand the connections *between* industries. Unlike other analyses that look at the economy of different geographic regions, only Regional Connections examines the six-county metropolitan region.

*Table 1.1 A Snapshot Comparison of Economic Information for the Portland Metropolitan Economy*

| Source | Analysis and Focus | Products | Primary Data Output | Methods | Audience | Meetings & Events |
|---|---|---|---|---|---|---|
| Employment Department | Regional workforce, labor issues and trends; data source for state and regional information on labor-related subjects | • Regional Economic Profile (every other year)<br>• Portland Economic Report (monthly)<br>• Web Site: Oregon Labor Management Information System (OLMIS) | Population trends; labor force statistics; job outlooks; industry trends; unemployment and wage rates. | Statistical analysis and trends in forecasting | • Mailing list and internet<br>• Employers<br>• Job seekers<br>• Policy-makers<br>• Staff | None |
| Metro | National and regional trends; employment growth by industry grouping; and growth patterns for employment, population, households | • Profiles of the Portland – Vancouver Economy (every three years)<br>• 2015 Regional Forecast and Urban Development Patterns (every two years) | Industry information by SIC code; industrial production indexes; employment wages; income; population and migration; productivity; housing starts; US and int'l trends and indicators | Location quotient index; econometric model; and a stand alone model that features US and Int'l drivers combined with regional assumptions | • Internal information<br>• General public | None (Growth workshops held to develop initial 2015 report) |
| State Office of Economic Analysis | State and county forecast information on population and employment | • Metropolitan Forecast<br>• Web Site http://www.oea.das.state.or.us | Population and employment demographic information | Forecast and trends | • Employers<br>• Policy makers<br>• Economists<br>• Academics | None |
| Oregon Economic Development Department | State and county information | • Project-based analysis – not specific to Portland Metro area | Dependent on project | Dependent on project | • N/A | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| University of Portland Economic Department | Analysis of real estate and housing – trends | • Real Estate Report (every two years) | Housing statistics | Statistical abstract | • Varies | None |
| Grubb & Ellis | Commercial real estate market for the Portland region | • Commercial Real Estate Information (annual report) | Vacancies; absorption rates; construction starts | Statistical analysis | • Clients only | None |
| US Bank | Northwest and state-wide analysis of economic performance and trends | • Regional Economic Review & Forecast Report (annual) | Employment growth and changes by sector; GDP; population growth; building permits; and selected county data | N/A | • Public<br>• Clients | Client meetings and presentations at various events |
| Regional Connections | Connections among industries that form clusters driving Portland's economy | • Regional Economic Cluster Analysis (industry & geographical linkages)<br>• Competitive Strengths | Cluster definition; cluster impact and linkages; cluster map; cluster history | Cluster analysis; location quotients; interviews with industry | • Citizens<br>• Industry leaders<br>• Community leaders | Annual economic summit; periodic sessions around industries and issues |

Other economic analyses are periodically conducted by the Port of Portland, University of Portland Business Administration Department, and Portland State University Urban Studies and Economics Departments.

## D. Analysis of Other Metropolitan Area Base Studies

Prior to beginning our research for Regional Connections, we looked at other metropolitan area economic base studies that had been done around the country. Table 1.2 lists the other studies examined and some of the findings from our analysis. In general, we found that these studies varied greatly in their analysis, the economic measures considered, the data sources used, and the time period covered. Even with this degree of variation, our examination of these other studies helped develop the analytical framework for Regional Connections. Specifically, these studies provided insight into how best to determine the existence of candidate industry clusters.

*Table 1.2 Other Metropolitan Area Base Studies*

| Paper | Model | Economic Measures | Time Period | Clusters/ Sectors | Geography | Data Source(s) |
|---|---|---|---|---|---|---|
| "The Competitive Advantage of Massachusetts," Michael Porter, 1991 | Porter Diamond | Per capita income; income per employee; employment; productivity; business failures; consolidations | 14 years (1976 – 1989) | • Health care<br>• Information technology<br>• Financial services<br>• Knowledge creation (environ., plastics, and metalworking) | Boston and State of Mass. | • 100 interviews<br>• Secondary data by SIC |
| "Joint Venture Silicon Valley," Center for Economic Competitiveness, SRI International, 1992 | Pyramid: export-oriented industries; linkage industries; responsive economic foundation (e.g. infrastructure, human resources, venture capital, etc.) | Employment; enterprise formation; venture capital financing; value added as a percent of shipments; pre-competitive R & D expenditures; housing costs; transportation congestion | 40 years (1950 – 1990) | • Computers<br>• Electronic components<br>• Communications<br>• Instruments<br>• Data processing and software engineering<br>• Biomedical | Santa Clara Co.; South Alameda Co.; East Santa Cruz Co.; South San Mateo Co. (boundaries defined based on interviews) | • Interviews/ surveys<br>• Secondary data by SIC |
| "Foundations for the Future: An Economic Development Strategy for the Central Puget Sound Region," Puget Sound Regional Council, Vols. I & II, 1993 – 1995 | Sectors based on SIC | Employment; location quotient; basic/ non-basic sectors; # of Fortune 500 HQs; productivity; wages; multiplier effects; export activity; environmental effects | 20 years (1970 – 1990) | • Electronics and instruments<br>• Aircraft and parts<br>• Food processing<br>• Printing and publishing<br>• Construction<br>• Transport. and communications<br>• Wholesale trade<br>• Computers and software<br>• Health services | Snohomish, King, Pierce and Kitsap Counties | • Interviews<br>• Secondary data by SIC |

| Paper | Model | Economic Measures | Time Period | Clusters/ Sectors | Geography | Data Source(s) |
|---|---|---|---|---|---|---|
| | | | | • Tourism | | |
| "The Tri-State Competitive Region Initiative" and "The Tri-State Competitive Region Initiative: Advanced Machinery and Systems Cluster Factbook," DRI/ McGraw Hill, 1994 | Sectors by SIC based on growth rates and historical presence | Growth output; share of US output; employment; geographic concentration | 30 years (1960 – 1990) | • Financial services<br>• Business services<br>• Information and media services<br>• Arts, culture and tourism<br>• Fashion<br>• Transportation and distribution<br>• Bio-medical<br>• Processed materials<br>• Adv. Machinery and systems | New York, New Jersey, and Connecticut | • Industry work groups<br>• Secondary data by SIC |
| "Twin Cities Industry Cluster Study," Munnich, 1995 | Porter diamond | Job growth ; share of jobs by industry; unemployment; earned income by industry; # of Fortune 500 HQs; location quotients; average weekly wages; industries ranked by # of employees | 10 years | • Printing and publishing<br>• Computers and software<br>• Medical devices<br>• Machinery and woodworking | Twin Cities | • ES-202<br>• SIC data<br>• Steering committee<br>• Focus groups |
| "Industrial Clusters and Regional Development in New Jersey," Markusen & Gray, 1996 | Marshallian; Italianate; Hub & Spoke; Satellite Platform; State Anchored | Scale economies; local linkages; employment; location quotients; capital services; role of University; role of State; innovation | 1 year (1993) | • Port-activities<br>• Health-care and chemicals<br>• Telecommunications<br>• Apparel and textiles<br>• Electronics | State of New Jersey | • Secondary data by SIC level |

| Paper | Model | Economic Measures | Time Period | Clusters/ Sectors | Geography | Data Source(s) |
|---|---|---|---|---|---|---|
| | | | | • Securities and Commodities | | |
| "A New Approach to Central Indiana Growth and Opportunity", the Corporate Community Council Task Force, July 21, 1998 | Region development strategy based on business development (traded sector), human resources development, and community development/ quality of life. | Population and employment; wages; unemployment rates; net migration; per capita income; transfer payments; earnings by industry; location quotients; | 16 years (1979 – 1995) | • Transportation equipment manufacturing<br>• Transportation and distribution<br>• Biomedical<br>• Insurance and finance<br>• Travel and tourism<br>• Other manufacturing sectors | Indianapolis MSA | • Interviews<br>• Metro region comparison<br>• BEA<br>• ES-202<br>• Secondary data by SIC |
| "MDN Tech Vision: A Blueprint for the 21st Century Economy of Metro Denver", Metro Denver Network, July 1998 | Porter diamond; 10 criteria for selecting industries: critical mass; growth; wage & skill level; environmental impact; traded sector; high value added; profitability; leading edge; global; communications | Population; employment; earnings; wages; forecasts by industry sector for employment and wages | 15 years (1980 – 1995) | • Computer storage and peripherals<br>• Software for communications<br>• Equipment for communications<br>• Biomedical devices and products | 6-County Metropolitan Denver region | • Local and national interviews<br>• Survey of national best practices<br>• Past industry studies |
| Regional Connections, 1997 - ? | Porter diamond; analysis of linkages; historical and geographic linkages | Employment; location quotients; wages; productivity; input-output relationships | 27 years (1969 – 1996) | • Electronics/ instruments<br>• Metals, machinery<br>• Transportation equipment<br>• Transportation and distribution | 6-County Portland MSA:(Clackamas, Columbia, Multnomah, Washington, | • ES 202<br>• BEA data<br>• Input-output data |

| Paper | Model | Economic Measures | Time Period | Clusters/ Sectors | Geography | Data Source(s) |
|---|---|---|---|---|---|---|
| | | | | • Professional services<br>• Wood products<br>• Ag/ food processing<br>• Printing<br>• Recreation related | Yamhill, and Clark (WA) Counties) | • Interviews |

## E. Area of Study

The Portland Metropolitan area straddles the border between the States of Oregon and Washington in the northwestern portion of Oregon. Two rivers dissect the region: the Willamette and the Columbia. The region is a major hub of transportation. It is at the head of deep-draft navigation of the Columbia River, and is served by a pair of continental railroads. It has two major interstate freeways and a rapidly growing international airport. But the region's economy is more than a reflection of these transportation assets. The Portland Metro area has a complex and varied economy that has developed over the past century and a half.

**History of the Portland Metropolitan Economy**

Historically, the Portland Metro economy has been based on industries that capitalized on the region's natural resources and Portland's location near the head of navigation of the Columbia River. This can be traced back to its earliest settlers, the Native Americans who took advantage of the region's accessible waterways, fertile soil, and plentiful wildlife to develop commerce and communication links with communities all along the Willamette and Columbia waterways. European explorers "discovered" the area during the period between 1542 and 1795 and took the region's assets even further, making the area an essential trading post for furs, wheat, lumber and fish with countries both near and far, including Asia, England, and the rest of North America.

As the pioneers settled in the area during the 1800's, Portland out-distanced other rivals in the lower Columbia and Willamette Rivers (Vancouver and Oregon City both had earlier starts) to become the region's principal export and commercial center. The local economy expanded and industries sprang up to support the earlier established export-oriented businesses and to meet the needs of the growing local population.

The early Portland area economy was based on being a supplier of raw materials to other manufacturing centers throughout the world. Its relatively remote location to consumer markets made the region a recipient of finished goods rather than a producer. As the 1800's drew to a close, the region had firmly asserted itself as a leader in the lumber industry through both superior quality of the area's timber and its diligent pursuit of mechanical and transportation improvements which lowered production costs.

Although the region can trace its economic beginnings to its natural resources and location, the economy has evolved substantially since then. While Portland began as an exporter of grain and lumber, the region's two principal resource products, these activities attracted a range of complementary industrial activities that are still apparent in the region today. The region's large forest products industry created a local market for firms producing a wide range of logging and production machinery, including saw blades (Omark), paper and wood products machinery (Coe), and log trucks (Freightliner). Portland's role as a shipping center created a market for ship repair, and as ship construction shifted from wood to metal in the late 19th and early 20th century, there was demand for local metalworking and ship-building. Local builders–like Gunderson–built specialized railcars and barges to meet the needs for moving the region's principal commodities. Even one of the region's first electronics firms, Iron Fireman (eventually merged into OECO) started life designing and building automated, thermostatically controlled fuel-feed systems for sawdust burning furnaces, widely used to heat buildings in the Northwest.

The region's cheap and abundant hydropower was the initial impetus for the growth of the local primary metals sector. The federal government built aluminum smelters in the region both as a critical part of the nation's defense infrastructure in the Second World War, and to provide ready customers for the electricity generated by federally financed dams. (Later, cheap power and the existence of local firms working with non-ferrous metals provided a basis for a flourishing titanium industry).

While many of the region's industries trace their roots to a connection to the region's resource base, they now compete based on other factors. Industries like electronics, software, multi-media and a range of professional services depend more on the specialized skills of the local labor market and the region's supplier base than they do on direct access to natural resources.

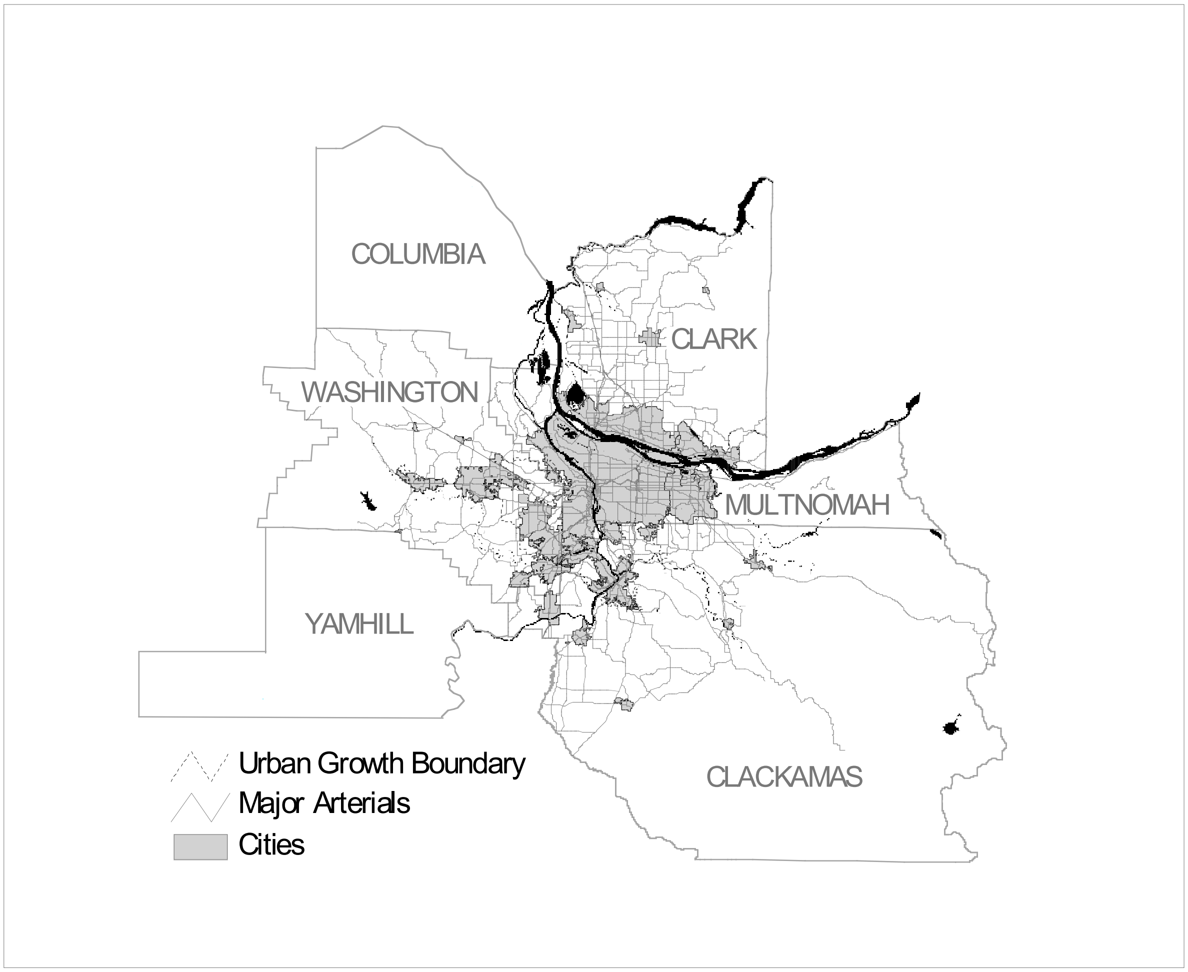
### Selection of Regional Boundaries

Regional Connections defines our “region” as the six-county Portland-Vancouver Metropolitan Area as used by the Bureau of Economic Analysis (BEA). This region consists of Clackamas, Columbia, Multnomah, Washington, and Yamhill Counties in Oregon and Clark County in Washington (Figure 1.1). This unit has several advantages. First, BEA has designated this area based on its analysis of journey-to-work patterns and has identified the six-county region as defining the boundaries of a single labor market. Consequently, both BEA and state and federal employment data are published on this basis. As we seek to compare our metropolitan area with other metropolitan areas in the nation, it is convenient and useful to use this common definition.

In some instances we have had to drop down to a smaller area for detailed analysis. Consequently, we have looked at the three-county (Clackamas, Multnomah, Washington) four-county (plus Yamhill) or five-county (plus Columbia) definition of the Oregon portion of the metropolitan area.

While the tri-county region – Clackamas, Multnomah and Washington counties – makes some sense for historical and political reasons, it is clear that the economic boundaries of the region stretch into the adjacent three counties.

*Figure 1.1 Area of Analysis for Regional Connections*




## Journey-to-Work Trends

One of the defining characteristics of any regional economy is the flow of its most vital commodity--labor. Labor markets are typically used to define the boundaries of an economic region. The critical indicator of the boundaries of labor markets is the pattern of journeys from residences to workplaces. Data collected as part of the decennial census are used by the Census and other agencies to determine labor market boundaries. The decennial census asks questions about place of work (and means of transportation and travel time) for a sample of all respondents. These data are used to estimate the flow of workers between counties. Counties connected to others by large flows of workers are considered to form labor markets.

Data for the Portland metropolitan area show that the six counties that form the region are closely linked by commuting patterns. Data from the 1990 census show that 97% of all of those who worked in the Metropolitan Statistical Area (MSA) were also residents of the region, and that of the region's residents, 97% worked at jobs located within the region. Conversely, about 3% of the region's jobs were held by persons from outside the MSA, while 3% of the region's employed population worked at jobs outside the MSA.

Within the region, there are tight linkages between counties, especially the region's four most populous counties--Clackamas, Clark, Multnomah and Washington. In 1990, more than 200,000 of the MSA's workers, about one-third of the region's workforce, worked in a different MSA county than they lived in. Because much of the region's employment remains centralized, Multnomah County is a big importer of labor from the surrounding counties. In 1990 for example, Multnomah County had about 257,000 workers living in the county and about 357,000 persons working in the county. Because some Multnomah County residents worked outside the county, about 40% of the jobs located in the county were held by commuters from outside Multnomah County. Multnomah County employers provided jobs to 82% of the workers living in Multnomah County, 47% of the workers living in Clackamas County, 36% of the workers living in Washington County and 28% of the workers living in Clark County. In fact, persons living in Clackamas County are more likely to work in Multnomah County than in Clackamas County.

Of course, most of the jobs in any county tend to be held by that county's residents. A substantial fraction of the jobs in any county are held by commuters from other counties. Residents of other counties hold 40% of the jobs in Washington and Clackamas Counties. About a third of the jobs in Washington County are held by residents of other counties. Only Clark County, in a different state and bound to the region by just two highway connections, is dramatically different; only 15% of Clark County jobs are held by residents from outside the county.

It appears that the tendency of the region's workers to work outside their county of residence is increasing. In each of the large counties in the region, the likelihood that workers worked in their county of residence declined between 1980 and 1990, while the likelihood that they worked outside their home county, but inside the MSA, increased. In 1980, nearly 71% of all workers worked in the same county in which they resided. In 1990, this figure had fallen to 65%. The fraction of the region's workers working outside their home county, but still in the MSA, rose from about 27% in 1980 to about 32% in 1990. Growth in work outside the MSA remained very small, but increased from about 2% to about 3% over the decade.

*Table 1.3 1980 – 1990 Place of Work Trends*

| | 1980 | | | 1990 | | |
|---|---|---|---|---|---|---|
| County of Origin | Within Home County | Outside Home County in SMSA | Outside SMSA | Within Home County | Outside Home County in SMSA | Outside SMSA |
| Multnomah | 87.6% | 10.9% | 1.5% | 82.3% | 15.8% | 1.9% |
| Clackamas | 46.7% | 49.9% | 3.3% | 36.9% | 57.9% | 5.3% |
| Washington | 59.8% | 38.2% | 2.0% | 54.0% | 42.4% | 3.6% |
| Clark (WA) | 66.0% | 30.0% | 4.0% | 64.2% | 32.1% | 3.7% |
| TOTAL SMSA | 70.9% | 26.8% | 2.3% | 64.9% | 31.9% | 3.2% |

Source: Journey-to-work data from the 1980 and 1990 censuses, compiled by Metro

The size and diversity of the region's labor market is an important economic advantage, both to employers and workers. For employers, the ability to recruit workers from throughout the metro area means that they are not restricted to the labor force of any single county. For workers, the range of employment opportunities available in the metro area gives them a better set of choices than they would find in any single county. The high and increasing level of movement of workers between the region's counties suggests strongly that this group of counties is best viewed as a single labor market and a single economy, rather than as separate economic units.

*Table 1.4 1990 Working Population by Place of Work and Place of Residence*

| | | Where We Work | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Multnomah | Clackamas | Washington | Clark | Columbia | Yamhill | Out of MSA | TOTAL |
| Where We Live | Multnomah | 215,506 | 16,744 | 19,344 | 5,410 | 639 | 346 | 2,848 | 260,837 |
| | Clackamas | 50,948 | 40,019 | 10,052 | 1,764 | 91 | 467 | 4,371 | 107,712 |
| | Washington | 48,369 | 6,103 | 71,813 | 1,889 | 749 | 941 | 2,287 | 132,151 |
| | Clark | 28,610 | 2,316 | 2,182 | 66,265 | 171 | 16 | 2,761 | 102,321 |
| | Columbia | 3,073 | 133 | 758 | 156 | 8,853 | 24 | 1,812 | 14,809 |
| | Yamhill | 1,947 | 529 | 2,690 | 70 | 27 | 17,853 | 2,051 | 25,167 |
| | Out of MSA | 8,653 | 1,839 | 2,347 | 2,264 | 1,756 | 2,328 | (NA) | 19,187 |
| | TOTAL | 357,106 | 67,683 | 109,186 | 77,818 | 12,286 | 21,975 | 16,130 | 662,184 |

Source: Journey-to-work data from the 1990 census, compiled by Metro

# II. Regional Economic Performance

A critical first step in developing a better understanding of how the region's economy works is to examine our recent economic performance. The region's residents and casual observers of the economy can easily see the evidence of an expanding economy all around them, as the region is adding new residents, new businesses and new jobs, and has been doing so for a number of years. The purpose of this section is to more rigorously measure the extent and nature of the region's performance.

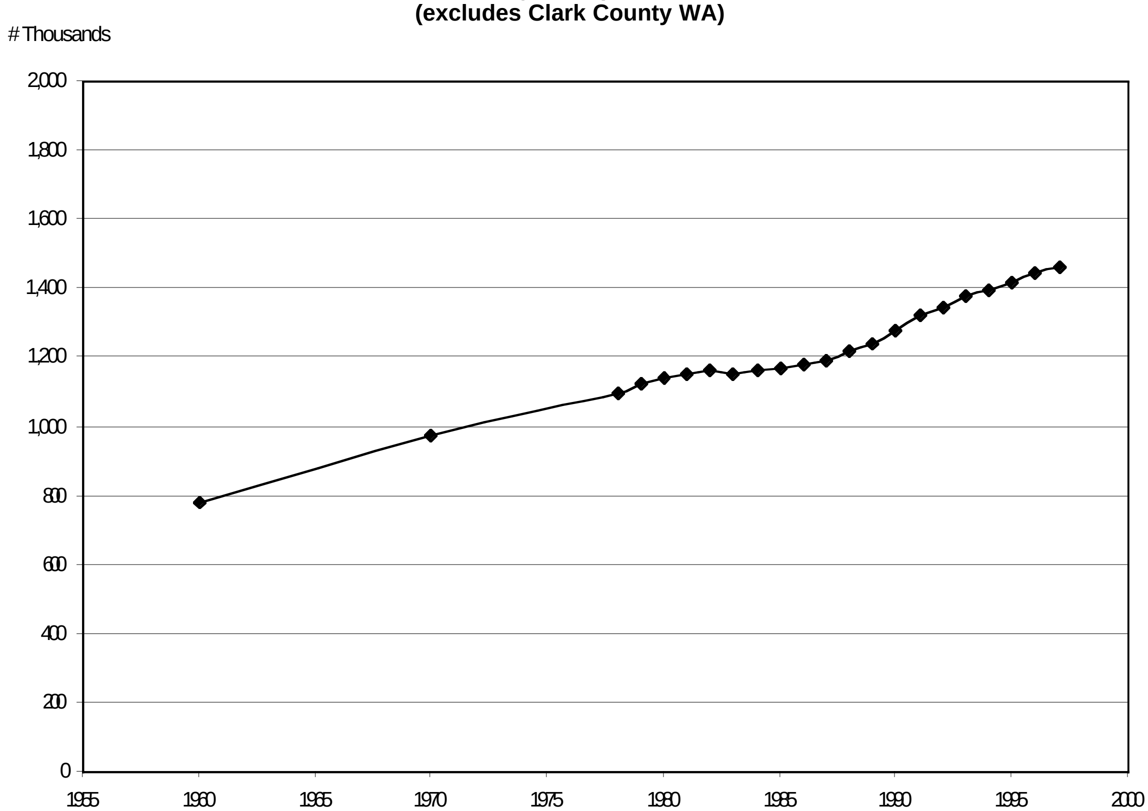
Our analysis of regional performance begins with broad measures of the size of the region's economy, its population and number of jobs, and then examines a series of other indicators of economic activity, including gross domestic product, number of manufacturing jobs, exports, and total income. These measures show us the direction and pace of the region's growth, and allow us to make some comparisons to the nation as a whole and to other metropolitan areas. We then examine key indicators of economic well being of the population, including per capita income, poverty rates and the distribution of income. Given that many industries are stressing the importance of a well-trained workforce, we examine changes in the educational attainment of the region's population as an indicator of our human capital. To begin to understand the composition of growth and the metropolitan area's contribution to the state economy, we also look at the employment growth record of the region's fifty largest firms and at the region's contribution to state government revenues.

Taken as a whole, these measures point to a regional economy that has grown consistently for a decade and a half, almost always outperforming the national economy. Wages, educational attainment and personal incomes are rising, and persons in every major income group have seen their incomes (after inflation) increase.

## A. POPULATION AND MIGRATION

As seen in Chart 2.1, the population of the Portland metro region has steadily increased over the past 37 years.

**Chart 2.1. Portland Metro Region Population Estimates 1960 - 1997 (excludes Clark County WA)**



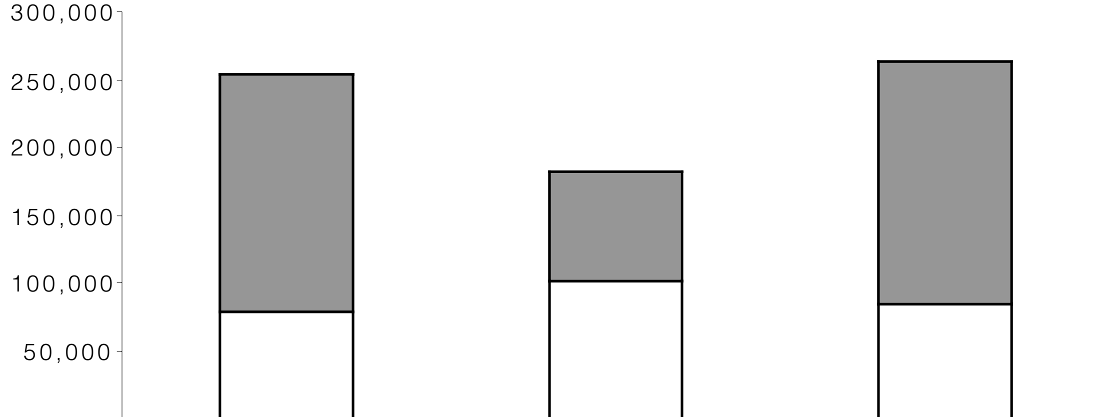

Source: Center for Population Research and Census, Population Estimates for Oregon 1978 - 1997; US Census Bureau, 1960, 1970, 1980, 1990 Census

However, the components of this population increase has changed over this time period (refer to Chart 2.2). Throughout the 1970s, the majority of the increase in population came from in-migration into the region. However, the recession of the 1980s saw a decline in net migration as more people left the region in pursuit of other opportunities. What we now see occurring during the period 1990 to 1997 is a return to our previous pattern of in-migration. In fact, the rate of in-migration appears to be surpassing 1970 levels.

Source: Center for Population Research and Census, Washington State OFM – Forecasting Division

According to 1997 population estimates illustrated in Chart 2.3, the majority of the region's population lives in the region's job centers of Multnomah and Washington counties.

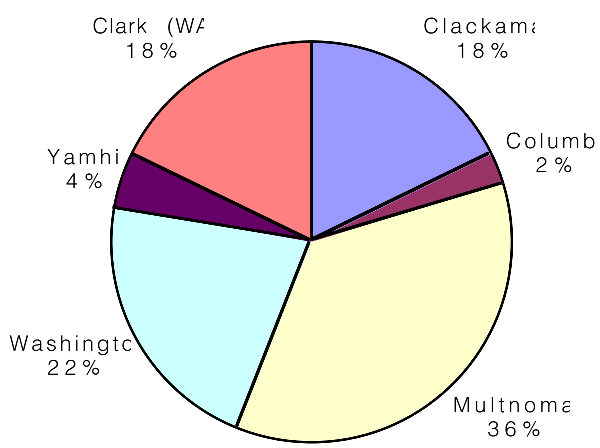
**Chart 2.2. Components of Population Change for the Region 1970-1997**




| | 1970 -1980 | 1980 - 1990 | 1990 - 1997 |
|---|---|---|---|
| Net Migration | 175,220 | 81,124 | 180,228 |
| Natural Increa | 79,813 | 102,606 | 84,409 |

Source: Center for Population Research and Census, Washington State OFM – Forecasting Division

**Chart 2.3. 1997 Population Distribution for Portland Metro Region**



Charts 2.4 and 2.5 describe the relationship of the region's growth to other metro areas around the country. The Portland metro region's steady growth rate over the previous ten years has earned it a ranking of 23rd among 50 other metros – weighing in at a growth rate of 26.3%. Even more significant is the fact that Portland falls in 11th place in terms of net migration in 1997. According to the Bureau of Census Population Estimates, the Portland PMSA saw a net migration of 22,500 residents, higher than other fast-growing areas as Denver, CO, Raleigh-Durham- Chapel Hill, NC, and San Diego, CA.

Calculation Notes: The population figures in our analysis are based on the population estimates published annually by the Center for Population Research and Census. According to the publication issued in March 1997, the calculations are completed as follows:

> Population figures represent all people who usually reside in the area designated. These figures include those people in correctional facilities, nursing homes, and college dormitories. College students are considered residents of the place they live while attending college. Seasonal populations, such as those living in summer homes, are considered residents of the place they consider their usual residence.
>
> The population 64 and under are developed by a component method (i.e. births and deaths) and an estimate of net migration based on school-aged migration. Medicare data are used to estimate the population 65 years and older. County population estimates are determined primarily by the ratio correlation method. The current equation contains school enrollment, state tax returns, voter registration, and births. Changes in the symptomatic data for each county are tracked annually since the last census to estimate the county's population. County population estimates based on the component method, and changes in housing stock since the last census are also considered, although substantially less weight is given to these estimates than that of the ratio correlation method.[1]

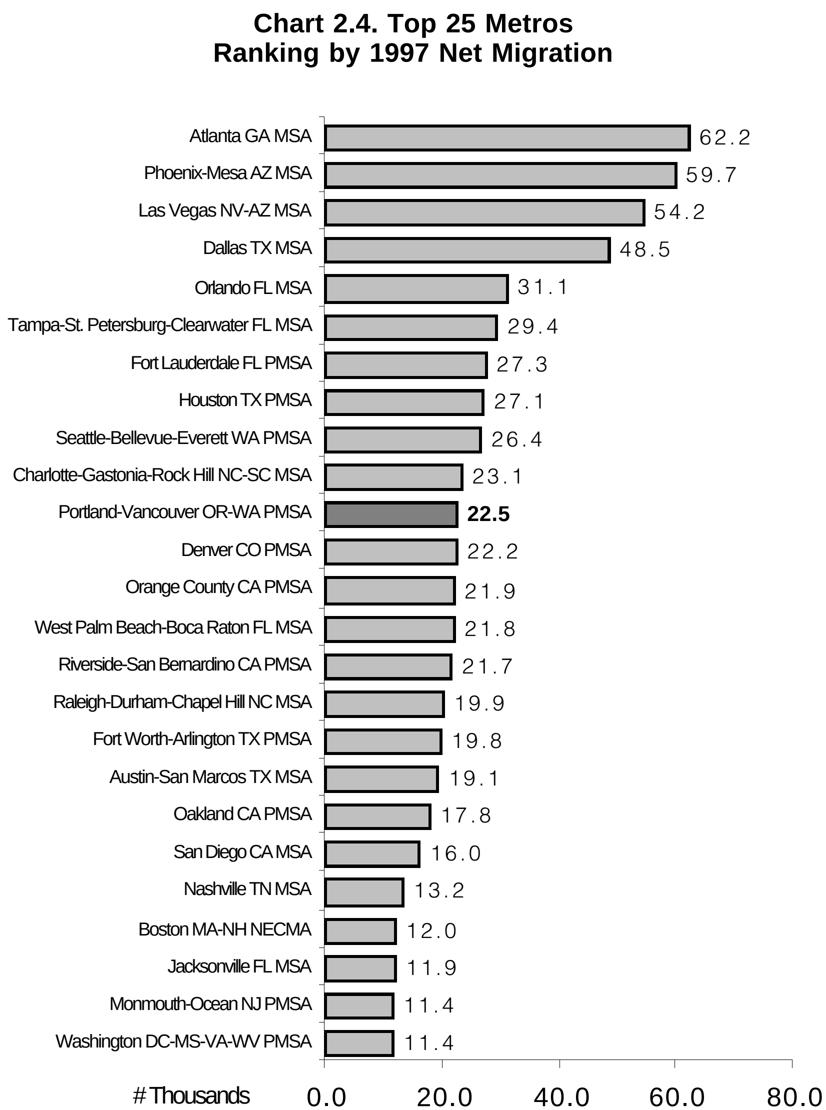
**Data Sources:**

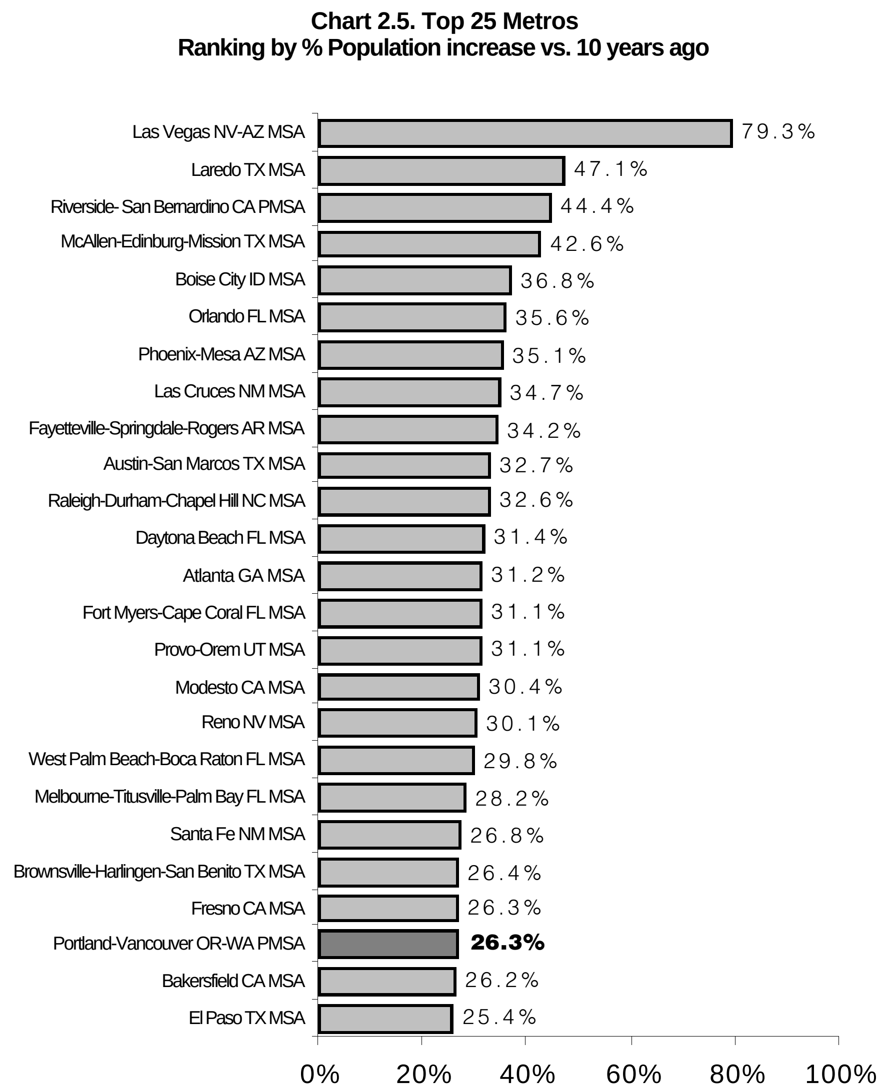
- Center for Population Research and Census, College of Urban and Public Affairs, Portland State University, Population Estimates for Oregon 1978 to 1996
- Bureau of Census, 1960, 1970,1980, 1990 US Census
- Washington State OFM, Forecasting Division

**Worksheet:**

- population.xls

[1] Wineberg, H. Population Estimates for Oregon: July 1, 1996, Center for Population Research and Census, College of Urban and Public Affairs, Portland State University, March, 1997, p.1.




Source: Bureau of Census: Population Estimates

## B. EMPLOYMENT

For nearly a decade and a half, Portland has compiled a record of strong employment growth. Portland has recorded year over year increases in employment for 14 straight years since 1983. Employment in the Portland area economy has grown especially rapidly during the 1990s. Since 1990, total employment in the region has increased from 725,000 non-farm payroll workers to nearly 920,000 workers. During the five year period from 1992 to 1997, the Portland metro economy added nearly 180,000 jobs, the equivalent of a Lane County (the state's largest county outside the Metro area).

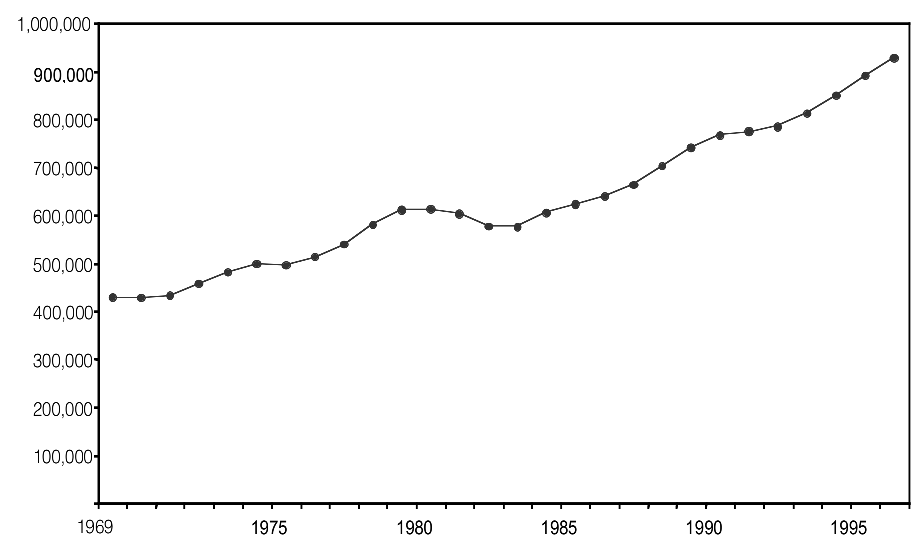
*Table 2.1 Non-Farm Payroll Employment in the Portland MSA, 1980 to 1997*

| Year | Employment | Year | Employment |
|---|---|---|---|
| 1980 | 581,500 | 1989 | 696,600 |
| 1981 | 571,100 | 1990 | 725,000 |
| 1982 | 545,800 | 1991 | 727,000 |
| 1983 | 544,700 | 1992 | 741,100 |
| 1984 | 572,400 | 1993 | 766,700 |
| 1985 | 586,300 | 1994 | 802,100 |
| 1986 | 605,500 | 1995 | 839,600 |
| 1987 | 629,400 | 1996 | 879,000 |
| 1988 | 662,000 | 1997 | 918,200 |

Source: Bureau of Economic Analysis website: www.bea.doc.com

The region avoided the decline in employment that the 1991 recession produced in most of the rest of the nation. For the past 27 years, the region has seen employment declines in only five: 1970, 1975, 1981, 1982 and 1983. Each of these employment declines coincided with a national economic slowdown.

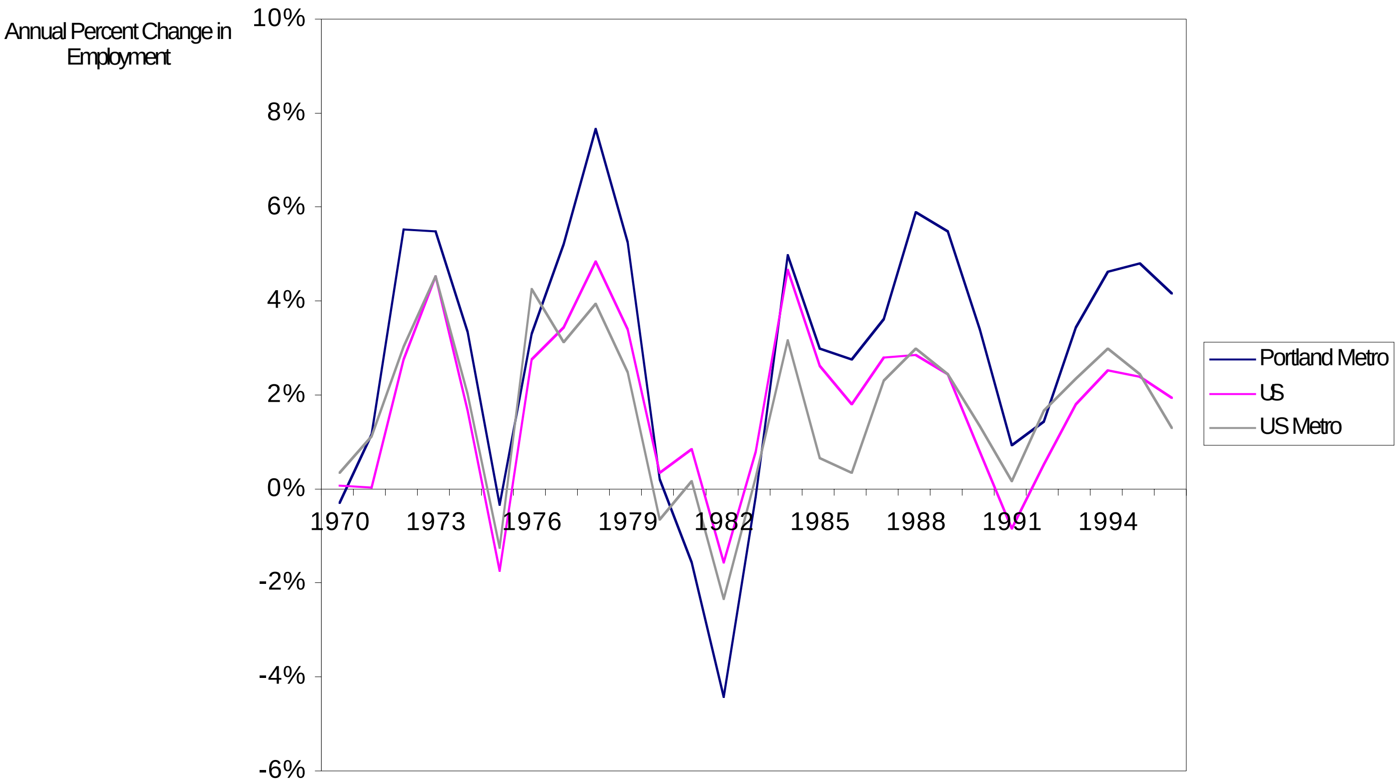
**Chart 26. Portland-Vancouver Employment - 1969 - 199**




*Source: BEA data*

The depth and severity of the 1980 to 1983 recession are evident in Chart 2.7. The expansions that preceded and followed that downturn, however, have been remarkably similar. If we measure economic expansions from the trough (lowest employment point) to the peak (highest), Portland has seen two long expansions over the past quarter century.

**Chart 2.7. Portland Employment Growth Outstrips Nation**




Source: Bureau of Economic Analysis

The first expansion from 1970 to 1980 (discounting the one year recession recorded in 1975, following the energy crisis), saw Portland employment expand at a 3.6% annual rate. Portland's growth rate in the expansion from 1984 to 1996 has been at the same 3.6% rate.

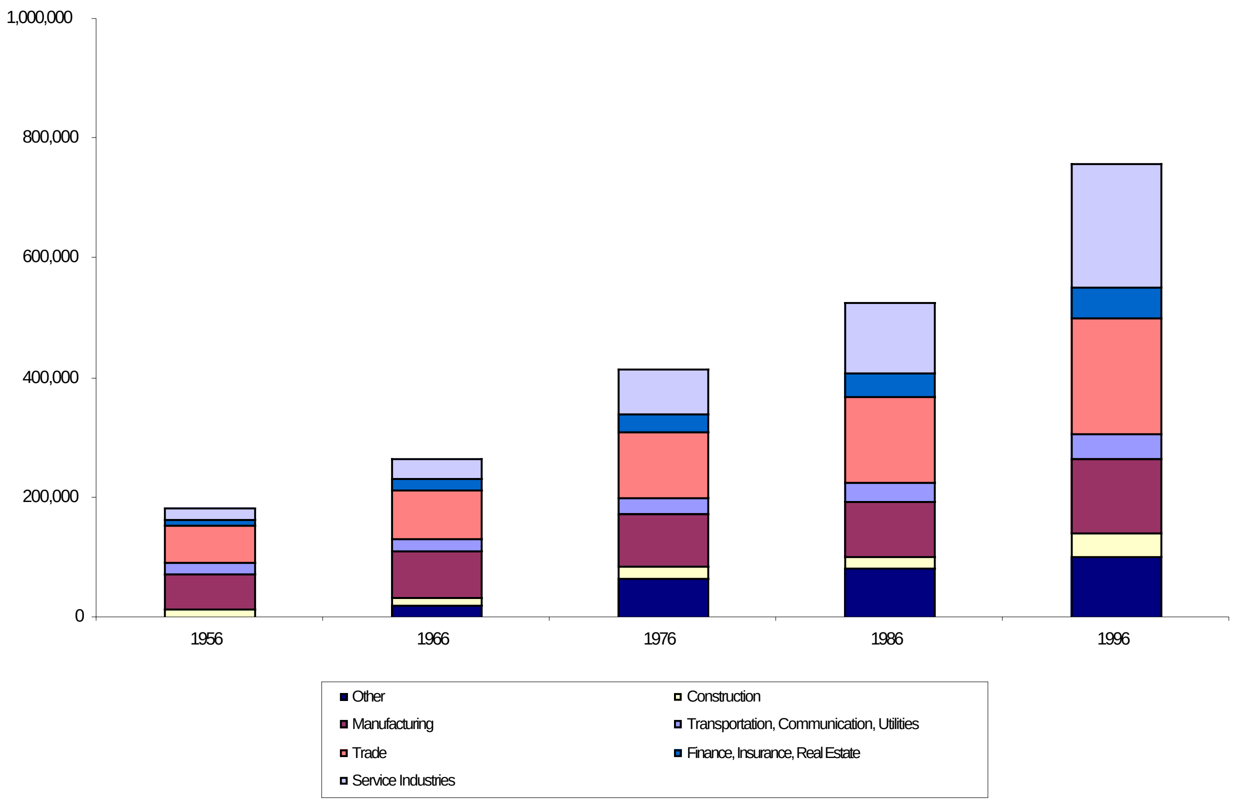
*Table 2.2 Average Annual Growth Rates in Portland's Last Two Major Expansions*

| Trough | Peak | Average Annual Growth |
|---|---|---|
| 1970 | 1980 | |
| 426,000 | 611,000 | 3.6% |
| 1984 | 1996 | |
| 604,000 | 927,000 | 3.6% |

For the past decade, Portland's employment growth has outperformed the rest of the nation. Data collected by the Bureau of Economic Analysis, which uses a broader employment measure, including self-employed persons and business proprietors, shows employment growth in the Portland area, the nation, and the average of the nation's metropolitan areas for the quarter-century from 1970 to 1996. Over this 27 year period, Portland's employment growth rate has exceeded the national average in all but five years (1970 and 1980 to 1983). Portland's growth has exceeded the national average every year since 1983. Portland's record against the average growth rate of all US metro areas has been nearly as good; Portland has grown faster that the US metro average every year since 1983, except 1992, when other metro areas, rebounding from the national recession, grew two-tenths of one percent faster.

A longer historical look at employment change shows the steady nature of the region's economic growth. Chart 2.8 shows the level of employment in the Portland metropolitan area for each decade from 1956 to 1996. This data clearly shows that the increase in the decade 1986 to 1996 was both numerically and in percentage terms the largest increase recorded.

**Chart 2.8. Portland Metro Region* Average Employment by Industry 1956 - 1996**




Source: Oregon Employment Department
* does not include Clark County WA

### Notes on Analyzing and Interpreting Employment Data

One of the greatest difficulties in analyzing employment levels and growth in the region is the proliferation of different measures of employment. This makes analyzing the local economy a bit like making a patchwork quilt; it requires piecing together bits of information from a variety of different sources. Like quiltmaking, sometimes things don't match up too well. A particular problem is that seemingly similar concepts are defined and applied differently for different purposes, producing what are superficially conflicting data. The best known of these definitional differences is employment; dramatically different estimates of the number of people working in an area result from different data sources. For example, for calendar years 1995 and 1996, Table 2.4 contains estimates from various sources for employment in the Portland Metropolitan Statistical Area.

*Table 2.4 Estimates of Employment in Portland PMSA, 1995, by Various Sources*

| Source | Employment Measure | 1995 | 1996 |
|---|---|---|---|
| Bureau of Economic Analysis | Total Full and Part Time Employment Annual Average | 1,075,250 | N/A |
| Bureau of Economic Analysis | Wage and Salary Employment Annual Average | 890,182 | 927,542 |
| Oregon Employment Department, Covered Employment & Payrolls | Covered Employment, Annual Average | 839,600 | 879,000 |
| Census: County Business Patterns | Private Sector Employees, Week of March 12 | 744,082 | N/A |
| Oregon Employment Department, Local Area Unemployment Statistics (LAUS) | Resident Employment, Annual Average | 923,000 | 956,500 |

Thus there are several different answers to the question of how many people work in the Portland metropolitan area. Depending on the data series used, the answer is anywhere from less than three-quarters of a million to more than a million. None of these measures are wrong, they're all just measuring slightly different things. The most important distinction is between the Local Area Unemployment Statistics (LAUS) definition of employment (which is place of residence) and the other three (which are all place of work). LAUS measures resident employment, and so counts as employees only those people who lived in the county or metro area. The other sources include all those who work in the county regardless of where they live.

The three place-of-work data series vary because they count slightly different groups. *County Business Patterns,* produced by the Census Bureau, excludes all workers not subject to FICA reporting requirements, which leaves out government workers, railroad employees and most agricultural workers. Covered employment counts only those subject to state unemployment insurance (UI) laws, again omitting most agricultural workers. BEA's wage and salary employment number is somewhat broader, and finally BEA's estimate of total employment includes self-employed farm and non-farm proprietors.

**Definition/ Calculation Notes:**

- Coverage: The information reported is based on tax reports submitted quarterly by employers subject to Employment Department law and by the program of Unemployment Compensation for Federal Employees (UCFE). Some kinds of employment are excluded from this report because not everyone in Oregon is covered by the Unemployment Insurance program. One of the most significant kinds of employment that is excluded are those individuals who are self-employed. For a complete listing of other excluded employment types, please refer to the Oregon Employment Department's covered employment and payrolls data from 12/97. A complete definition of covered versus non-covered employment can be found in Employment Department law, Chapter 657 ORS, sections 657.010 through 657.097.
- Reporting Units: A reporting unit is defined as a single-location company of each separate physical location of a multiple-location company (i.e. one store in a chain of stores).
- Industrial Classification: All summary level employment and payroll data contained in this publication is based on County and Standard Industrial Classification (SIC) codes assigned by the Employment Department. The classifications used here are based on the 1987 edition of the SIC manual.
- Limiting Factors in Year-to-Year Comparisons: The Oregon Employment Department cautions that certain factors can make strict year-to-year comparisons misleading. Technical changes in the unemployment insurance program, changes in the SIC codes system, or review of assigned industry and location codes can sometimes cause the appearance of sudden changes in employment and payroll tables. The primary causes of non-economic change in employment and payrolls are industry or county reclassifications and/or changes in the level or reporting made by the employer. Changes in the level of detail reported by some employers is the other primary cause of non-economic employment and/or wage variations.

  A listing of changes over time to the SIC code system and Unemployment Insurance Coverage can be found in the Oregon Employment Department's covered employment and payrolls data from 12/97. However, a few significant changes should be noted here.

  - Beginning in 1989, employers that operate in more than one location and have at least ten employees outside their primary location are required to report their employment and payroll by separate location. When the county or SIC code of the individual location is different than the master account, the effect on the data is the same as the industry reclassifications described above. The incorporation of establishment based reporting beginning in 1989 was a two-year process. As a result, 1989 and 1990 had a greater than usual number of employment and payroll shifts that were due to reclassifications.
  - SIC Codes: 1958, 1975, and 1988 marked significant changes to the SIC Manual in order to improve industry detail, coverage and definitions in response to technological and structural changes that occurred in the American economy. Please refer to the SIC manuals for a detailed listing of these changes.

- Unemployment Insurance Coverage: The period of our analysis includes the extension of coverage to several categories of employment including state and local government workers (1956 and 1974 respectively), employees of nonprofit institutions (1972, 1989, 1996), and private firms with a small number of employees (1956 and 1960). For a detailed listing of these changes please refer to the Oregon Employment Department's covered employment and payrolls data from 12/97.

**Data Source:**

- State of Oregon Employment Department, Workforce Analysis Section
- ES-202 data, BEA
- Regional Economics Information System

**Worksheets:**

- sicemp.xls
- bea6996emp.xls
- oeddata.xls

## C. INCOME

The best single indicator of an economy's overall well being is generally its level of per capita income. Per capita income is defined as the total personal income of a place divided by the number of residents. Historically, the Portland metropolitan area has enjoyed a per capita income somewhat higher than the US average.

The data show that, measured in current dollar terms, income per resident in the Portland metropolitan area has risen from a little over $4,000 per year in the late 1960s to more than $26,000 per year in 1996. While per capita income is useful for comparing one area to another at a single time, measuring changes over time is distorted by the effects of inflation. A dollar earned in one year doesn't buy the same as a dollar earned in an earlier year. To adjust for the effects of inflation, we can use a price index to recompute prices in similar dollars. This report uses one of the most widely used indices, the implicit price deflator for personal consumption expenditures–a chain-price index–prepared by the federal government's chief macroeconomic statistical agency, the Bureau of Economic Analysis.

Expressed in chained 1997 dollars, Portland's per capita income rose from about $16,300 in 1969 to $26,800 in 1996. In general, over this 27-year period, real incomes have risen from year to year, indicating a steadily improving standard of living. Indeed, in inflation adjusted terms, Portland residents have about $10,000 more per resident in income than in the late 1960s. There was a three-year period 1980 to 1982, where incomes actually declined.

*Table 2.5. Portland Metropolitan Per Capita Income, 1969 to 1996 - Expressed in Current and Chained 1997 Dollars*

| Year | Current Dollars | Chained Dollars |
|---|---|---|
| 1969 | $4,067 | $16,280 |
| 1970 | 4,323 | 16,524 |
| 1971 | 4,615 | 16,879 |
| 1972 | 5,016 | 17,724 |
| 1973 | 5,527 | 18,531 |
| 1974 | 6,159 | 18,748 |
| 1975 | 6,650 | 18,721 |
| 1976 | 7,398 | 19,705 |
| 1977 | 8,058 | 20,126 |
| 1978 | 9,068 | 21,114 |
| 1979 | 10,079 | 21,533 |
| 1980 | 10,984 | 21,168 |
| 1981 | 11,858 | 20,973 |
| 1982 | 12,092 | 20,223 |
| 1983 | 12,726 | 20,359 |

| Year | Current Dollars | Chained Dollars |
|---|---|---|
| 1984 | $13,840 | $21,330 |
| 1985 | 14,570 | 21,655 |
| 1986 | 15,206 | 21,975 |
| 1987 | 15,898 | 22,135 |
| 1988 | 17,021 | 22,754 |
| 1989 | 18,299 | 23,323 |
| 1990 | 19,557 | 23,727 |
| 1991 | 20,068 | 23,364 |
| 1992 | 20,993 | 23,663 |
| 1993 | 21,897 | 24,043 |
| 1994 | 23,046 | 24,705 |
| 1995 | 24,553 | 25,652 |
| 1996 | 26,228 | 26,762 |

*Source: Bureau of Economic Analysis statistics, deflated by chain price index, an implicit price deflator for personal consumption expenditures.*

As recently as the late 1970's Portland's per capita income was about 10% higher than the US average. During the 1980s, however, Portland per capita income grew more slowly than per capita incomes in the rest of the nation, and Portland's average income declining to just about equal to the national average in the mid 1980s. While much of the decline is attributable to the effects of the economic downturn that gripped the state from 1979 to 1982, Portland's income continued to decline relative to the US average even after the area had begun to record substantial job growth. Since the late 1980s, income growth in the Portland area has accelerated sharply, and Portland incomes have grown much more rapidly than elsewhere in the nation. Portland's per capita income has risen from just about equal to the US average in 1988, to seven percentage points higher than the US average in 1996, the latest year for which comparable data are available.

*Table 2.6 Per Capita Personal Income, Portland Metropolitan Statistical Area and US, 1969 to 1996*
*Income in Current Dollars*

| Year | Portland | US | Difference | |
|---|---|---|---|---|
| 1969 | 4,067 | 3,835 | 232 | 106% |
| 1970 | 4,323 | 4,072 | 251 | 106% |
| 1971 | 4,615 | 4,321 | 294 | 107% |
| 1972 | 5,016 | 4,691 | 325 | 107% |
| 1973 | 5,527 | 5,201 | 326 | 106% |
| 1974 | 6,159 | 5,664 | 495 | 109% |
| 1975 | 6,650 | 6,085 | 565 | 109% |
| 1976 | 7,398 | 6,671 | 727 | 111% |
| 1977 | 8,058 | 7,312 | 746 | 110% |
| 1978 | 9,068 | 8,170 | 898 | 111% |
| 1979 | 10,079 | 9,090 | 989 | 111% |
| 1980 | 10,984 | 10,030 | 954 | 110% |
| 1981 | 11,858 | 11,109 | 749 | 107% |
| 1982 | 12,092 | 11,692 | 400 | 103% |
| 1983 | 12,726 | 12,345 | 381 | 103% |

| Year | Portland | US | Difference | |
|---|---|---|---|---|
| 1984 | 13,840 | 13,547 | 293 | 102% |
| 1985 | 14,570 | 14,406 | 164 | 101% |
| 1986 | 15,206 | 15,140 | 66 | 100% |
| 1987 | 15,898 | 15,944 | (46) | 100% |
| 1988 | 17,021 | 17,017 | 4 | 100% |
| 1989 | 18,299 | 18,127 | 172 | 101% |
| 1990 | 19,557 | 19,142 | 415 | 102% |
| 1991 | 20,068 | 19,638 | 430 | 102% |
| 1992 | 20,993 | 20,582 | 411 | 102% |
| 1993 | 21,897 | 21,223 | 674 | 103% |
| 1994 | 23,046 | 22,044 | 1,002 | 105% |
| 1995 | 24,553 | 23,196 | 1,357 | 106% |
| 1996 | 26,228 | 24,436 | 1,792 | 107% |

Source: Bureau of Economic Analysis, Regional Economic Information System; for years 1969-95, 1997 CD version; for 1996, from BEA Website: http://www.bea.doc.gov/remd2/svy_msa.htm

**Data Source:**

- Bureau of Economic Analysis, Regional Economic Information System, for years 1969-95, 1997 CD version, for 1996, from BEA Website, http://www.bea.doc.gov/remd2/svy_msa.htm

**Worksheet:**

- PDXIncome.xls
- BEA6995.XLS TAB: PDXVUSdata

## D. GROSS STATE PRODUCT

The most widely used indicator of overall activity in the national economy is Gross Domestic Product (GDP), the value of all the goods and services produced in the nation. While the federal government does not produce GDP figures for metropolitan areas, it is possible to estimate the region's GDP by examining the relationship between regional, state and national income and state and national GDP (all of which are estimated by federal statistical agencies.)

We estimate that in 1997, the Portland metropolitan area's GDP was approximately $60 billion. For comparative purposes we have listed the GDPs of a number of countries. Overall, the total value of goods and services produced by Portland area residents was about equal to that of the Czech Republic.

*Table 2.7 1997 GDP at Current Dollars and Exchange Rates:*

| Country | GDP in billions of 1997 $US dollars |
|---|---|
| USA | $7,820 |
| Japan | 4193 |
| Germany | 2100 |
| Italy | 1145 |
| Canada | 609 |
| Australia | 393 |

| Country | GDP in billions of 1997 $US dollars |
|---|---|
| Switzerland | 253 |
| New Zealand | 66 |
| Portland | 60 |
| Czech Republic | 53 |
| Hungary | 45 |

Source: Organization for Economic Cooperation and Development www.oecd.org/std/gdp.htm

Our estimate of Portland's GDP is based on figures provided by the US Bureau of Economic Analysis and the Oregon State Economist. Using published data of Portland area and Oregon personal income and published BEA estimates of GDP, we used two key assumptions to estimate Regional GDP. First, we assumed that the growth in Portland area personal income would continue to have the same relationship to Oregon personal income growth over the next four years as it did over the previous five. Second, we assumed that the relationship between Oregon personal income and Oregon GDP is the same as the relationship between Portland personal income and Portland GDP.

*Table 2.8 Portland Metropolitan Area Estimated Gross Domestic Product (Thousands of Current Dollars)*

| Year | Portland GDP |
|---|---|
| 1992 | $38,417,202 |
| 1993 | 41,561,035 |
| 1994 | 45,346,144 |
| 1995 | 48,621,178 |
| 1996 | 52,669,960 |

| Year | Portland GDP |
|---|---|
| 1997 | $56,673,146 |
| 1998 | 60,304,178 |
| 1999 | 63,796,925 |
| 2000 | 67,719,386 |

Source: See Text for Methodology

**Calculation Notes:**

**Methodology for Estimating Regional Gross Domestic Product (GDP)**

1. Estimate Relationship between State Personal Income and Regional Personal Income

Using data provided by the BEA, we examined the relationship between personal income at the state level and personal income for the six-county Portland metropolitan area. We calculated the year-to-year changes in estimated personal income for the region and for the state and calculated the ratio between the two. The annual growth rate in Portland metro area personal income was between 1.06 and 1.18 times faster than the growth in state personal income between 1990 and 1995. The average growth rate differential was 1.12, meaning annual percentage growth in the Portland metro area over this period was 1.12 times that of the growth for the state.

2. Estimate Projected Portland Personal Income

BEA personal income data are not available for metro areas more recently than for 1995. We used the relationship between Oregon and Portland area personal income to estimate the forecast growth in Portland personal income. We used the assumption (based on the data for 1990 to 1995) that Portland area personal income would rise approximately 1.12 as fast as the state's personal income. Starting with the state economists' forecast for growth in personal income in Oregon, we then calculated a project growth rate for personal income in Portland. We applied this growth rate to estimated 1995 personal income ($42.1 billion) to estimate personal income in each of the next five years (1996 to 2000).

3. Obtain Estimates of Oregon Gross Domestic Product

BEA periodically produces GDP estimates for each of the fifty states. These forecasts are stated in terms of inflation-adjusted, chained 1992 dollars. We took these estimates, and dividing by the chain-price index, computed the current dollar estimates Oregon GDP. Then, we examined the relationship between Oregon Personal Income and Oregon GDP. For the period from 1992 to 1994, Oregon's GDP was, on average, 1.15 times greater than Oregon personal income. We used this factor (1.15) multiplied by our estimates of Portland metro area personal income to estimate the area's GDP. We looked back at the historical data on Portland personal income and estimated GDP for the years 1992 to 1995 (about $38.4 billion in 1992, increasing to $48.6 billion in 1995). We also forecast regional GDP for the years 1996 to 2000. Our forecast is that Portland area GDP will rise to more than $60 billion in the year 1998.

**Data Source:**

- State personal income, historical, Bureau of Economic Analysis
- State GDP, historical, Bureau of Economic Analysis

- State personal income, forecast, Office of Economic Analysis, Department of Administrative Services
- Regional personal income, historical, Bureau of Economic Analysis

**Worksheet:**

- PDXIncome.xls
- BEA6995.XLS, Tab GDP Forecast

## E. WAGES

### Trends in Average Covered Wages

Average wages (expressed in current dollars) have risen steadily in Oregon. The average wage for covered employment has risen from about $15,200 per worker in 1980 to about $29,900 per worker in 1996. While this seems like an impressive gain, much of the increase is due to inflation. Stated in inflation adjusted dollars, wages per worker in the metro area are up only slightly over this time period, from about $29,300 in 1980 to $30,500 in 1996, an increase of just $1,200 per worker, or about 4% (amounts expressed in chained 1997 dollars).

The major cause for this lackluster performance in wages was the decline in average inflation adjusted wages that occurred in the early 1980s. Wages measured in chained 1997 dollars declined from $29,300 in 1980 to $28,000 in 1989. The performance of the 1990s has been almost exactly the opposite; wages have increased steadily year on year, making up the loss of the 1980s between 1990 and 1994, and racking up all the net gain of the period shown in the years 1995 and 1996.

*Table 2.9 Average Covered Annual Wage, Portland Metropolitan Area, 1980 to 1996 : Current Dollars and Chained 1997 Dollars*

| Year | Current Dollars | Chain Price Index | Chained 1997 Dollars |
|---|---|---|---|
| 1980 | $15,211 | 58.49 | $29,314 |
| 1981 | 16,429 | 63.73 | 29,058 |
| 1982 | 17,347 | 67.40 | 29,011 |
| 1983 | 17,953 | 70.46 | 28,721 |
| 1984 | 18,660 | 73.14 | 28,758 |
| 1985 | 19,131 | 75.84 | 28,434 |
| 1986 | 19,763 | 78.00 | 28,560 |
| 1987 | 20,386 | 80.96 | 28,383 |
| 1988 | 21,218 | 84.32 | 28,364 |
| 1989 | 21,998 | 88.44 | 28,037 |

| Year | Current Dollars | Chain Price Index | Chained 1997 Dollars |
|---|---|---|---|
| 1990 | $23,165 | 92.91 | $28,104 |
| 1991 | 24,353 | 96.82 | 28,352 |
| 1992 | 25,712 | 100.00 | 28,983 |
| 1993 | 26,362 | 102.66 | 28,945 |
| 1994 | 27,068 | 105.15 | 29,017 |
| 1995 | 28,375 | 107.89 | 29,645 |
| 1996 | 29,944 | 110.47 | 30,554 |

*Source: Eric Moore, Oregon Employment Department. Data are for covered employees in the six-county Portland Metropolitan Statistical Agency.*

### Trends in Average Wage and Salary Income

The BEA wage and salary data are somewhat different that the Employment Department data, but tells a similar story. By the BEA measure, average wage and salary earnings per worker peaked at $29,000 per year in 1979, (expressed in chained 1997 dollars) and declined steadily through the 1980s, reaching a low point of about $27,600 in 1989 ( a decline of $2,400, or about 8%). Wages increased steadily through the 1990s, setting a new high of $29,300 in 1995.

*Table 2.10 Average Wage Per Wage and Salary Employee, Portland Metropolitan Area, 1969 to 1995*

| Year | Wage and salary employment | Wage and salary disbursements | Average Wage | Price Index | Average Wage Chained 97$ |
|---|---|---|---|---|---|
| 1969 | 427,966 | 2,901,731 | $6,780 | 28.16 | $27,140 |
| 1970 | 426,867 | 3,050,209 | 7,146 | 29.49 | 27,313 |
| 1971 | 431,922 | 3,267,933 | 7,566 | 30.82 | 27,672 |
| 1972 | 455,923 | 3,665,579 | 8,040 | 31.9 | 28,409 |
| 1973 | 480,914 | 4,123,105 | 8,573 | 33.62 | 28,745 |
| 1974 | 497,103 | 4,617,595 | 9,289 | 37.03 | 28,276 |
| 1975 | 495,511 | 4,920,024 | 9,929 | 40.04 | 27,953 |
| 1976 | 511,921 | 5,512,257 | 10,768 | 42.32 | 28,680 |
| 1977 | 538,689 | 6,206,037 | 11,521 | 45.13 | 28,775 |
| 1978 | 579,977 | 7,234,972 | 12,475 | 48.41 | 29,046 |
| 1979 | 610,435 | 8,302,291 | 13,601 | 52.76 | 29,057 |
| 1980 | 611,914 | 9,115,237 | 14,896 | 58.49 | 28,708 |
| 1981 | 602,585 | 9,680,235 | 16,065 | 63.73 | 28,413 |
| 1982 | 576,036 | 9,733,823 | 16,898 | 67.4 | 28,260 |
| 1983 | 575,285 | 10,055,587 | 17,479 | 70.46 | 27,963 |
| 1984 | 604,167 | 10,990,110 | 18,191 | 73.14 | 28,034 |
| 1985 | 622,329 | 11,615,079 | 18,664 | 75.84 | 27,740 |
| 1986 | 639,604 | 12,358,350 | 19,322 | 78 | 27,923 |
| 1987 | 662,941 | 13,200,915 | 19,913 | 80.96 | 27,724 |
| 1988 | 702,004 | 14,602,716 | 20,801 | 84.32 | 27,808 |
| 1989 | 740,678 | 16,028,359 | 21,640 | 88.44 | 27,581 |
| 1990 | 766,011 | 17,589,630 | 22,963 | 92.91 | 27,859 |
| 1991 | 773,409 | 18,544,127 | 23,977 | 96.82 | 27,915 |
| 1992 | 784,712 | 19,867,588 | 25,318 | 100 | 28,539 |
| 1993 | 811,834 | 21,108,438 | 26,001 | 102.66 | 28,549 |
| 1994 | 849,712 | 22,738,645 | 26,760 | 105.15 | 28,687 |
| 1995 | 890,606 | 24,996,002 | 28,066 | 107.89 | 29,323 |

Source: Bureau of Economic Analysis, Regional Economics Information System

### Portland Area Wages Compared to US

Comparing Portland's recent wage history with that of the nation shows the severity of the downturn the region experienced in the 1980s and the strength of the expansion of the 1990s. Throughout the 1970s, real wages in Portland were above the national average. Portland reached a peak relative to the nation in 1979, with wages about 6% higher than the national average on a per worker basis. While real wages stagnated in Portland during the 1980s, they grew–slowly–in the rest of the nation. By 1985, Portland wages were below the US average. They fell relative to the nation until 1988. Since then, however, Portland wages have grown sharply faster than in the rest of the nation. By 1995, Portland wages were $700 per worker above the national average.

*Table 2.11 Average Wage and Salaries per Wage and Salary Worker, Portland and United States - 1969 to 1995, Dollar Amounts Expressed in Chained 1997 Dollars*

| | Average Wage, Chained 1997$ | | | |
|---|---|---|---|---|
| Year | Portland | US | Difference | Portland % of US |
| 1969 | 27,140 | 26,041 | 1,099 | 104% |
| 1970 | 27,313 | 26,457 | 855 | 103% |
| 1971 | 27,672 | 26,853 | 819 | 103% |
| 1972 | 28,409 | 27,635 | 775 | 103% |
| 1973 | 28,745 | 27,870 | 874 | 103% |
| 1974 | 28,276 | 27,149 | 1,127 | 104% |
| 1975 | 27,953 | 26,949 | 1,004 | 104% |
| 1976 | 28,680 | 27,403 | 1,277 | 105% |
| 1977 | 28,775 | 27,451 | 1,323 | 105% |
| 1978 | 29,046 | 27,533 | 1,513 | 105% |
| 1979 | 29,057 | 27,376 | 1,681 | 106% |
| 1980 | 28,708 | 26,974 | 1,734 | 106% |
| 1981 | 28,413 | 27,015 | 1,398 | 105% |
| 1982 | 28,260 | 27,236 | 1,025 | 104% |
| 1983 | 27,963 | 27,348 | 615 | 102% |
| 1984 | 28,034 | 27,708 | 327 | 101% |
| 1985 | 27,740 | 28,018 | (278) | 99% |
| 1986 | 27,923 | 28,374 | (452) | 98% |
| 1987 | 27,724 | 28,556 | (831) | 97% |
| 1988 | 27,808 | 28,780 | (973) | 97% |
| 1989 | 27,581 | 28,373 | (792) | 97% |
| 1990 | 27,859 | 28,425 | (567) | 98% |
| 1991 | 27,915 | 28,192 | (277) | 99% |
| 1992 | 28,539 | 28,710 | (171) | 99% |
| 1993 | 28,549 | 28,444 | 105 | 100% |
| 1994 | 28,687 | 28,415 | 272 | 101% |
| 1995 | 29,323 | 28,646 | 676 | 102% |

Source: Bureau of Economic Analysis, Regional Economics Information System

### Portland Area Wages Compared

How typical has Portland's wage experience been compared to the state's economic performance and to other metropolitan areas in the US? Data on BEA's broad measure of earnings shows that Portland's average earnings have changed substantially over the past two decades.

Table 2.12 shows earnings per worker, for the nation, for the average of all residents of metropolitan areas, for the Portland metropolitan area and for the rural portions of Oregon for the years 1969 to 1997. As noted above, Portland's average earnings per worker have historically been above the US average (except for the mid 1980s). Portland's average earnings were lower than the US metropolitan average in the mid 1980s, after being higher in the late 1970s. By 1996, according to BEA's measurements, Portland's wages were within $300, or less than 1%, of the average for wages in all US metropolitan areas.

*Table 2.12 Average Earnings per Worker, United States, Metro Areas, Portland and Rural Oregon 1969 to 1997, Amounts Expressed in Constant 1997 Dollars*

| | US | Metro Average | PDX Metro | Rural Oregon |
|---|---|---|---|---|
| 1969 | $26,481 | $27,719 | $27,597 | $23,917 |
| 1970 | 26,901 | 28,156 | 27,771 | 24,266 |
| 1971 | 27,301 | 28,587 | 28,134 | 24,754 |
| 1972 | 28,096 | 29,418 | 28,883 | 25,524 |
| 1973 | 28,333 | 29,628 | 29,219 | 25,532 |
| 1974 | 27,603 | 28,825 | 28,748 | 24,728 |
| 1975 | 27,397 | 28,556 | 28,416 | 24,326 |
| 1976 | 27,857 | 28,991 | 29,157 | 25,561 |
| 1977 | 27,911 | 29,030 | 29,256 | 25,681 |
| 1978 | 27,996 | 29,068 | 29,535 | 25,955 |
| 1979 | 27,831 | 28,854 | 29,541 | 26,042 |
| 1980 | 27,424 | 28,434 | 29,187 | 25,106 |
| 1981 | 27,470 | 28,470 | 28,891 | 24,350 |
| 1982 | 27,692 | 28,724 | 28,733 | 24,104 |
| 1983 | 27,804 | 28,901 | 28,429 | 24,036 |
| 1984 | $28,171 | $29,269 | $28,503 | $24,070 |
| 1985 | 28,486 | 29,616 | 28,204 | 23,669 |
| 1986 | 28,849 | 30,025 | 28,389 | 23,303 |
| 1987 | 29,033 | 30,261 | 28,187 | 23,169 |
| 1988 | 29,262 | 30,553 | 28,273 | 23,093 |
| 1989 | 28,847 | 30,123 | 28,041 | 22,657 |
| 1990 | 28,899 | 30,210 | 28,323 | 22,589 |
| 1991 | 28,664 | 29,981 | 28,381 | 22,522 |
| 1992 | 29,190 | 30,587 | 29,016 | 23,047 |
| 1993 | 28,933 | 30,311 | 29,046 | 22,959 |
| 1994 | 28,928 | 30,283 | 29,217 | 23,016 |
| 1995 | 29,156 | 30,555 | 29,867 | 23,150 |
| 1996 | 29,615 | 31,052 | 30,828 | 23,331 |

Source: Bureau of Economic Analysis, from BEA website: www.bea.doc.com, 12/30/97

### Growth in Earnings, 1990 to 1996

The positive economic performance recorded by the Portland metropolitan area in the decade of the 1990s is clearly reflected in the growth in average earnings per worker. Between 1990 and 1996, average earnings per worker rose from $28,273 to $30,828, a gain of more than $2,500, expressed in inflation adjusted 1997 dollars. This represents a gain, after inflation, of 9% per worker. In contrast, wages nationally rose by only about $350 (or 1.2%), and for all urban areas rose only about $500 (or about 1.6%). The growth in Portland area wages also far outstripped wage growth in Rural Oregon, where wages increased only a tenth as much in real terms (by $238 per worker).

*Table 2.13 Growth in Average Earnings per Worker, 1990 to 1996: United States, Metro Areas, Portland and Rural Oregon; Amounts Expressed in Constant 1997 Dollars*

| | | | Change, 1990 to 1996 | |
|---|---|---|---|---|
| | 1990 | 1996 | Amount | Percent |
| US | $29,262 | $29,615 | $353 | 1.2% |
| Metro Average | 30,553 | 31,052 | 499 | 1.6% |
| PDX Metro | 28,273 | 30,828 | 2,556 | 9.0% |
| Rural Oregon | 23,093 | 23,331 | 238 | 1.0% |

Source: Bureau of Economic Analysis, from BEA website: www.bea.doc.com, 12/30/97

### Portland Compared to Rural Oregon

Earnings per worker in the Portland metropolitan area have historically been higher than in the rural portions of the state. The phenomenal growth in wages recorded in the Portland area during the 1990s, however, has greatly widened that gap. As recently as 1979, wages in Portland were only about 13% higher than in rural Oregon. (Rural Oregon as defined by the federal government, includes those counties outside the Portland, Salem, Eugene and Medford Metropolitan Statistical Areas). By 1996, however, according to BEA data, average wages in the metro area were 32% higher than in the rest of the state. This divergence reflects not only the rapid growth of income in the Portland area, but also the stagnation of wages in rural Oregon due to the loss of jobs and the decline in real earnings in traditionally high paid rural industries like wood products manufacturing.

*Table 2.14 Average Earnings Per Worker in Portland and Rural Oregon, 1979 and 1996, Current Dollars*

| | 1979 | 1996 |
|---|---|---|
| Portland-Vancouver | $13,601 | $29,650 |
| Rural Oregon | 11,990 | 22,439 |
| Ratio | 113% | 132% |

Source: Bureau of Economic Analysis, from BEA website: www.bea.doc.com, 12/30/97

## Distribution of Wages

The data presented above describe the average level of wages in the metropolitan area and show that average wages in Portland have been rising faster than in the rest of the nation, especially since 1990. While this suggests that the typical worker is earning more, the average data don't show the extent to which the earnings increases are primarily among well-paid or poorly paid workers or whether they are shared proportionately by workers at all wage levels. Generally, we have little information about the distribution of wages among various occupations. In 1997, however, the Bureau of Labor Statistics completed a survey (using a new methodology) of the Portland-Salem Consolidated Metropolitan Statistical Area (CMSA), which provided the following data.

In August 1997, the mean hourly wage in the consolidated metropolitan area was $15.74, slightly more than $30,000 on an annual basis. The estimated median wage was $13.46, meaning half the region's workers made more than $13.46 and half make less. The distributional data suggested that about 10% of all workers earned less than $7.30 per hour, and only about 10% of all workers earned more than $27.14 per hour. Half of all workers earned between $9.50 per hour and $19.65 per hour.

*Table 2.15 Distribution of Wages for the Portland-Salem CMSA, 1997*

| Percentile | Wage |
|---|---|
| Mean | $15.74 |
| 10th | 7.30 |
| 25th | 9.50 |
| 50th | 13.46 |
| 75th | 19.65 |
| 90th | 27.14 |

Source: Bureau of Labor Statistics, Portland-Salem OR-WA
National Compensation Survey, August, 1997 (Bulletin 3090-33) (May, 1998)

This estimate was based on a survey of a sample of employers throughout the region and excludes firms in agriculture and in the federal government. *The National Compensation Survey* is a new report, using a different methodology than previous pay studies, and national level comparable data are not yet available.

## Definition/ Calculation Notes:

There are a number of sources of data for measuring wage levels in the Portland metropolitan area. The two most widely used measures of average wages are the covered employment and payroll series and the BEA data.

- Covered Employment and Payrolls: The Oregon Department of Employment uses employer payroll tax reports filed for the purpose of complying with unemployment insurance laws to track the number of persons working in Oregon and the total amount of salaries and wages they receive. Not all workers or forms of labor related income are covered by the unemployment insurance tax. Workers in some industries, like much of agriculture, and the self-employed are not subject to the unemployment insurance tax and are therefore not counted in the covered employment and payroll series.

- BEA Earnings Data: The second source of data about average wages comes from the BEA, the federal agency responsible for the preparation and maintenance of the national income accounts. It has two series of data on earnings that are useful for describing wage trends. The BEA prepares estimates of the levels of employment and earnings in all counties in the United States on an annual basis. In addition to national level data like GDP, the BEA prepares information on state level income and employment. Its estimates are based on data from a variety of sources including payroll tax data, income tax returns and other sources. BEA estimates total earnings for counties, including wages and salary income, other labor income and proprietors income.

  The first BEA series is data wage and salary employment and disbursements, which is similar to the series for covered employment and payroll but also includes "non-covered" employment–persons and compensation not covered by unemployment insurance laws. These data are broader than the covered employment and payrolls series. In addition, unlike the covered employment data, which vary from year to year with changes in the scope of coverage of UI laws, BEA data are adjusted and revised to assure a consistent time series.

  The second series is BEA's earnings data. This broad measure includes proprietors' income and other labor income that are not counted as wage and salary earnings. Both of these data can be used to measure the level and patterns of change in average pay levels in the Portland metropolitan area. We compare the BEA wage and salary series with the covered employment series (because these are most similar in definition) and then also examine the trend in overall earnings as well.

**Data Source:**

- Eric Moore, Oregon Employment Department.
- Bureau of Economic Analysis, Regional Economics Information System
- Bureau of Economic Analysis. website: www.bea.doc.com, released by BEA 12/30/97
- Bureau of Labor Statistics, Portland-Salem OR-WA. *National Compensation Survey*, August, 1997 (Bulletin 3090-33) May, 1998

**Worksheet:**

- PDXIncome.xls
- BEA6995.XLS tab: PDXEMP
- BEA 6996 Employment Data.xls tab: AVGPAY

## F. Exports

A principal source of economic activity in any large metropolitan economy is exporting of goods and services to other places in the world. Exporting of goods and services provides revenue to local businesses and income to local residents.

Portland firms and residents export their products and services both directly and indirectly. Some products are directly exported from Portland, for example, by being loaded on ships at the Port of Portland, by being air freighted out of Portland International Airport, or by being trucked from Portland via Interstate 5 to ports of entry in Canada and Mexico. Many of Portland's exports, however, are indirect. Oregon manufacturing firms frequently produce parts or sub-assemblies that they sell to firms in other states, which are then incorporated into another product. A titanium part produced by Precision Castparts, for example, might be incorporated into a jet engine assembled by General Electric in Cincinnati or Boston and then exported as part of a plane sold by Boeing. Unfortunately, however, no data are collected on these indirect estimates.

Data on the geography of exports is confined almost entirely to direct exports. Most of the data on exports comes from shippers export declarations, part of the customs paperwork that businesses must file when they sell goods or services to persons or businesses outside the United States. Most trade statistics are reported based on the location of the shipper–the so-called “exporter location” series. In some cases, particularly in the case of large manufacturing firms, the shipper and the manufacturer are one and the same. In the case of many smaller firms, and particularly in the case of commodities, the shipper is usually an intermediary firm such as a wholesaler or broker. In this latter case, data reported based on the shipper's address may not accurately reveal the geography of actual production.

In the case of Portland, exports in some categories reflect not items that are produced in Portland but merely shipped out of it. This is particularly the case with commodities and bulk raw materials. Portland is a major shipping port for lumber, grain and bulk minerals, nearly all of which come from outside the metropolitan area, and most of which come from outside the state of Oregon. The value of these exports get reported as Portland exports for most data purposes because Portland is the location of the firm that is the shipper of record.

**Exporter Location Statistics**

Historically, export data has been reported only on a customs district basis (customs districts usually include one or more entire states). Since 1993, the US Department of Commerce has been reporting data for metropolitan areas based on the exporter location data series.

*Table 2.16 Total Value of Exports from the Portland Metropolitan Area, 1993-96 (Exporter Location Basis)*

| | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|
| Manufactured products | $3,550,094,343 | $4,095,151,898 | $5,540,884,580 | $5,800,936,153 |
| Electric and electronic equipment | 463,699,737 | 700,314,453 | 1,270,258,933 | 1,685,529,013 |
| Industrial machinery and computers | 1,028,793,797 | 1,100,153,560 | 1,703,179,730 | 1,432,568,427 |
| Lumber and wood products | 706,271,430 | 632,624,414 | 580,206,407 | 573,466,511 |
| Scientific and measuring instruments | 371,609,357 | 405,794,419 | 481,646,297 | 535,289,873 |
| Paper products | 128,794,111 | 211,358,454 | 313,191,904 | 348,807,395 |
| Transportation equipment | 304,189,972 | 365,971,976 | 389,156,203 | 317,792,165 |
| Rubber, plastic and leather products | 69,947,005 | 89,737,271 | 121,155,268 | 192,762,360 |
| Food and tobacco products | 122,525,687 | 151,888,427 | 160,335,609 | 182,795,224 |
| Primary metals | 105,956,558 | 152,552,070 | 193,782,476 | 161,280,165 |
| Fabricated metal products | 59,330,975 | 70,401,068 | 88,793,208 | 98,115,510 |
| Chemical products | 31,081,836 | 41,620,849 | 55,361,916 | 68,815,854 |
| Misc. and other manufactures | 53,015,031 | 58,212,237 | 59,283,119 | 59,299,455 |
| Apparel | 21,406,527 | 22,137,081 | 31,517,665 | 37,519,335 |
| Stone, clay and glass products | 20,938,163 | 20,118,051 | 21,860,182 | 32,289,005 |
| Printing and publishing | 23,461,745 | 27,123,590 | 21,988,753 | 24,421,057 |
| Refined petroleum products | 16,080,287 | 21,207,150 | 22,401,035 | 22,267,373 |
| Textile mill products | 13,867,792 | 17,139,094 | 20,389,777 | 20,507,624 |
| Furniture and fixtures | 9,124,333 | 6,797,734 | 6,376,098 | 7,409,807 |
| Non-manufactured commodities | 2,148,427,889 | 2,353,675,047 | 3,390,427,123 | 3,433,378,503 |
| TOTAL | $5,698,522,232 | $6,448,826,945 | $8,931,311,703 | $9,234,314,656 |

Source: Exporter Location Series, Census Bureau. Prepared by: International Trade Administration, US Dept. of Commerce, http://www.ita.doc.gov

Not only has the volume of trade through the Portland metropolitan area increased substantially in the past several years, but the composition of trade has also changed. The biggest increases in exports have come in high technology industries. The volume of electrical and electronic equipment exported from Portland more than tripled between 1993 and 1996, from less than $500 million to nearly $1.7 billion. Overall, exports from high tech industries, (shown in Table 2.16), nearly doubled over this period. In contrast, exports of some traditional, resource-based products, notably lumber and wood products, actually declined, from more than $700 million in 1993 to less than $600 million in 1996. Most of the region's agricultural exports—like wheat and other bulk grains—are included in the category "non-manufactured commodities."

*Table 2.17 Value of High Technology Exports from the Portland Metropolitan Area, 1993-1996, Exporter Location Series*

| High Technology Exports | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|
| Manufactured products | $3,550,094,343 | $4,095,151,898 | $5,540,884,580 | $5,800,936,153 |
| Electric and electronic equipment | 463,699,737 | 700,314,453 | 1,270,258,933 | 1,685,529,013 |
| Industrial machinery & computers | 1,028,793,797 | 1,100,153,560 | 1,703,179,730 | 1,432,568,427 |
| Scientific and measuring instruments | 371,609,357 | 405,794,419 | 481,646,297 | 535,289,873 |
| TOTAL HIGH TECH | $1,864,102,891 | $2,206,262,432 | $3,455,084,960 | $3,653,387,313 |

Source: Exporter Location Series, Census Bureau. Prepared by: International Trade Administration, US Dept. of Commerce, http://www.ita.doc.gov

## Origin of Manufacture Statistics

The US Department of Commerce produces a second set of international trade statistics, called the "origin of manufacture" or OM statistics, which report the volume of exports based on the state of original manufacture. Unlike the exporter location statistics, which are based on the location of the exporting firms, OM statistics try to find the place where the product was manufactured. Exporters are required to report a product's place of origin by entering a zip code on the Shipper's Export Declaration. The Department of Commerce contracts with the Massachusetts Institute of Social and Economic Research (MISER) to compile this data and to estimate the volume of exports.

These data are available at the state level for the years 1989 to 1996. Unfortunately, this data is not available for the metropolitan area. Examinations of the data, however, show clear differences in the patterns of growth between resource-based exports (primarily from the state's rural areas) and value-added exports (largely from the Portland metropolitan area). In Table 2.18, we've separated Oregon exports into two main categories, resource-related, including all lumber, wood and paper products, and grains, food products and other natural resource commodities; and value-added, including industrial and computer equipment, measuring instruments, transportation equipment, fabricated metal products, and rubber and miscellaneous plastics.

Historically, the state's largest export products have been agricultural crops and lumber and wood products. These two commodity categories were, respectively number one and number two in state exports in 1989, according to the OM data. By 1996, however, both of these products had been surpassed by industrial machinery/computers (SIC 35), which accounted for more than $2.1 billion in exports from Oregon.

*Table 2.18 Exports from Oregon, by Selected Industries, 1989 and 1996, Origin of Manufacture (OM) Basis*

| SIC | INDUSTRY | 1989 | 1996 |
|---|---|---|---|
| | Natural Resource | | |
| 1 | Agricultural production crops | $1,346,494,890 | $2,033,892,392 |
| 24 | Lumber and wood products excluding furniture | 1,184,212,024 | 1,106,102,905 |
| 20 | Food and kindred products | 221,148,589 | 339,348,831 |
| 26 | Paper and allied products | 142,073,825 | 278,956,843 |
| | Fishing, hunting, and trapping | 22637639 | 39506428 |
| 8 | Forestry | 3,414,253 | 4,123,109 |
| 2 | Livestock and animal specialties | 1,303,708 | 1,506,820 |
| 12 | Coal mining | 3,580 | 998,829 |
| 10 | Metal mining | 3,439,115 | 453,700 |
| 13 | Oil and gas extraction | 5,118 | 9,633 |
| | Subtotal, natural resources | 2,924,732,741 | 3,804,899,490 |
| | Value-added | | |
| 35 | Industrial /commercial /computer equipment | 758,655,130 | 2,142,968,692 |
| 36 | Electric. Equipment excluding computers | 336,459,645 | 1,568,981,941 |
| 38 | Measuring instruments | 314,796,416 | 582,092,580 |
| 37 | Transportation equipment | 190,123,274 | 357,817,234 |

| SIC | INDUSTRY | 1989 | 1996 |
|---|---|---|---|
| 34 | Fabricated metal products | 54,017,806 | 105,982,304 |
| 30 | Rubber/misc. plastics products | 18,085,061 | 74,564,698 |
| 39 | Misc. manufacturing industries | 21,837,918 | 72,121,895 |
| | Subtotal, value-added | 1,693,975,250 | 4,904,529,344 |
| | All other | $471,904,816 | $727,025,474 |

Source: The Massachusetts Institute for Social & Economic Research (OM Export Series). Prepared for US Department of Commerce, obtained from the Oregon Economic Development Department web page. Data was provided to OEDD by the independent firm Trade Stats Northwest.

As Table 2.19 shows, Oregon has seen a substantial shift in its export base over the past decade. In 1989, natural resource related products still accounted for a majority of the state's exports. Now, however, value-added products account for a majority of Oregon's exports.

*Table 2.19 Exports from Oregon, by Resource and Value-Added, 1989 and 1996, Origin of Manufacture (OM) Basis*

| | 1989 | 1995 |
|---|---|---|
| Natural Resource | $2,924,732,741 | $3,804,899,490 |
| High Technology | 1,693,975,250 | 4,904,529,344 |
| All other | 471,904,816 | 727,025,474 |

| | | |
|---|---|---|
| Natural Resource | 57.5% | 40.3% |
| High Technology | 33.3% | 52.0% |
| All other | 9.3% | 7.7% |

Source: The Massachusetts Institute for Social & Economic Research (OM Export Series). Prepared for US Department of Commerce, obtained from the Oregon Economic Development Department web page. Data was provided to OEDD by the independent firm Trade Stats Northwest.

There is little doubt that this statewide change has been propelled by the growth of value-added manufactures and value-added industries in the Portland metropolitan area. Portland accounts for the overwhelming majority of the state's production capacity for value-added manufactures and services. In the value-added industries with more than $100 million in 1996 state exports, Portland accounted for 70% of all Oregon employment. These data strongly suggest that the value-added industries concentrated in the Portland metro area have been a major force in enlarging the state's exports and changing the composition of what the state exports.

*Table 2.20 Location of Covered Employment, 1996 (Employment in Thousands). Selected Value-Added Industries with Oregon Exports for More than $100 Million. State of Oregon and Oregon Portion of Portland Metro Area*

| SIC | Industry | State | Portland | % Portland |
|---|---|---|---|---|
| 34 | Fabricated Metal Products | 13.8 | 9.7 | 70% |
| 35 | Industrial /Commercial /Computer Equipment | 22.1 | 15.3 | 69% |
| 36 | Electrical Equipment Excluding Computers | 31.1 | 21.5 | 69% |
| 37 | Transportation Equipment | 15.5 | 10.1 | 65% |
| 38 | Measuring Instruments | 10.5 | 8.6 | 82% |
| | TOTAL | 93 | 65.2 | 70% |

Source: Employment Department, 1996 Oregon Covered Employment and Payrolls by Industry & County.

**Definition/Calculation Notes:**

This "origin of manufacture" data series (also called the MISER data) is conceptually a better means of picturing the contribution of trade to particular regional economies. The data itself, however, have a number of flaws. The accuracy with which shippers enter the information into the export declaration is questionable; frequently they enter their own zip code (even if they are not the manufacturer) and in other cases may enter only the zip code of the warehouse from which it was shipped to them. This field is left blank on many forms, and so MISER must estimate the origin of a large fraction of the exports based on limited data.

Because of these flaws in the underlying information on which the statistics are based, the preparers of the data have attached an unusual warning to those who are attempting to use those data. It is worth quoting at length here:

> *Users of the National Trade Data Bank (NTDB) are strongly warned to use the state-of-origin of export data prepared by the Massachusetts Institute for Social and Economic Research (MISER) with special care as the data are estimates that depend heavily on…assumptions of consistency and uniformity and can be misinterpreted or misleading. MISER bases its estimates on census data in accordance with a joint agreement and they use the best methodology currently available, but reliance on these data to make state-to-state or year-to-year comparisons may result in analytical difficulties because the resultant data may be subject to error and may be erratic over time…*
>
> *This can be seriously misleading to those interested in the state where the commodity was grown, mined or manufactured since many products are typically exported by wholesalers and jobbers…not directly by manufacturers. The MISER data and the underlying shippers' export declaration data are not comparable to the "Exports from Manufacturing Establishments" publication based on the Annual Survey of Manufacturers…"State of origin of movement" is missing or invalid in a substantial percentage of Shipper's Export Declaration [SED] forms. About 75% of the SED's have valid state codes; the rest must be coded "state unknown" by the Census Bureau since no funds have been appropriated for follow-up or correction. The Massachusetts Institute of Social and Economic Research of the University of Massachusetts-Amherst adjusts for these missing data through a joint agreement with the Census Bureau. There is no assurance that errors and omissions are randomly distributed or will be consistent over time. Exporters of agricultural mineral and other non-manufactured products overwhelmingly report the state that contains the port of embarkation as the state where the export journey began….Users are cautioned that these data may be subject to wide and perhaps erratic errors. Analyses and comparisons that use these data as surrogates for state-of-production-of-export are very likely to be seriously misleading.*

**Data Source:**

- Exporter Location Series, Census Bureau, Prepared by: International Trade Administration, U.S. Dept. of Commerce, http://www.ita.doc.gov
- The Massachusetts Institute for Social & Economic Research (OM Export Series). Prepared for US Department of Commerce, obtained from the Oregon Economic Development Department web page. Data was provided to OEDD by the independent firm Trade Stats Northwest.
- Employment Department, 1996 Oregon Covered Employment and Payrolls by Industry & County.

**Worksheet:**

- 1996_exp.xls
- 1996 Export Data.XLS tab: PDX
- 1996 Export Data.XLS tab: Oregon

## G. Unemployment

One of the most widely used measures of the extent of economic distress is the unemployment rate. Unemployment is a measure of how many persons seeking work are unable to find it. Portland's unemployment rate has been quite low by historical standards over the past decade, averaging between 3.7% (the low point reach for calendar year 1995) and 6.4%, the highest rate recorded in the 1990s.

Portland's unemployment rate has consistently been below the unemployment rate for the nation as well as for the rest of the state.

*Table 2.21 Annual Average Unemployment Rates, 1990 to 1997*

| Year | United States | Oregon | Portland PMSA | PDX v US |
|---|---|---|---|---|
| 1990 | 5.6% | 5.5% | 4.2% | -1.4% |
| 1991 | 6.8% | 6.0% | 4.9% | -1.9% |
| 1992 | 7.5% | 7.5% | 6.4% | -1.1% |
| 1993 | 6.9% | 7.3% | 6.0% | -0.9% |
| 1994 | 6.1% | 5.4% | 4.3% | -1.8% |
| 1995 | 5.6% | 4.8% | 3.7% | -1.9% |
| 1996 | 5.4% | 5.9% | 4.5% | -0.9% |
| 1997 | 4.9% | 5.8% | 4.3% | -0.6% |

Source: Oregon Employment Department

**Definition/Calculation Notes:**

The unemployment rate is calculated by dividing the number of persons without jobs who are actively seeking work by the number of persons included in the labor force. Persons are not counted as being in the labor force if they are under 16 or over 65 or are not actively seeking work. The unemployment rate does not count persons as unemployed who have given up looking for work because they do not believe they can find a job. It also counts as employed persons who are working part-time although they may desire full-time work. An important limitation of the unemployment rate is that it does not consider wage or benefit levels; all jobs are counted the same.

Metropolitan Portland's unemployment rate is estimated on a monthly basis by the Oregon Employment Department and the Washington State Department of Employment Security. They use a method developed by the US Department of Labor that enables an indirect computation of the number of unemployed based on initial claims for unemployment compensation and changes in overall employment levels. These estimates are adjusted for commuting patterns and seasonal factors.

**Data Source:**

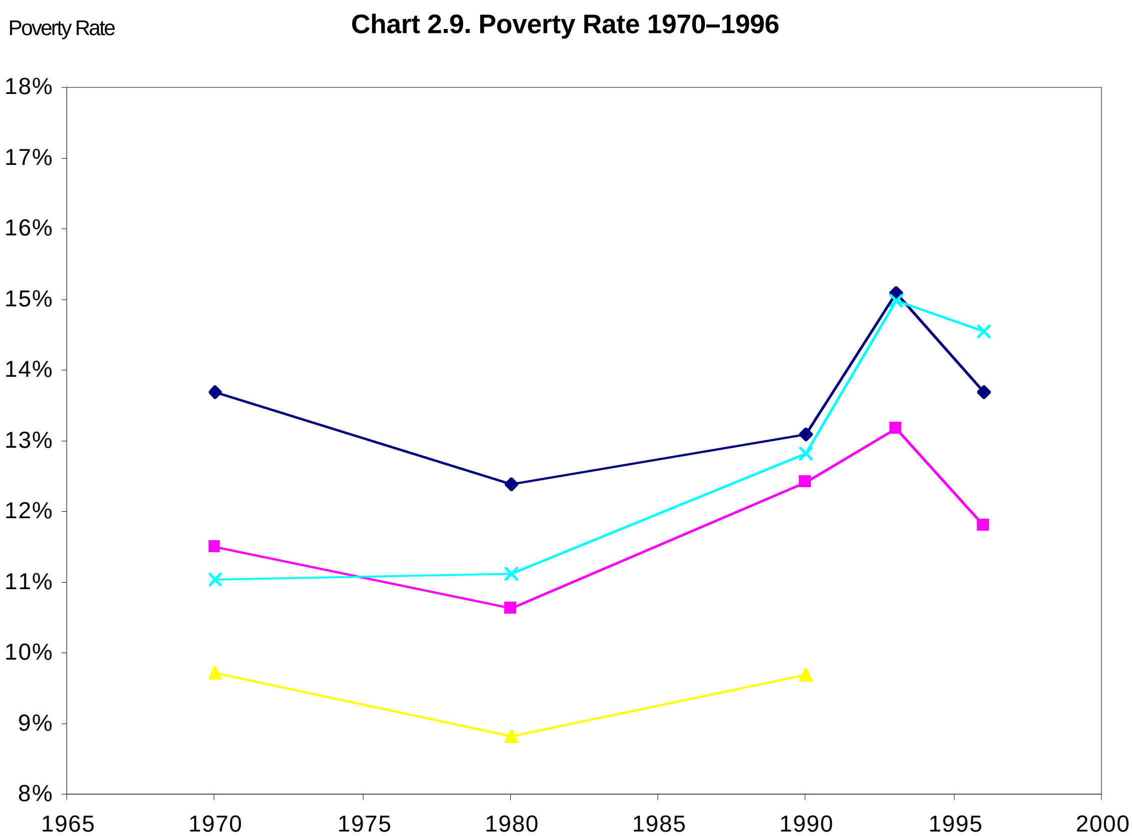
- Oregon Employment Department

**Worksheet:**

- Oeddata.xls

## H. POVERTY RATES

Unlike many other economic indicators, the poverty rate for the counties in the Portland Metro Region is not tracked on a regular basis. The most reliable poverty information comes from the decennial census which, in 1998, is quite dated. However, the poverty rates for the nation, the state, and the metro region since 1970 (Chart 2.9) show that historically, the metro region tracks at a lower rate than that of the rest of the state and the United States. Though poverty rate data for the region is unavailable for 1996, we can hypothesize that this trend will continue. Being that national and state estimates in 1996 show that the poverty rate is declining, it is possible that the rate for the region has also declined.




Source: 1970, 1980, 1990 Census Data, American Community Survey, March 1997 Current Population Survey

However, we do have information for Multnomah County in 1996 as a result of the American Community Survey. As seen in Chart 2.9, while there appears to have been a decline in that county's poverty rate from 1993 to 1996 it is still significantly higher than that of the rest of the region. In looking more closely at the numbers we find that this is due to increases in the number of individuals under 25 years of age who are living in poverty. Though the rise in the poverty rate for Multnomah County is significant, we can assume that the historical trend of Multnomah County having a higher rate than overall region will continue and that the region's poverty rate is, in fact, somewhat lower.

**Definition/Calculation Notes:**

The poverty statistics presented in this report are based on a definition originated by the Social Security Administration in 1964 and subsequently modified by a Federal Interagency Committee. At the core of this definition of poverty is the 1961 economy food plan, the least costly of four nutritionally adequate food plans designed by the Department of Agriculture. It was determined from the Agriculture Department's 1955 survey of food consumption that families of three or more persons spend approximately one-third of their income on food; hence the poverty level for these families was set at three times the cost of the economy food plan. For smaller families and persons living alone, the cost of the economy food plan was multiplied by factors that were slightly higher in order to compensate for the relatively larger fixed expenses for these smaller households. The poverty income cutoffs are revised annually to allow for changes in the cost of living as reflected in the Consumer Price Index. Poverty thresholds are computed on a national basis only. No attempt has been made to adjust these thresholds for regional, state or other local variations in the cost of living (except for the farm/non-farm differential).

*Table 2.22 Average Poverty Threshold*

| | 1970 | 1980 | 1990 |
|---|---|---|---|
| Average poverty threshold for a family of four persons | $3,745 | $7,412 | $12,674 |

The poverty status is determined for all persons except inmates of institutions, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old. Regional Connections uses the poverty status of individual persons in its analysis. The poverty status of an individual person who is a family member is determined by the family income and its relation to the appropriate poverty threshold for that family. The poverty status of a person who is an unrelated individual is determined by his or her own income in relation to the appropriate poverty threshold.

**Data Source:**

- Census Bureau, 1970, 1980, 1990 US Census Data
- 1996 American Community Survey
- Census Bureau, March 1997 Current Population Survey

**Worksheet:**

- pov2.xls

## I. INCOME DISTRIBUTION

While per capita income tells us about the average level of income in the population, it doesn't shed much light on the distribution of income. A critical public policy question is whether all segments of the population–lower income and upper income–are sharing in the benefits of the region's economic growth. The best data on the distribution of income comes from the decennial census, from which it is possible to calculate with some precision the distribution of income and to compare the current income distribution with that of previous years and with that of the rest of the nation.

One of the ways to assess Portland's income distribution is to compare it with national statistics. The most recent data available, taken from the 1990 Census, show that Portland's income is much more evenly distributed than is national income.

Table 2.23 shows the comparative distributions of family income for families living in the nation and families living in the Portland metropolitan area. The figures in each column correspond to the fraction of the families nationally and in Portland in each income category. For example, in 1990, 4% of all US families and 2.5% of all Portland metro families had incomes of less than $5,000 per year. In general, the data show that Portland has a smaller fraction of its families earning less than $15,000 per year and also a smaller fraction of its families earning more than $75,000 per year than the rest of the nation. As a result, a larger fraction of Portland families are found in the middle income categories.

*Table 2.23 US and Portland MSA Families, by Income Category, 1990*

| Family Income Category | US | Portland MSA |
|---|---|---|
| Less than $5,000 | 4.0% | 2.5% |
| $5,000 to $9,999 | 5.6% | 4.2% |
| $10,000 to 14,999 | 7.2% | 5.8% |
| $15,000 to $24,999 | 16.4% | 16.1% |
| $25,000 to $34,999 | 16.5% | 18.1% |
| $35,000 to $49,999 | 20.4% | 23.3% |
| $50,000 to $74,999 | 18.2% | 19.6% |
| $75,000 to $99,999 | 6.3% | 5.8% |
| $100,000 or more | 5.4% | 4.7% |

Source: 1990 Census of Population and Housing

Using $15,000 per year and $75,000 per year as the lower and upper boundaries of the middle income group, Table 2.23 shows the fraction of the Portland and US families in low, middle and high income groups.

*Table 2.24 US and Portland MSA Families, Grouped by Income Category, 1990*

| Category | Annual Income | US | Portland MSA |
|---|---|---|---|
| Low | Less than $15,000 | 9.6% | 6.7% |
| Middle | $15,000 to 74,999 | 71.5% | 77.0% |
| High | $75,00 or more | 11.7% | 10.5% |

Source: 1990 Census of Population and Housing

The Department of Revenue reports taxable income by household income category. Published categories generally include income in $2,000 increments for income under $30,000, for $5,000 increments up to $90,000 and larger increments for amounts above that. While it would be possible to analyze the distribution of income by comparing these categories from year to year, over time, the effect of inflation is to make the categories non-comparable. For example, the standard of living implied by an income of $8,000 to $10,000 in 1985 was considerably higher than that implied by a household income in the same range ten years later. To overcome this problem of non-comparability of dollar amounts over time, we look at the distribution of income in terms of quintiles of the population (see Table 2.25). A quintile is one-fifth of the population. Since we are using exemptions to count the population, a quintile of the metro area population is assumed to be one-fifth of all exemptions claimed in the metro area in a given year.

*Table 2.25 Estimated Distribution of Taxable Income, 1985, 1990 and 1995, Portland Metropolitan Area, (Oregon Portion)*

*By Quintile (based on Exemptions Claimed)*

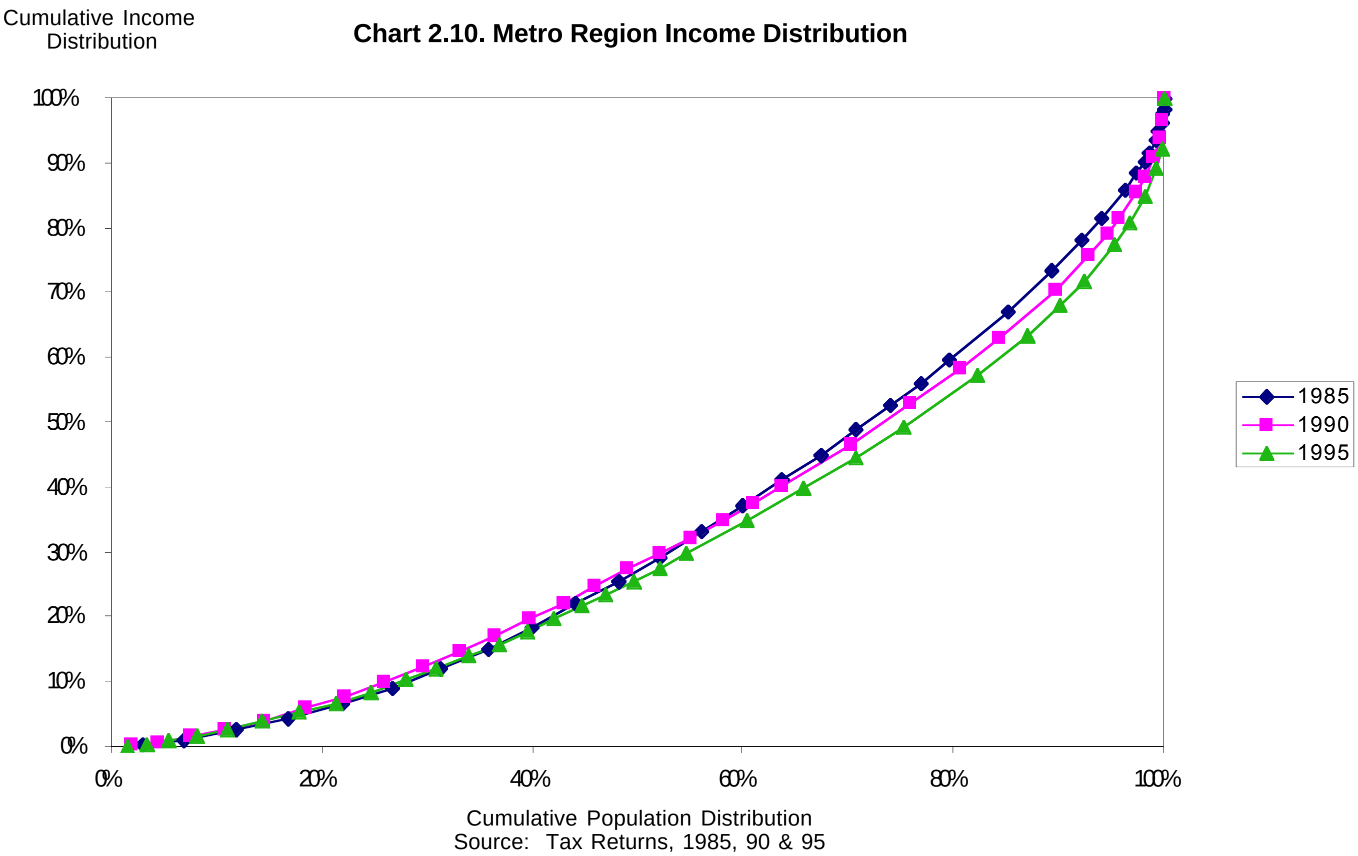
| Quintile | 1985 | 1990 | 1995 |
|---|---|---|---|
| Lowest Quintile | 5.3% | 5.9% | 5.4% |
| Second | 11.9% | 12.3% | 11.1% |
| Third | 18.2% | 17.1% | 16.3% |
| Fourth | 23.7% | 21.7% | 21.2% |
| Highest Quintile | 40.9% | 43.0% | 46.0% |

Source: Oregon Department of Revenue. Methodology for estimates is explained in text.

A key limitation of the data on the distribution of income is that it is reported only in ranges, and as it turns out the ranges generally do not break evenly by quintile. Typically, the income level that forms the boundary between two quintiles will fall somewhere in the middle of a range of incomes. For example, in 1995, the boundary between the lowest quintile and the second quintile of exemptions lay somewhere between $14,000 and $16,000. Therefore, we had to develop a method for dividing the number of exemptions and the amount of income within that range between the two quintiles. This was done by plotting the cumulative distribution of income against the cumulative distribution of exemptions. Each point on this plot represented the incremental addition of the number of exemptions and the amount of income of each successive range to all of the preceding ranges in the distribution. The result is an upward sloping curve representing the distribution of income.

Chart 2.10 shows the distribution of incomes. The income distributions are all roughly similar, flat on the left-hand side and very steep on the right. This reflects the fact that the lowest income individuals earn a relatively small fraction of the regions income, while the relative high income individuals earn a much larger fraction of the region's income. If every person in the region had exactly the same taxable income, the chart would appear as a 45-degree line from the lower left to the upper right. In general, the further this line bows away from 45 degrees, the less equal is the distribution of income.

**Chart 2.10. Metro Region Income Distribution**




Source: Oregon Department of Revenue. Methodology for estimates is explained in text.

These data show that the overall distribution of taxable income in the metro area has grown somewhat less equal in the past decade. The richest one-fifth of the population has increased its share of total income from about 41% in 1985 to about 46% in 1995. The lowest quintile has a slightly larger share of taxable income in 1995 than it did a decade ago (though a smaller share than it had in 1990). For the middle three quintiles, income shares are lower now than a decade ago. These data suggest that it has been the growth in the income of high-income families that has been the disproportionately largest source of Oregon personal income gains over the past decade.

This does not mean, however, that income has not increased for the lowest income Oregonians. In fact, if we analyze the income data, we see that adjusted for inflation, income per exemption (or, roughly speaking, income per resident) has increased in each of the five quintiles (although it clearly has increased much more rapidly in the upper income groups.) This analysis is as follows.

From Department of Revenue records, we know the total amount of income reported each year. Using the distribution figures estimated in Table 2.25, we can multiply the fraction of income earned by each quintile times the region's total income to estimate the income of each quintile for each year. This calculation is shown in Table 2.26.

*Table 2.26 Portland Metropolitan Area Taxable Income by Quintile, 1985, 1990 and 1995, Thousands of Current Dollars*

| Totals | 1985 | 1990 | 1995 |
|---|---|---|---|
| Income | $11,051,289 | $17,294,859 | $24,588,613 |
| Exemptions | 1,114,474 | 1,133,620 | 1,250,938 |
| Total Income by Quintile | | | |
| Lowest | 585,718 | 1,020,397 | 1,327,785 |
| Second | 1,315,103 | 2,127,268 | 2,729,336 |
| Third | 2,011,335 | 2,957,421 | 4,007,944 |
| Fourth | 2,619,155 | 3,752,984 | 5,212,786 |
| Highest | 4,519,977 | 7,436,789 | 11,310,762 |

By definition, each quintile contains one-fifth of the exemptions claimed on tax returns in the metro area in the year in question. If we divide the total income shown for each quintile for each year by one-fifth of the total number of exemptions claimed that year we can estimate the average income per exemption for each quintile for each year. This calculation is shown in Table 2.27.

*Table 2.27 Portland Metropolitan Area Average Taxable Income Per Exemption by Quintile, 1985, 1990 and 1995 Current Dollars*

| Quintile | 1985 | 1990 | 1995 |
|---|---|---|---|
| Lowest | $2,628 | $4,501 | $5,307 |
| Second | 5,900 | 9,383 | 10,909 |
| Third | 9,024 | 13,044 | 16,020 |
| Fourth | 11,751 | 16,553 | 20,836 |
| Highest | 20,279 | 32,801 | 45,209 |

These numbers show the average income per exemption. But because of inflation, the numbers are not directly comparable from year to year. To correct for inflation, we can estimate the amounts shown in Table 2.27 by converting them to chained 1997 dollars. This calculation is shown in Table 2.28.

*Table 2.28 Portland Metropolitan Area Average Taxable Income Per Exemption by Quintile, 1985, 1990 and 1995 Chained 1997 Dollars*

| Quintile | 1985 | 1990 | 1995 |
|---|---|---|---|
| Lowest | $3,906 | $5,460 | $5,545 |
| Second | 8,769 | 11,383 | 11,398 |
| Third | 13,412 | 15,825 | 16,737 |
| Fourth | 17,465 | 20,083 | 21,768 |
| Highest | 30,140 | 39,795 | 47,233 |

Table 2.28 shows that, adjusted for inflation, reported taxable incomes increased for Metro area residents in each quintile. The economy has improved the standard of living of metro area residents in all income groups. The greatest gains, however, have gone to those in the highest income categories. Average income per exemption has increased about $1,500 in real terms in the lowest quintile since 1985. Average income in the upper quintile has increased by about $17,000 per exemption in real terms since 1985.

**Definition/Calculation Notes:**

The great limitation of the decennial census is that it is administered only every ten years, and as a result, the data doesn't measure recent changes in economic activity (and any changes that may have occurred in the distribution of income).

The best available source of data on annual income of residents of the Portland metropolitan area is the reports on personal income tax data prepared by the Oregon Department of Revenue. These annual reports summarize the information contained on personal income tax returns submitted annually by Oregonians. Data are reported on a county by county basis.

It should be noted that these data are program records. The income tax system was not designed to produce county by county estimates of changes in income over time. Changes in tax law, particularly the initial threshold of reporting, and choices that individuals and families make about how to report their income influence the printed data. The Department of Revenue does not audit data that is unrelated to tax liability, so some information, for example county of residence, may not necessarily be accurate. Nonetheless, income tax returns (specifically those collected by the internal revenue service) are the source of much of the published data on economic activity. Because no other annual, published county level data is available, we use this source.

The definition of income for tax purposes, adjusted gross income, is not as broad as the definition of personal income developed by the BEA. Some income is not subject to be reported for personal income tax purposes. For example, income of individuals earning less than the minimum required to file income taxes isn't reported. BEA counts some sources of income, such as the value of fringe benefits, and the imputed rental value of owner-occupied housing. For most of the past decade, reported adjusted gross income in Oregon has averaged about 70% of BEA's estimate of total Oregon personal income. During the economic turmoil of the early 1980s, taxable income fell more rapidly than BEA's estimate of personal income.

*Table 2.29 Oregon Personal Income and Adjusted Gross Income, 1980 to 1995*

| Year | Personal Income | Adjusted Gross Income | Ratio |
|---|---|---|---|
| 1980 | $26,244 | $18,229 | 69% |
| 1981 | 28,186 | 19,044 | 68% |
| 1982 | 28,641 | 18,776 | 66% |
| 1983 | 30,348 | 19,441 | 64% |
| 1984 | 33,025 | 20,901 | 63% |
| 1985 | 34,901 | 22,016 | 63% |
| 1986 | 36,724 | 23,634 | 64% |
| 1987 | 38,579 | 25,981 | 67% |
| 1988 | 41,942 | 29,468 | 70% |
| 1989 | 45,712 | 32,076 | 70% |
| 1990 | 49,810 | 34,702 | 70% |

| Year | Personal Income | Adjusted Gross Income | Ratio |
|---|---|---|---|
| 1991 | 52,276 | 36,031 | 69% |
| 1992 | 55,668 | 38,816 | 70% |
| 1993 | 59,260 | 41,708 | 70% |
| 1994 | 62,991 | 44,295 | 70% |
| 1995 | 67,796 | 48,231 | 71% |

Sources: Personal Income: Bureau of Economic Analysis, Regional Economics Information System. Adjusted Gross Income: Oregon Department of Revenue, Personal Income Tax Annual Statistics, 1996, page 7.

The Department of Revenue produces tabulations of income taxes paid according to the reported income of the filing unit (typically a household). For each adjusted income category, the Department of Revenue reports, among other items, the number of returns that fall into that income category, the number of exemptions claimed on those returns, the total amount of income reported on the returns in that category, and the tax paid. We can use this information to construct a rough picture of the distribution of income in the Portland metropolitan area.

To begin, we make a number of important assumptions. First, we exclude all data from Clark County Washington. Even though Clark County residents who work in Oregon are required to file Oregon personal income tax returns (some 46,000 do, and pay about $70 million per year in Oregon personal income taxes), these returns are not a complete or accurate picture of the income of Clark County residents. Clark County residents are not required to report income earned in Washington, and families are classified based only on their Oregon income. Many Clark County families, those with no Oregon workers, don't have to pay Oregon income tax at all.

Second, we eliminate all returns with negative income from consideration. Some households report negative taxable income, typically because of business losses. Analyzing negative income is problematic when calculating the income distribution of the entire population, so these figures present the distribution of income for families with positive incomes. This may slightly skew the distribution analysis because some households will move in and out of the group of positive income households, based primarily on changes in the year to year success of their businesses.

Third, we use exemptions as our measure of the population. Households filing personal income taxes are generally entitled to claim personal exemptions for each member of the household. This serves as a good proxy for the overall population in each taxpaying household.

A critical issue with the use of income tax data is the fact that many households do not file income tax returns. Families that earn no taxable income and those who earn less than a statutory minimum for filing don't need to file at all. In addition, state tax laws change over time, with modifications to filing requirements, withholding taxes and credits and deductions, which changes the number of persons who file.

**Data Source:**

- Personal Income: Bureau of Economic Analysis, Regional Economics Information System.
- Adjusted Gross Income: Oregon Department of Revenue, Personal Income Tax Annual Statistics, 1996, page 7.

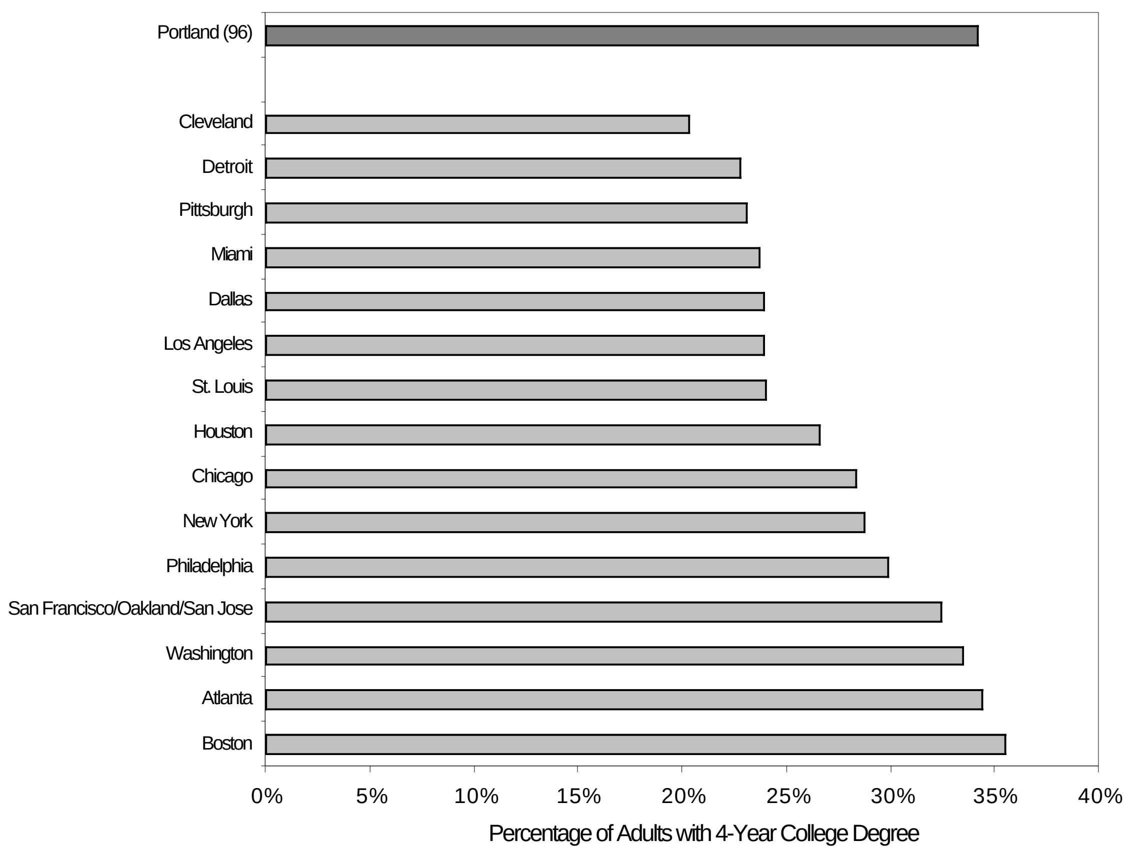
**Worksheet:**

- Incomedistribution.xls

## J. EDUCATIONAL ATTAINMENT

One of the most significant indicators for the Portland metro region has been the dramatic increase in the number of adults over 25 years of age with a four-year college degree. Chart 2.10 illustrates how the number of adults with college degrees has gone up to more than three times what it was in 1970. In many respects, the Portland metro area is beginning to look more and more like that of a "college town." A good deal of this increase can be attributed to the increase of in-migration in the area.

**Chart 2.11. Portland Ranks Among Highest in Attainment**
**1995 Educational Attainment (Portland 1996)**




Source: 1970, 1980, 1990 Census

The change in educational attainment is even more striking when you compare Portland to other metropolitan cities in the US (Chart 2.11). It should be noted that this comparison is for the city of Portland not the region. According to the 1996 American Community Survey, 34.2% of the adult population over 25 had a 4-year college degree. Among the nation's 15 largest metro areas, only two—Boston and Atlanta—had higher levels of educational attainment in 1995.

**Data Sources:**

- Bureau of Census, 1970, 1980, 1990 Census
- 1996 American Community Survey
- National Center for Education Statistics

**Worksheet:**

- edattain.xls

## K. Fiscal Contribution

One important aspect of the economic health of the Portland metropolitan economy is the role it plays in providing taxes for needed state and local government services. Focusing on just the major sources of state and local government revenue, Portland area residents pay local property taxes to cities, counties, schools and special districts, and income taxes to the state government. Businesses also pay property taxes to local governments, and corporate income and unemployment taxes to the state government.

By far, the largest source of revenue for state and local finance is the personal income tax. Prior to the passage of Measure 5 in 1990, the property tax had been the largest source of revenue to finance the combined activities of state and local government. Since 1990, the state has assumed a much larger share of the cost of providing K-12 education, and has paid for this increased spending largely through higher income tax revenues.

The Portland area pays a large and growing share of state personal income taxes. In 1985, the six-county metropolitan area paid slightly more than half of all Oregon personal income taxes ($573 million of $1,078 million). By 1996, the metropolitan area accounted for $1.4 billion of the $2.6 billion collected in state personal income taxes. Over this 11-year period, the Portland metropolitan area's share of total personal income taxes paid rose from 53.2% to 55.2%.

One important aspect of the personal income tax is the fact that a small but significant amount is paid by out-of-state residents. Residents of Washington state pay Oregon personal income tax on income they earn in the state.

For 1996, the latest year for which data are available, Clark County residents paid more than $71 million in personal income taxes.

*Table 2.30 Personal Income Taxes Paid by County, Portland Metropolitan Area and State of Oregon, 1985, 1990 and 1996. All Dollar Figures in Thousands*

| | Income Taxes Paid | | | | Dollar Increase | | Percent Increase | |
|---|---|---|---|---|---|---|---|---|
| | 1985 | 1990 | 1996 | | 85-96 | 90-96 | 85-96 | 90-96 |
| | | | | | | | | |
| State Total | $1,078,151 | $1,831,472 | $2,614,026 | | $1,535,875 | $782,554 | 142% | 43% |
| | | | | | | | | |
| Clackamas | 123,500 | 233,682 | 331,527 | | 208,027 | 97,845 | 168% | 42% |
| Clark | 22,428 | 46,071 | 71,447 | | 49,019 | 25,376 | 342% | 106% |
| Columbia | 14,315 | 23,902 | 30,434 | | 16,119 | 6,532 | 72% | 14% |
| Multnomah | 247,242 | 400,546 | 576,543 | | 329,301 | 175,997 | 133% | 44% |
| Washington | 146,145 | 255,973 | 381,490 | | 235,345 | 125,517 | 161% | 49% |
| Yamhill | 19,628 | 33,678 | 52,130 | | 32,502 | 18,452 | 166% | 55% |
| Metro | 573,258 | 993,852 | 1,443,571 | | 870,313 | 449,719 | 152% | 45% |
| | | | | | | | | |
| Metro % of state | 53.2% | 54.3% | 55.2% | | | 57.5% | | |
| | | | | | | | | |
| Balance of state | 504,893 | 837,620 | 1,170,455 | | 665,562 | 332,835 | 132% | 40% |

Source: Oregon Department of Revenue, Personal Income Tax Statistics, Years Cited: 1985: Table A: Income and Tax in Thousands of Dollars by County, page 94; 1990: Table A: Income and Tax (in Thousands of Dollars) by County, page 114; 1996: Preliminary, provided by ODOR, 7/28/98: Worksheet for Table 11A.

**Calculation Note:**

Adjusting for Inflation

Much of the money change in incomes and wages is the effect of inflation over time. To factor out the role of inflation, time series data have been recomputed in inflation-adjusted dollars.

The index used to factor out inflation is the “implicit price deflator” for personal consumption expenditures. The implicit price deflator has a number of important advantages for making long term comparisons in relative values. First, it is more broadly based than some other measures, like the consumer price index, that includes a fixed market basket of goods and services. Second, the IPD/PCE is a chain-weighted index, meaning it is designed to avoid substitution bias (the effects of consumers shifting purchases away from relatively higher priced items).

The implicit price deflator for personal consumption expenditures is calculated by BEA and is regularly published and revised. The latest estimates of the IPD/PCE are available at: http://www.stls.frb.org/fred.

**Data Sources:**

- Oregon Department of Revenue, Personal Income Tax Statistics, Years Cited

    1985: Table A: Income and Tax in Thousands of Dollars by County, page 94

    1990: Table A: Income and Tax (in Thousands of Dollars) by County, page 114

    1996: Preliminary, provided by ODOR, 7/28/98: Worksheet for Table 11A.

**Worksheet:**

- Metro Area Tax Analysis, 1996.xls:Summary

# III. REGIONAL ECONOMIC STRUCTURE

To understand the reasons for the Portland region's economic performance, it is critical to have a clear understanding of the economic, and in particular, the industrial structure of the region's economy. Which characteristics distinguish the economic activities that occur in the Portland metropolitan area from other parts of the United States, and especially other similarly sized metropolitan areas?

This section examines the industrial structure of the Portland economy and describes the ways in which that structure has changed over the past two decades. The description comes in seven major parts. To begin, we examine the distribution of employment among the different industries of the region. In particular we identify those industry sectors, which contribute to the bulk of the region's employment. Second, we look at the growth of Portland as a manufacturing center. Third, we examine sectoral growth in the region over the past decade.

Fourth, we look at how the region's share of certain national industries has changed over time. While Portland represents about six-tenths of one percent of the national economy overall, it represents a higher share of some industries, and has increased its share much more rapidly in some industries than in others. Shift share analysis examines these trends. Fifth, we look at the location quotients for industry location. Location quotients identify those industries, which are disproportionately represented in the region's economy, and therefore are distinctive attributes of the region.

Sixth, we combine these previous findings into a strategic analysis of the region's industries. Finally, we undertake to examine industry linkages by looking at the input and output connections among the major sectors that compose the regional economy. Firms buy from and sell to one another, and these buying and selling relationships help drive the local economy. National input output data begin to allow us to examine the linkages among the various industrial sectors of the regional economy.

## A. EMPLOYMENT BY INDUSTRY

Statistical agencies report the distribution of employment by industry for the metropolitan area based on the Standard Industrial Classification (SIC) system, a method that assigns firms to particular industries based on what they produce. The SIC code system originated in the 1940s and although it has been revised a number of times, it remains better at classifying traditional economic activities rather than emerging ones. The SIC code is a hierarchical system of classification. At the broadest level of categorization, types of businesses are separated into industry divisions (ten categories at the so-called one-digit level of aggregation) and industries are most finely categorized at the 4-digit level of analysis (approximately 800 different industries).

This report uses two major sources of data to characterize the industrial composition of activity in the Portland metropolitan area. The first is the US Bureau of Economic Analyses data on employment. The BEA data include wage and salary employees, as well as BEA's estimate of the number of self-employed persons. The second data source is the ES 202 data collected by the Washington and Oregon Employment Departments. This data reports the number of persons employed by firms required to pay unemployment insurance taxes in the two states. Because self-employed persons are not required to pay unemployment insurance taxes, they are not counted in this data series. The ES-202 data, however, are available at a much finer level of industry detail, (at the two-digit, three-digit and four-digit SIC code levels) which permits a much more detailed description of industry employment patterns. (A third source of data, the County Business Patterns estimates developed by the Census Bureau, are not used because of time lags in their publication).

The data presented in Table 3.1 summarize some of the key dimensions of the Portland metropolitan economy. First, nearly 90% of all workers are employed in the private sector of the economy, while about 11% work for federal, state and local governments. Second, retail trade and all services account for slightly less than half of all of the region's jobs (47.5%). Finance, insurance and real estate activities are about one in six jobs, while manufacturing is about one in seven. Fewer than 10% of workers are found in wholesaling, construction, transportation and utilities. Agriculture and mining are the smallest industry divisions in the metropolitan economy.

*Table 3.1. Total Non-Farm Employment by Industry Division in the Portland Metropolitan Area, 1995*

| Industry Category | Employment | Percent |
|---|---|---|
| Nonfarm employment | 1,056,007 | 100.0% |
| Private employment | 937,349 | 88.8% |
| Ag. serv., forestry, fishing, and other 3/ | 13,333 | 1.3% |
| Mining | 1,642 | 0.2% |
| Construction | 63,015 | 6.0% |
| Manufacturing | 145,124 | 13.7% |
| Transportation and public utilities | 55,359 | 5.2% |
| Wholesale trade | 71,484 | 6.8% |
| Retail trade | 177,515 | 16.8% |
| Finance, insurance, and real estate | 86,207 | 8.2% |
| Services | 323,670 | 30.7% |
| Government and government enterprises | 118,658 | 11.2% |
| Federal, civilian | 17,877 | 1.7% |
| Military | 7,091 | 0.7% |
| State and local | 93,690 | 8.9% |
| State | 22,381 | 2.1% |
| Local | 71,309 | 6.8% |

Source: Bureau of Economic Analysis, Regional Economic Information System, August 1997.

Table 3.2 shows the change in employment in the regional economy over the five years from 1990 to 1995. The relative size of the major industry divisions has changed relatively little over this time period. These data show that the private sector has accounted for 95% of the growth in the region's employment. The total number of military and federal civilian jobs has actually declined since 1990. Expansion of services and retail trade accounted for a majority (57.2%) of the region's new employment growth.

*Table 3.2. Growth in Employment by Industry Division in the Portland Metropolitan Area - 1990 to 1995*

| | 1990 | 1995 | Change | Share of Change |
|---|---|---|---|---|
| Nonfarm employment | 907,499 | 1,056,007 | 148,508 | 100.0% |
| Private employment | 796,901 | 937,349 | 140,448 | 94.6% |
| Ag. serv., forestry, fishing, and other 3/ | 10,316 | 13,333 | 3,017 | 2.0% |
| Mining | 1,497 | 1,642 | 145 | 0.1% |
| Construction | 49,637 | 63,015 | 13,378 | 9.0% |
| Manufacturing | 130,770 | 145,124 | 14,354 | 9.7% |
| Transportation and public utilities | 48,565 | 55,359 | 6,794 | 4.6% |
| Wholesale trade | 61,393 | 71,484 | 10,091 | 6.8% |
| Retail trade | 151,014 | 177,515 | 26,501 | 17.8% |
| Finance, insurance, and real estate | 78,499 | 86,207 | 7,708 | 5.2% |
| Services | 265,210 | 323,670 | 58,460 | 39.4% |
| Government and government enterprises | 110,598 | 118,658 | 8,060 | 5.4% |
| Federal, civilian | 18,614 | 17,877 | (737) | -0.5% |
| Military | 8,660 | 7,091 | (1,569) | -1.1% |
| State and local | 83,324 | 93,690 | 10,366 | 7.0% |
| State | 20,142 | 22,381 | 2,239 | 1.5% |
| Local | 63,182 | 71,309 | 8,127 | 5.5% |

Source: Bureau of Economic Analysis, Regional Economic Information System, August 1997.

We can get a more detailed picture of the region's economy by examining the ES-202 data compiled by the Oregon Employment Department. Table 3.3 shows the region's covered employment by two-digit SIC code for the year 1996. In 1996, the region had 850,000 workers covered by unemployment insurance, compared to BEA's estimate of 1,050,000 total part-time and full-time non-agricultural workers in 1995. The ES-202 data show fewer workers than the BEA data series largely because of the exclusion of self-employed workers.

*Table 3.3 Portland Metropolitan Employment by Two-digit SIC Code, 1996 (Covered Employment, Annual Average)*

| SIC | Industry | 1996 Employment |
|---|---|---|
| 80 | Health | 59,475 |
| 73 | Business services | 58,506 |
| 58 | Eating and drinking | 57,095 |
| 82 | Education | 52,081 |
| 50 | Durable wholesaling | 37,482 |
| 17 | Building trades | 34,103 |
| 91-93 | Government | 34,828 |
| 51 | Non-durable wholesaling | 25,915 |
| 36 | Electrical mach. | 25,509 |
| 83 | Social | 21,913 |
| 54 | Food stores | 20,557 |
| 87 | Membership orgs. | 19,582 |
| 35 | Machinery | 19,454 |
| 53 | General merchandise | 19,133 |
| 55 | Auto dealers | 16,819 |
| 60 | Banking | 16,603 |
| 59 | Misc. retail | 16,393 |
| 42 | Trucking/warehousing | 16,246 |
| 65 | Real estate and insurance | 14,044 |
| 63 | Insurance | 11,821 |
| 1 | Crop production | 11,412 |
| 15 | General construction | 11,086 |
| 79 | Amusement and recreation | 11,026 |
| 34 | Fabricated metals | 10,816 |
| 20 | Food and kindred | 10,665 |
| 37 | Transportation | 10,556 |
| 27 | Printing | 9,749 |
| 70 | Hotel/motel | 9,565 |
| 86 | Membership orgs. | 9,499 |
| 75 | Auto repair | 9,413 |
| 45 | Air transport | 9,173 |
| 49 | Electric/gas utilities | 9,008 |
| 38 | Instruments | 8,962 |
| 48 | Communication | 8,599 |
| 56 | Apparel and accessories | 8,595 |
| 33 | Primary metals | 8,013 |
| 24 | Lumber and wood | 7,868 |
| 72 | Personal services | 7,081 |
| 57 | Furnishings | 6,757 |
| 16 | Heavy construction. | 6,679 |
| 7 | Agricultural services | 6,587 |
| 30 | Rubber and plastic | 6,439 |
| 26 | Paper and allied | 6,437 |
| 81 | Legal | 6,353 |
| 52 | Building materials retailing | 6,305 |
| 43 | Trucking/warehousing | 5,261 |
| 41 | Local transit | 5,209 |
| 61 | Credit agencies | 4,944 |
| 64 | Insurance agents | 4,910 |
| 78 | Motion pictures | 4,222 |
| 47 | Transport services | 3,908 |
| 32 | Stone clay and glass | 3,023 |
| 76 | Miscellaneous repair | 2,934 |
| 39 | Miscellaneous manufacturing | 2,787 |
| 44 | Water transport | 2,453 |
| 62 | Security brokers | 2,419 |
| 23 | Apparel | 2,346 |
| 25 | Furniture | 2,291 |
| 28 | Chemicals | 2,099 |
| 88 | Household workers | 2,013 |
| 67 | Holding companies | 1,847 |
| 22 | Textiles | 1,735 |
| 8 | Forestry | 1,115 |
| 84 | Museums | 1,050 |
| 14 | Non-metal mining | (D) |
| 2 | Stock production | (D) |
| 89 | Household workers | (D) |
| 31 | Leather | (D) |
| 29 | Petroleum | (D) |
| 9 | Fishing | (D) |
| 13 | Oil and gas mining | (D) |
| | Total | 853,390 |

*Note: (D) indicated totals for this industry cannot be disclosed.*

*Source: ES 202 data provided by Oregon and Washington Employment Departments.*

The two-digit classification system shows considerably more detail about the industrial structure of the regional economy. In terms of employment, the largest two-digit industries are in services and retailing, specifically, health care, business services and eating and drinking establishments (which includes restaurants and taverns). The smallest industries are mostly extractive, resource-based industries that are seldom found in any numbers in metropolitan areas.

**Data Sources:**

- ES202 data provided by Oregon and Washington Employment Departments
- Bureau of Economic Analysis, Regional Economic Information System, August 1997

**Worksheets:**

- PDX Emp bu 4 digit SIC.xls, tab: LQ2

## B. TRADED VS. NON-TRADED SECTORS OF THE LOCAL ECONOMY

To better understand the nature of the region's economy, it is helpful to distinguish the differing roles that various activities play in contributing to the region's economic growth. The most important distinction is between activities that primarily serve local markets and those that serve wider markets.[1] The growth of the Portland economy depends largely, though not entirely, on its ability to produce traded goods and services. The export of traded goods and services draws income into the region that supports the local sector of the regional economy.

A traded industry is one that sells its goods or services in a market for which there is national or international competition. In contrast, local goods and services are those which are sold in markets for which there is only local competition. Automobiles, electronic circuits and grain are all products for which there is clearly national or international competition. In contrast, haircuts, doctor visits and residential real estate are essentially local markets.

The distinctions between traded and local businesses are not always clear-cut or fixed. Some businesses start out operating primarily in a local market, but expand or modify their production in ways that moves them into a traded sector; a bakery selling fresh baked goods may start out in the local marketplace, but if it packages its products it may find itself competing in a wider market.

An additional characteristic of traded sector businesses is that one can be competing against businesses around the world even in one's own backyard. A Portland microbrewer, for example, may sell all of her product in Portland, but is competing against brewers in Milwaukee, St. Louis, Mexico and Germany, as well as against local brewers. The SIC code system provides a useful, but not foolproof, basis for beginning to separate industries into traded and non-traded categories.

Which sectors are predominantly sold to local households and which export outside the region and provide income that then is re-circulated in the local economy? One source of estimates

1 The region's growth can also be propelled by a number of other factors, especially in the short run. The region can grow by improving its productivity of purely locally produced and consumed services. The region can have persons move in who have sources of income (such as transfer payments or earnings on investments) that enable them to spend money in the local economy without currently exporting goods and services. The region can also expand its economy if it expands local production of a previously imported good or service. It is also widely recognized that population in-migration driven by quality of life factors can buoy the local labor market and encourage the migration of firms (and the formation of firms by new inmigrants); but in this case, unless these new firms export their goods or services (or displace previous imports), they will simply compete for the local market.

of the extent of the region's trade with the rest of the world is provided by IMPLAN, an input-output modeling system that estimates how much is produced and consumed in the region, and how much is sold to (and purchased from) the rest of the world.

A 1982 version of the IMPLAN model was used by David Holland, Bruce Weber and Ed Waters to estimate trade flows between the four-county metropolitan area (Clackamas, Clark, Multnomah and Washington) and the rest of the world. Their analysis shows the extent to which locally produced goods and services are consumed locally, as opposed to being exported outside the region. Some of the output consumed locally is consumed by businesses (the purchase of inputs from local suppliers) but households consume the majority. These data suggest that most manufacturing industries (electronics, pulp and paper, wood products and other manufacturing) serve export markets, while most service industries (health care, utilities, retail trade) serve primarily local markets. In between, there are some industries that export roughly the same amount of services that they sell locally, including food processing, agricultural services, transportation and wholesaling. It's important to keep in mind that in this context many of the "exports" from the metropolitan area are sales to businesses and households located in elsewhere in Oregon and in Southwest Washington, but outside the four metro area counties.

*Table 3.4: Share of Local Output Consumed Locally, 1982. Portland Metropolitan Area (Four Counties)*

| Industry | % Consumed Locally |
|---|---|
| Pulp & Paper | 0% |
| Other Manufacturing. | 30% |
| Electronics | 33% |
| Wood Products | 38% |
| Communications | 41% |
| Food Processing | 52% |
| Agricultural Services | 53% |
| Transportation | 53% |
| Wholesale Trade | 59% |
| Mining | 60% |
| Other Services. | 65% |

| Industry | % Consumed Locally |
|---|---|
| Business Services | 68% |
| Eating Drinking & Lodging | 76% |
| Financial Services | 84% |
| Insurance & Real Estate | 86% |
| Retail Trade | 87% |
| Utilities | 88% |
| Construction | 95% |
| Health Services | 96% |

*Source: Estimates of local consumption based on data in Holland, Weber & Waters, Table 3*

**Data Sources:**

- Holland, David, Bruce Weber and Edward Waters, "Modeling the Economic Linkage Between Core and Periphery Regions: The Portland, Oregon, Trade Area, Oregon State University Graduate Faculty of Economics, Working Paper 92-103

**Spreadsheet:**

- Implan Analysis.xls

# C. ANALYSIS OF THE REGION'S FIFTY LARGEST FIRMS

To gauge the contribution of the region's largest firms to economic expansion over the past decade, we undertook a detailed examination of the employment records of the fifty largest employers in the Portland metropolitan economy between 1986 and 1996.

The attached data show total employment in the metro area for 1986 and 1996, and show the employment contribution of the region's top 50 firms in 1986, and the employment of those same 50 firms (or their legal successors) in 1996.

*Table 3.5 Change in Employment among 50 largest firms by Industry, 1986 to 1996*

| Industry | 1986 | 1996 | Diff. | % |
|---|---|---|---|---|
| Retail | 20,933 | 26,467 | 5,534 | 26% |
| Electronics | 20,340 | 15,346 | (4,994) | -25% |
| Health | 18,548 | 21,224 | 2,676 | 14% |
| Utilities | 11,065 | 8,308 | (2,757) | -25% |
| Metals/machinery/ transportation equipment | 9,355 | 9,883 | 528 | 6% |
| Finance | 8,761 | 10,268 | 1,507 | 17% |
| Paper | 5,500 | 3,435 | (2,065) | -38% |
| Other | 4,713 | 6,143 | 1,430 | 30% |
| Transportation | 4,174 | 6,712 | 2,538 | 61% |
| Total | 103,389 | 107,786 | 4,397 | 4% |

Source: Top 50 Businesses.xls, Industry tab

- 1986's Top 50 firms:
- accounted for only 2% of the net job growth between 1986 and 1996
- added 5,200 net jobs between 1986 and 1996; combined, all other businesses added nearly 283,000 jobs
- grew only one-tenth as fast as all other firms in the regions (including the net impact of closings of other firms and starting of new business)
- accounted for 16% of regional employment in 1986; those same firms accounted for 12% of employment in 1996

Over the decade 1986 to 1996, total private employment in the region increased by slightly less than 300,000 workers, from 640,000 workers to nearly 930,000 workers. Overall, private sector employment increased 45% during the decade.

In 1986, the region's fifty largest firms accounted for slightly more than 100,000 of the region's 639,000 private sector employees. The total employment levels of these same fifty firms by 1996 had increased to nearly 108,000, an increase of five percent over the decade. This increase was composed, of course, of the net effect of employment increases at some firms and employment declines at others. Collectively, the employment change at all the other businesses in the region (including the net effects of expansions and contractions at firms that existed in 1986 that survived through 1996, the addition of jobs at start-ups and the loss of jobs at firms that ceased to exist over the decade), accounted for an increase of more than 280,000 jobs, growing from nearly 540,000 in 1986 to about 820,000 in 1996. Hiring at firms other than the fifty largest of 1986 accounted for 98% of all the net job growth in the region over the decade. Collectively, the fifty largest firms accounted for only two percent of the job growth. The firms that were the region's largest expanded their employment only about a tenth as fast as hiring in the rest of the region's economy (5% over the decade for the fifty largest firms versus 54% for the balance of the economy).

The result of the slow growth of the fifty largest firms (as a group) coupled with actual employment declines for several of these firms, meant that other firms entered the list of the top fifty over the course of the decade. By 1996, the Business Journal's list of the region's fifty largest firms looked somewhat different than it had a decade earlier. 6% of firms had left the list, while 28% of firms were new to it.

| | No. of Firms | % |
|---|---|---|
| Still on Top 50 List in 1996 | 37 | 74% |
| Merged so still in Top 50 | 11 | 22% |
| Employment dropped below Top 50 | 5 | 10% |
| Out of business/ moved | 3 | 6% |
| New companies for 1996 Top 50 | 14 | 28% |

*Table 3.6 Overall Private Sector Employment and Employment at the 50 largest firms, Portland Metropolitan Area, 1986 and 1996*

| | 1986 | 1996 | Growth | + % |
|---|---|---|---|---|
| Total MSA | 639,473 | 927,542 | 288,069 | 45% |
| Top 50 (86) | 102,718 | 107,927 | 5,209 | 5% |
| All other | 536,755 | 819,616 | 282,861 | 53% |

*Table 3.7 Percentage contribution of 50 largest firms and all firms to employment and employment growth, Portland Metropolitan Area, 1986 and 1996 Percent of Metro Jobs*

| | 1986 | 1996 | Growth |
|---|---|---|---|
| Total MSA | 100% | 100% | 100% |
| Top 50 (86) | 16% | 12% | 2% |
| All other | 84% | 88% | 98% |

Methodology:

Examining the employment contribution of the region's fifty largest firms to employment growth over the past decade required tracking individual firms' employment levels over this time period. We began with the list of the 50 largest private employer's published by the Business Journal in 1986. These records were compiled from the Business Journal staff's own original research. (Unlike state employment tax records, which cannot be published with identifying information for individual firms, the Business Journal is free to associate names with employment levels. We then obtained employment department records for these same firms for calendar year 1996.)

Not all of the employers who were listed among the region's fifty largest employers in 1986 remained in business in 1996. Some firms had gone out of business, while others changed corporate identities or merged into other businesses. We tracked employment for merged firms and firms that underwent a change of corporate identity over that time period, and computed their employment in 1996.

Data Source:

- 1985, 1986, 1996 Business Journal Research
- 1996 employment department records

Worksheet:

- Top 50 Businesses.xls, Industry tab

## D. PORTLAND AS A MANUFACTURING CENTER

One of the key sources of economic activity in any urban area is the presence of manufacturing firms. Because most manufacturing activities tend to be traded or export sectors of the local economy, their growth can play a key role in driving the local economy. Growth in employment in manufacturing in the United States has generally been stagnant over the past two decades. Major industrial centers, particularly in the East and Midwest have lost thousands of jobs in traditional heavy industries like steel and automobiles. At the same time, new manufacturing industries (particularly in high technology) and new manufacturing centers (especially metropolitan areas in the South and West) have emerged.

Manufacturing employment has been growing in Portland at a time when overall growth has been weak nationally.

*Table 3.8 Manufacturing Employment in the United States and Portland - 1969 to 1995*

| Year | PDX | US |
|---|---|---|
| 1969 | 99,644 | 20,546,000 |
| 1970 | 93,882 | 19,687,300 |
| 1971 | 92,057 | 18,854,700 |
| 1972 | 96,175 | 19,345,800 |
| 1973 | 104,788 | 20,413,200 |
| 1974 | 107,874 | 20,400,600 |
| 1975 | 99,951 | 18,654,700 |
| 1976 | 103,979 | 19,372,500 |
| 1977 | 109,687 | 20,090,300 |
| 1978 | 119,370 | 20,967,800 |
| 1979 | 127,507 | 21,497,200 |
| 1980 | 125,496 | 20,780,900 |
| 1981 | 119,823 | 20,663,000 |
| 1982 | 109,858 | 19,270,200 |

| Year | PDX | US |
|---|---|---|
| 1983 | 106,163 | 18,921,900 |
| 1984 | 113,783 | 19,883,200 |
| 1985 | 115,513 | 19,779,000 |
| 1986 | 113,538 | 19,489,600 |
| 1987 | 117,347 | 19,551,800 |
| 1988 | 124,374 | 19,886,000 |
| 1989 | 128,623 | 19,997,600 |
| 1990 | 130,770 | 19,634,600 |
| 1991 | 129,015 | 19,024,700 |
| 1992 | 127,769 | 18,710,900 |
| 1993 | 131,787 | 18,736,100 |
| 1994 | 138,901 | 19,029,100 |
| 1995 | 145,124 | 19,225,900 |

Source: Bureau of Economic Analysis, Regional Economic Information System

The historical data show that Portland experienced a boom in manufacturing employment corresponding to the economic boom of the late 1970s, and that the region's manufacturing employment fell sharply during the early 1980s. Nationally, the pattern was somewhat similar, as US manufacturing employment reached its all time historical high in 1979, with nearly 21.5 million manufacturing workers. Nationally and in Oregon manufacturing employment rebounded somewhat after 1983, with Portland reaching its pre-recession level of manufacturing employment in 1989, while the US still had 1.5 million fewer manufacturing jobs than it had a decade earlier. The 1990s show a sharp divergence in the pattern of growth. Between 1990 and 1996, Portland added 15,000 new manufacturing jobs. Due to the national recession, the nation as a whole actually had fewer manufacturing jobs in 1996 than it had in 1990.

*Table 3.9 US Metropolitan Statistical Areas, Ranked by Number of Manufacturing Workers, 1996*

| Rank | Metro Area | Manufacturing |
|---|---|---|
| 1 | Los Angeles | 673,417 |
| 2 | Chicago | 669,658 |
| 3 | Boston | 467,900 |
| 4 | Detroit | 457,792 |
| 5 | New York | 346,352 |
| 6 | Philadelphia | 318,571 |
| 7 | Minneapolis | 285,170 |
| 8 | Dallas | 245,005 |
| 9 | San Jose | 240,531 |
| 10 | Cleveland | 233,445 |
| 11 | Atlanta | 222,880 |
| 12 | Orange Co. | 221,483 |
| 13 | St Louis | 209,299 |
| 14 | Seattle | 198,758 |
| 15 | Houston | 198,189 |
| 16 | Milwaukee | 182,594 |
| 17 | Charlotte | 156,129 |
| 18 | Phoenix | 155,510 |
| 19 | Grand Rapids | 154,440 |
| 20 | Portland | 145,124 |

| Rank | Metro Area | Manufacturing |
|---|---|---|
| 21 | Cincinnati | 145,009 |
| 22 | New Haven | 144,138 |
| 23 | Newark | 143,335 |
| 24 | Pittsburgh | 138,051 |
| 25 | Greenville Spartanburg | 131,319 |
| 26 | Rochester | 131,126 |
| 27 | Indianapolis | 129,430 |
| 28 | San Diego | 126,441 |
| 29 | Oakland | 114,949 |
| 30 | Kansas City | 111,256 |
| 31 | Baltimore | 107,180 |
| 32 | Washington DC | 102,162 |
| 33 | Columbus | 96,685 |
| 34 | Denver | 94,279 |
| 35 | Buffalo | 94,078 |
| 36 | Tampa | 91,079 |
| 37 | Raleigh Durham | 88,519 |
| 38 | Salt Lake City | 81,963 |
| 39 | Austin | 70,174 |
| 40 | Sacramento | 45,259 |

Source: Bureau of Economic Analysis Data, tabulated by Dismal Sciences. http://www.dismal.com/regions/

While the largest manufacturing centers remain the large metro areas (Los Angeles, Chicago, Detroit, Boston), a number of smaller cities have increased their standing through growth in the past two decades. Portland now ranks twentieth among US metro areas in the number of manufacturing employees, ahead of traditional industrial powerhouses like Pittsburgh and Baltimore.

**Data Sources:**
- Bureau of Economic Analysis, Regional Economic Information System
- Bureau of Economic Analysis Data, tabulated by Dismal Sciences. http:// www.dismal.com/ regions

**Spreadsheet:**
- PDXIncome.xls
- BEA6995.XLS, tab: PDXvUSData
- Manufacturing Centers Comparison.xls

## E. SECTORAL GROWTH

***What has propelled Portland's growth over the past decade?***



To understand the shift in share of Portland industries, it is helpful to begin by examining sectoral growth patterns: the variations in average annual rates of earnings increases for selected industries between 1985 and 1995. Overall, total earnings in the US increased by 5.7% per year during this period, while they increased by 7.8% per year in the Portland metropolitan area. (This faster rate of earnings increase is what caused Portland's share of national earnings to rise from .59% in 1985 to .73% in 1995).

As a rule, total earnings increased faster in Portland than in the rest of the country in almost every major industry group. But the pattern of increases varies substantially from industry to industry.

Several industries grew much faster in Portland than they did in the rest of the country. In electronics (SIC 36) total earnings increased an average of 14% per year over this decade, compared with a meager 1.2% annual increase for the US. Air transportation in Portland increased even faster, at nearly 15% per year, more than twice as fast as the national increase of slightly more than 6% per year. (These fast growing industries are listed in Table 1). Portland's construction industry grew two and one half times faster than in the rest of the nation between 1985 and 1995. This decade represented a dramatic turnaround both for the US and for the nation. From 1985 to 1995, Portland's construction sector outperformed the rest of the regional economy, growing 10.7% per year compared to regional earnings growth of 7.8% annually. Over the same period nationally, construction under-performed the economy, growing at 4.1%, compared to overall growth of 5.7%.

In the mid 1980s, Portland's economy was still languishing after the effects of the severe 1979 to 1982 recession, and population and employment had barely reached pre 1979 levels, so construction demand was limited. Meanwhile the rest of the country was doing much better, propelled in part by increased defense spending that scarcely affected Oregon. By the late 1980s and early 1990s, the situation was reversed. The savings and loan collapse affected large parts of the South and West, and defense spending cutbacks, followed by a national recession in 1991, cut heavily into construction activity. Oregon, however, saw substantial in-migration and growth in the late 1980s and early 1990s, and largely avoided the national recession. The dramatic increase in Portland's share of national construction activity was thus the combined result of abnormally low construction activity in Portland in the mid 1980s, coupled with a national boom, while in the period 1985 to 1995, Portland's construction activity was unusually strong at a time while the national economy's construction activity was weak.

Other sectors of the Portland economy that substantially outpaced their national counterparts included other transportation equipment, agricultural services and business services. Of these, business services was the largest employer. According to Employment Department data, the largest growth components of business services (SIC 73) during this time period were temporary help supply services (SIC 736) and software and computer services (SIC 737). It is reported that the largest single customer of temporary help supply services in the Portland area is the high tech industry. This makes it likely that the growth in business services over this decade is closely related to the expansion of electronics.

*Table 3.10 Leading Sectors of Portland Economy (Ranked by Growth Differential v. US)*
*Annual Average Rate of Earnings Increase in Selected Sectors*

| Industry | Portland Growth Rate | US Growth Rate | Difference |
|---|---|---|---|
| Electronic and other electric equipment | 14.3% | 1.2% | 13.0% |
| Transportation by air | 14.9% | 6.2% | 8.8% |
| Construction | 10.7% | 4.1% | 6.6% |
| Other transportation equipment | 7.8% | 1.3% | 6.5% |
| Agricultural Services, forestry, fishing, and other | 12.7% | 8.0% | 4.6% |
| Business services | 11.2% | 7.0% | 4.3% |

(Growth in total earnings, 1985 to 1995, expressed at an annual rate)

Source: calculations based on Bureau of Economic Analysis earnings data

Clearly, high technology industries and a construction boom led the Portland economy's growth in the decade 1985 to 1995. Other sectors of the economy moved in virtual lockstep with overall economic activity. Earnings in retail trade, for example grew slightly more slowly than the economy in both Portland and in the US. Earnings in eating and drinking establishments grew at nearly the same rate as the overall economy in both Portland, (8.0% v. 7.8% per year) and the US (5.8% v. 5.7%).

While several sectors of the Portland economy outperformed the region as a whole, others grew even more slowly than the region (although many performed better than their national counterparts). Slower growing industries are shown in Table 3.11. Transportation and public utilities grew at about 6%, mining declined, and government and government enterprises grew more slowly than the overall economy. In the nation, earnings in government grew at just about the same rate as the overall economy–government grew 5.5% per year, while all earnings grew 5.7% per year. In Portland, government earnings grew much more slowly than the overall economy, 5.9% per year v. 7.8% growth in the overall economy.

*Table 3.11 Lagging Sectors of Portland Economy (Ranked by Growth Differential v. US)*
*Annual Average Rate of Earnings Increase in selected sectors*

| Industry | Portland Growth Rate | US Growth Rate | Difference |
|---|---|---|---|
| Transportation and public utilities | 5.9% | 5.3% | 0.6% |
| Mining | -0.1% | -0.6% | 0.5% |
| Government and government enterprises | 5.9% | 5.5% | 0.4% |
| Health services | 8.7% | 8.7% | 0.0% |

(Growth in total earnings, 1985 to 1995, expressed at an annual rate)

Source: Calculations based on Bureau of Economic Analysis earnings data

One of the most striking observations is the health care sector. The period 1985 to 1995 was marked by very rapid expansion of the health care sector nationally–earnings grew by an average of 8.7% per year during the decade. But despite the fact that Portland population and economy grew faster than the nation as a whole, earnings in health care grew no faster than in the rest of the country. Thus while Portland increased its share of the nation's population and income, its share of total health care earnings remained unchanged. While the explanation for this observation would require a detailed analysis of Portland's health care industry, it is consistent with the hypothesis that health care in Portland was much more efficient than in the rest of the country over this time period.

**Data Sources:**

- Bureau of Economic Analysis, Regional Economic Information System, earnings data

**Worksheets:**

- BEA6995.xls

## F. SHIFT-SHARE ANALYSIS

Another way to look at these data is to look at the change in Portland's share of national earnings. National forces propel the overall direction and composition of economic growth, but they don't act equally in every area. Shift-share analysis measures how much the changes in the Portland economy are similar to or different from changes in the national economy.

Overall, if Portland grows faster than the nation, its share of national economic activity increases. Conversely, if Portland grows more slowly than the nation, its share decreases. Between 1985 and 1995, Portland's share of total US earnings increased from 0.59% to 0.73%. That is, Portland accounted for less than six tenths of one percent of all earnings in 1985 and slightly more than seven tenths of one percent of all earnings in 1995. This represents about a 23% increase in Portland's share of national economic activity.

Metropolitan Portland's share of earnings in major industries varies substantially from industry to industry. While we account for about 0.73% of all earnings, we have a much larger share in some industries, such as wood products (1.49%) and electronics (1.62%), and a much smaller share in other industries, such as mining (0.11%), and non-durable manufacturing (0.50%). In most industries, Portland's share of national earnings is roughly the same as the regional economy's share of national earnings. For example, retail and service earnings have always closely paralleled Portland's share of US personal income.

Shift-share analysis indicates those industries in which Portland is increasing its share of overall national earnings. Table 3.12 shows earnings patterns over two ten-year periods, 1975 to 1985 and 1985 to 1995. These two periods represent very different points in the economic cycle. The 1975 to 1985 period was a boom (1975 to 1978), bust (1979 to 1982) and recovery (1982 to 1985). The 1985 to 1995 period represented a period of strong growth, interrupted by only a very brief and mild national recession in 1991 (one that only grazed the Portland economy).

Portland's share of national earnings declined slightly over the ten-year period from 1975 to 1985, reflecting the region's economic roller coaster ride. Portland's share of US non-farm earnings was 0.61% in 1975 and 0.59% in 1985. The economic downturn was driven by declines in share in lumber and wood products manufacturing, transportation equipment, and construction (all down 0.15% or more). These declines reverberated through other sectors of the local economy, producing declining shares of earnings in air transportation, eating and drinking and hotel and motel sectors. Overall, shares of earnings in wholesale, retail and services also declined slightly. Notably, however, one sector of the economy did show a gain in earnings relative to the nation over this period: electronics, which increased its share of US earnings by 0.29%.

*Table 3.12 Industries with the Largest Declines in Share of Earnings, 1975 to 1985*

| Industry | Percent Decline |
|---|---|
| Lumber | -0.46% |
| Other transportation equipment | -0.32% |
| Construction | -0.15% |
| Eating and drinking | -0.10% |

| Industry | Percent Decline |
|---|---|
| FIRE | -0.10% |
| Hotel and motel | -0.10% |
| Air transportation | -0.09% |

The period 1985 to 1995 represents almost the mirror image of the pattern of the previous decade. Overall, Portland's share of national earnings increased from .59% to .73%. Portland gained share in almost every single industry group (excepting lumber and wood products manufacturing, which continued its pattern of declining shares of US income). Led by a rebound in construction, continued expansion in electronics, and a notable gain in air transportation (all up more than .35% over the decade).

*Table 3.13 Industries with the Largest Increases in Share of Earnings 1985 to 1995*

| Industry | Percent Increase |
|---|---|
| Electronics | 1.18% |
| Construction | 0.47% |
| Air transportation | 0.39% |
| Agricultural services | 0.34% |
| Business services | 0.29% |
| Other transportation equipment | 0.25% |
| Wholesale | 0.23% |

*Table 3.14 Shift in Share of US Earnings, 1975-85 and 1985-95, Selected Industries*

| | Portland Share of US Earnings | | | Shift in Share | |
|---|---|---|---|---|---|
| | 1975 | 1985 | 1995 | 1975-85 | 1985-95 |
| Population (000's) | 0.55% | 0.58% | 0.65% | 0.03% | 0.07% |
| Personal income | 0.60% | 0.59% | 0.69% | -0.01% | 0.10% |
| Non-farm earnings | 0.61% | 0.59% | 0.73% | -0.02% | 0.14% |
| Agricultural services | 0.59% | 0.58% | 0.92% | -0.02% | 0.34% |
| Mining | 0.10% | 0.11% | 0.11% | 0.00% | 0.01% |
| Construction | 0.66% | 0.50% | 0.97% | -0.15% | 0.47% |
| Manufacturing | 0.56% | 0.57% | 0.76% | 0.02% | 0.19% |
| Durables | 0.61% | 0.64% | 0.93% | 0.03% | 0.29% |
| Non-durables | 0.47% | 0.46% | 0.50% | -0.01% | 0.04% |
| Lumber | 2.46% | 2.00% | 1.49% | -0.46% | -0.51% |
| Electronics | 0.15% | 0.44% | 1.62% | 0.29% | 1.18% |
| Fabricated metals | 0.59% | 0.55% | 0.70% | -0.04% | 0.15% |
| Other transportation equipment | 0.59% | 0.27% | 0.52% | -0.32% | 0.25% |
| Printing and publishing | 0.42% | 0.51% | 0.65% | 0.09% | 0.14% |
| Transportation, communication | 0.71% | 0.72% | 0.76% | 0.01% | 0.04% |
| Air transportation | 0.36% | 0.28% | 0.66% | -0.09% | 0.39% |
| Wholesale | 0.86% | 0.84% | 1.06% | -0.03% | 0.23% |
| Retail | 0.67% | 0.63% | 0.78% | -0.04% | 0.14% |
| Eating and drinking | 0.73% | 0.63% | 0.79% | -0.10% | 0.16% |
| FIRE | 0.66% | 0.57% | 0.69% | -0.10% | 0.12% |
| Services | 0.62% | 0.59% | 0.69% | -0.02% | 0.09% |
| Business services | 0.54% | 0.54% | 0.83% | 0.00% | 0.29% |
| Hotel and motel | 0.50% | 0.40% | 0.54% | -0.10% | 0.14% |
| Health | 0.67% | 0.66% | 0.66% | -0.01% | 0.00% |
| Government | 0.52% | 0.54% | 0.56% | 0.02% | 0.02% |

Source: Calculations based on Bureau of Economic Analysis Regional Economics Information System earnings data; issued August 1997. (Note: share of lumber and wood products earnings for 1985 is not available due to data suppression by BEA; the 1985 figure is estimated.)

## Data Sources:

- Bureau of Economic Analysis, Regional Economics Information System, earnings data, issued August 1997

## Worksheet:

- PDXIncome6995.xls, tab y-growth, tab shiftshare

## G. LOCATION QUOTIENTS

Portland's mix of industries is different from the mix found nationally or in other metropolitan areas. Some industries are more concentrated in Portland than they are in the nation as a whole; others are less concentrated here. The extent to which the Portland economy's mix of industries resembles the national mix can be analyzed by computing the location quotient of each industry.

The location quotient is the ratio of the fraction of economic activity accounted for by a particular industry in a region divided by the fraction of the national economy accounted for by that same industry. If an industry accounts for the same fraction of the regional economy that it does the national economy, we say that it has a location quotient of 1. For example, if the share of regional employment made up by apparel and accessory stores was 1.01% in Portland and 1.01% nationally, then the location quotient for this industry would be one. Industries with that make up a larger fraction of the local economy than they do of the national economy have a location quotient larger than one. For example, crop production makes up 1.34% of the Portland economy but only .45% of the US economy, which means that the location quotient for crop production in Portland is 2.98–so the industry is about three times more concentrated in Portland than it is on average in the US economy.

To get some idea of those major two-digit industries that are most concentrated in Portland (as opposed to other parts of the US) Table 3.15 presents industries ranked by their 1996 location quotient. Somewhat surprisingly two resource-based industries–forestry and crop production– have the highest location quotients of any of the region's two digit industries. In part, these numbers reflect the roles that these industries, particularly nursery crops and forest products management, play in the regional economy.

However, there is a bit of a statistical artifact in this high location quotient. All these location quotients are calculated based on covered employment, the number of workers subject to state unemployment insurance laws. The exact extent of coverage varies from state to state, and many states have chosen not to extend coverage to agricultural workers. In part, Oregon's high location quotient reflects the fact that many states do not cover agricultural workers. This also affects some forestry activities, like tree-planting and tree nurseries that are treated as agricultural activities.

*Table 3.15 Top Ten Two-Digit Industries Ranked by Location Quotient, Portland Metropolitan Area, 1996*

| SIC | Industry | Location Quotient | Employment |
|---|---|---|---|
| 8 | Forestry | 4.458 | 1,115 |
| 1 | Crop production | 2.981 | 11,412 |
| 36 | Electrical mach. | 2.377 | 25,509 |
| 44 | Water transp. | 1.804 | 2,453 |
| 33 | Primary metals | 1.673 | 8,013 |
| 45 | Air transp. | 1.526 | 9,173 |
| 26 | Paper and allied | 1.500 | 6,437 |
| 38 | Instruments | 1.454 | 8,962 |
| 84 | Museums | 1.443 | 1,050 |
| 17 | Building trades | 1.441 | 34,103 |
| 24 | Lumber and wood | 1.397 | 7,868 |

Sources: computations based on employment data provided by the Oregon Employment Department (Clackamas, Multnomah, Washington and Yamhill Counties), the Washington State Employment Security Department (Clark County)

Other industries with high location quotients reflect the region's economic specialization. The hub of a major West Coast port with both extensive ocean going and river barge traffic, Portland has a high location quotient for water transportation. (Inland states like Colorado or New Mexico with no seaports or navigable waterways for example would have extremely low location quotients in this industry). Among manufacturing industries, Portland has high location quotients for electrical machinery (2.4), primary metals (1.7), paper production (1.5), instruments (1.5) and lumber and wood products (1.4). Other sectors with high location quotients reflect the role of the metropolitan area as a transportation hub (the location quotient for air transport is 1.5) and cultural center (the location quotient for museums is 1.4) for much of Oregon and southwest Washington.

Not all of the region's industries with high location quotients are large sources of employment in the region. In fact, many of the region's industries that employ a large fraction of the region's workers have location quotients near or below one. This reflects the fact that most employment in any metropolitan economy is in those sectors that are found in virtually every metropolitan area, which are evenly distributed across the nation. For the most part these industries are the kinds of retail and service sectors that serve the local population. Table 3.16 shows the employment levels and location quotients of the region's ten largest two-digit industries. Though health care, for example, is the region's largest single two-digit industry, it has a location quotient far less than one (0.75) indicating Portland is less specialized in health care than the nation's economy as a whole. Actually, given that health care is a local industry (largely if not exclusively serving the needs of the local population) this low location quotient may be an indicator of the relative efficiency of the region's health care providers (i.e. meeting the health needs of the population with proportionately fewer employees than one finds on average across the US).

The fact that Portland has a location quotient for eating and drinking establishments just about equal to one reflects that restaurants and similar establishments are fairly evenly distributed according to population, rather than being concentrated in particular metropolitan areas.

*Table 3.16 Top Ten Two-Digit SIC Industries, Ranked by Number of Employees, Portland Metropolitan Area, 1996*

| SIC | Industry | Location Quotient | Employment |
|---|---|---|---|
| 80 | Health | 0.741 | 59,475 |
| 73 | Business svcs. | 1.137 | 58,506 |
| 58 | Eating and drinking | 1.028 | 57,095 |
| 82 | Education | 0.739 | 52,081 |
| 50 | Durable whlslng. | 1.334 | 37,482 |
| 17 | Bldg. Trades | 1.441 | 34,103 |
| 51 | Non-durable wholesaling | 1.289 | 25,915 |
| 36 | Electrical mach. | 2.377 | 25,509 |
| 83 | Social services | 1.102 | 21,913 |
| 54 | Food stores | 0.815 | 20,557 |

Sources: computations based on employment data provided by the Oregon Employment Department (Clackamas, Multnomah, Washington and Yamhill Counties), the Washington State Employment Security Department (Clark County)

Taking a look at these industries at the four-digit SIC level as shown in Table 3.17 can provide a more detailed picture of Portland's industrial composition. Some major subsectors are buried within broader industrial classifications. In several cases, the location quotients for large four-digit industries suggest that Portland is much more concentrated in specific segments of an industry than it is in the overall industry. For example, while the two-digit industrial data indicate that Portland is about 2.5 times more specialized in electrical machinery than the average area, the four digit industry data suggest that Portland is nearly nine times more concentrated in the semiconductor industry than is the national economy. In another instance, an examination of the four-digit industrial detail shows that the production of some services is organized differently in Portland than in the rest of the nation. While Portland's overall location quotient for health care, SIC 80, is .74, the location quotient for doctor's offices and clinics is 1.15, and that for hospitals is only .69. This suggests that relative to most metro areas, more health care is delivered through employees of clinics and doctors offices than through hospitals.

*Table 3.17 Largest Four-Digit Private Sector Industries, Portland Metropolitan Area, Ranked by 1996 Employment*

| SIC | Industry | Location Quotient | 1996 Employment |
|---|---|---|---|
| 5812 | Eating and drinking places | 0.967 | 53,709 |
| 8211 | Elementary and secondary schools | 0.632 | 30,366 |
| 7363 | Help supply services | 1.433 | 23,662 |
| 8062 | General medical and surgical hospitals | 0.696 | 23,589 |
| 5411 | Grocery stores | 0.811 | 18,239 |
| 3674 | Semiconductors and related sevices | 8.943 | 15,858 |
| 5311 | Department stores | 0.860 | 15,284 |
| 8221 | Colleges, Universities and professional schools | 0.967 | 15,219 |
| 8011 | Offices and clinics of Doctors of medicine | 1.145 | 13,958 |
| 6021 | National commercial banks | 1.798 | 11,870 |
| 7011 | Hotels and motels | 0.763 | 9,241 |
| 4213 | Trucking, except local | 1.335 | 8,343 |
| 5511 | Motor vehicle dealers (new and used) | 1.025 | 7,694 |
| 1711 | Plumbing, heating and air-conditioning | 1.415 | 7,603 |
| 8322 | Individual and family social services | 1.174 | 7,310 |
| 8711 | Engineering services | 1.421 | 7,089 |

*Sources: Computations based on employment data provided by the Oregon Employment Department (Clackamas, Multnomah, Washington and Yamhill Counties), the Washington State Employment Security Department (Clark County)*

We can identify those specific industries that are most distinctively clustered in the Portland Metropolitan area by examining four digit industries with very high location quotients. Those four digit industries with location quotients in excess of 4.0 are listed in Table 3.18. (Exact data on employment levels and location quotients are not shown to protect the confidentiality of individual firms; in some cases all or nearly all of the employment in a sector in the Metropolitan area is in just one or two firms.) These intensely concentrated industries fall into four broad categories, agriculture forestry and food processing, metals, machinery and transportation equipment, electronics, computers and instruments, and other industries.

*Table 3.18 Four-Digit Industries with Location Quotients Exceed 4.0, Portland Metropolitan Area*

| SIC | Industry | Location Quotient | 1996 Employment |
|---|---|---|---|
| Agriculture, forestry and food processing | | | |
| 171 | Berry crops | 14.281 | 3,127 |
| 181 | Ornamental floriculture and nursery products | 4.955 | 5,155 |
| 811 | Timber tracts | 6.440 | 795 |
| 831 | Forest nurseries and gathering of forest | 5.353 | 86 |
| 2095 | Roasted coffee | 4.090 | 296 |
| Metals, machinery and transportation equipment | | | |
| 3324 | Steel investment foundries | 16.812 | 1,966 |
| 3325 | Steel foundries, NEC | 6.746 | 1,376 |
| 3334 | Primary production of aluminum | 4.754 | 811 |
| 3369 | Nonferrous foundries, except aluminum and | 10.081 | 496 |
| 3421 | Cutlery | 7.884 | 703 |
| 3425 | Saw blades and handsaws | 20.993 | 1,139 |
| 3537 | Industrial trucks, tractors, trailers, and stackers | 4.450 | 978 |
| 3553 | Woodworking machinery | 9.748 | 830 |
| 3743 | Railroad equipment | 4.266 | 1,175 |
| 4741 | Rental of railroad cars | 6.817 | 115 |
| Computers, electronics and instruments | | | |
| 3577 | Computer peripheral equipment, NEC | 9.757 | 4,446 |
| 3674 | Semiconductors and related devices | 8.943 | 15,858 |
| 3677 | Electronic coils, transformers, and other | 7.161 | 1,006 |
| 3825 | Instruments for measuring and testing of | 8.538 | 4,556 |
| 3827 | Optical instruments and lenses | 4.053 | 555 |
| 3843 | Dental equipment and supplies | 9.366 | 978 |
| Other industries | | | |
| 2231 | Broadwoven fabric mills, wool (including | 4.505 | 523 |
| 2674 | Uncoated paper and multiwall bags | 5.263 | 731 |
| 5139 | Footwear wholesaling | 22.176 | 4,350 |
| 7822 | Motion picture and video tape distribution | 4.443 | 535 |
| 8661 | Religious organizations | 5.665 | 4,942 |
| 1429 | Crushed and brokenstone, NEC | 6.992 | 409 |

Sources: computations based on employment data provided by the Oregon Employment Department (Clackamas, Multnomah, Washington and Yamhill Counties), the Washington State Employment Security Department (Clark County)

Among two-digit industries shown in Table 3.19, location quotients range from 0.35 for the chemical industry (indicating that chemicals production is one-third as concentrated in the Portland metropolitan area as it is nationally, to 4.46 for forestry (meaning that forestry is four and one-half times more concentrated in the Portland metro area than elsewhere).

Most of the Portland area's largest local two digit industries consist of sectors with location quotients near one or below, suggesting that the region is not highly specialized in these activities. A number of these sectors serve principally local markets, such as health care, eating and drinking establishments, social services and food stores.

Business services has a location quotient in excess of one (1.14), but this relatively high location quotient is due to a very high representation in two sub-sectors of business services, temporary employment (SIC 736) with a location quotient of 1.32, and software and computer services (SIC 737) with a location quotient of 1.34. The location quotients of the remaining components of business services are near or below one.

Portland's strong level of construction activity is reflected in the location quotient for the building trades (SIC 17), where Portland is more than 40% more concentrated that the nation as a whole.

Portland also has a high location quotient in durable (SIC 50) and non-durable (SIC 51) wholesaling. Both are approximately 30% more concentrated in the region than they are as in the nation as a whole. An examination of the subcomponents of the wholesale industry shows that Portland has location quotients in excess of most durable goods. Portland's strengths in wholesaling are, however, the product of a variety of influences, including the distribution of out-bound products, the anomalous classification of one large employer, and the strength of the region's food distribution base. Portland is a national center for the distribution of manufactured wood products, and has a location quotient of 2.46 for this industry. Portland's highest location quotient for a three digit wholesale industry is in apparel--location quotient 3.6–due largely to the classification of Nike as a wholesale firm. Portland is also particularly strong in the distribution of groceries (reflecting the location of large regional distribution facilities like Fred Meyer), as evidenced by a location quotient of 1.53.

*Table 3.19 Estimated Location Quotients for Private Sector Industries in the Portland Metropolitan Area, 1996 (Note: excludes Columbia County)*

| SIC | Industry | Share of Employment | | Location Quotient | 1996 Employment |
|---|---|---|---|---|---|
| | | Portland | US | | |
| 1 | Crop production | 1.34% | 0.45% | 2.98 | 11,412 |
| 2 | Stock production | Not shown due to confidentiality | | | |
| 7 | Agricultural services | 0.77% | 1.57% | 0.49 | 6,587 |
| 8 | Forestry | 0.13% | 0.03% | 4.46 | 1,115 |
| 9 | Fishing | Not shown due to confidentiality | | | |
| 13 | Oil and gas mining | | | | |
| 14 | Non-metal mining | | | | |
| 15 | General const. | 1.30% | 1.06% | 1.22 | 11,086 |
| 16 | Heavy const. | 0.78% | 0.75% | 1.04 | 6,679 |
| 17 | Building trades | 4.00% | 2.77% | 1.44 | 34,103 |
| 20 | Food and kindred | 1.25% | 1.42% | 0.88 | 10,665 |
| 22 | Textiles | 0.20% | 0.23% | 0.90 | 1,735 |
| 23 | Apparel | 0.27% | 0.56% | 0.49 | 2,346 |
| 24 | Lumber and wood | 0.92% | 0.66% | 1.40 | 7,868 |
| 25 | Furniture | 0.27% | 0.42% | 0.63 | 2,291 |
| 26 | Paper and allied | 0.75% | 0.50% | 1.50 | 6,437 |
| 27 | Printing | 1.14% | 1.37% | 0.84 | 9,749 |
| 28 | Chemicals | 0.25% | 0.69% | 0.35 | 2,099 |
| 29 | Petroleum | 0.04% | 0.03% | 1.16 | 336 |
| 30 | Rubber and plastic | 0.75% | 0.86% | 0.88 | 6,439 |
| 31 | Leather | 0.04% | 0.07% | 0.59 | 348 |
| 32 | Stone, clay and glass | 0.35% | 0.41% | 0.86 | 3,023 |
| 33 | Primary metals | 0.94% | 0.56% | 1.67 | 8,013 |
| 34 | Fabricated metals | 1.27% | 1.20% | 1.06 | 10,816 |
| 35 | Machinery | 2.28% | 1.67% | 1.36 | 19,454 |
| 36 | Electrical mach. | 2.99% | 1.26% | 2.38 | 25,509 |
| 37 | Transportation | 1.24% | 1.50% | 0.83 | 10,556 |
| 38 | Instruments | 1.05% | 0.72% | 1.45 | 8,962 |
| 39 | Miscellaneous | 0.33% | 0.31% | 1.05 | 2,787 |
| 41 | Local transit | 0.61% | 0.51% | 1.21 | 5,209 |
| 42 | Trucking/warehousing | 1.90% | 1.65% | 1.15 | 16,246 |
| 43 | Trucking/warehousing | 0.62% | 0.75% | 0.82 | 5,261 |
| 44 | Water transport | 0.29% | 0.16% | 1.80 | 2,453 |
| 45 | Air transport | 1.07% | 0.70% | 1.53 | 9,173 |
| 47 | Transportation services | 0.46% | 0.37% | 1.22 | 3,908 |
| 48 | Communication | 1.01% | 1.16% | 0.87 | 8,599 |
| 49 | Electric/gas util. | 1.06% | 0.99% | 1.07 | 9,008 |
| 50 | Durable wholesaling | 4.39% | 3.29% | 1.33 | 37,482 |
| 51 | Non-durable wholesaling | 3.04% | 2.35% | 1.29 | 25,915 |
| 52 | Building materials–retail | 0.74% | 0.76% | 0.97 | 6,305 |
| 53 | General merchandise | 2.24% | 2.40% | 0.94 | 19,133 |
| 54 | Food stores | 2.41% | 2.95% | 0.82 | 20,557 |
| 55 | Auto dealers | 1.97% | 1.93% | 1.02 | 16,819 |
| 56 | Apparel and acces. | 1.01% | 1.01% | 1.00 | 8,595 |
| 57 | Furnishings | 0.79% | 0.84% | 0.95 | 6,757 |
| 58 | Eating and drinking | 6.69% | 6.51% | 1.03 | 57,095 |
| 59 | Miscellaneous retail | 1.92% | 2.36% | 0.81 | 16,393 |

| SIC | Industry | Share of Employment | | Location Quotient | 1996 Employment |
|---|---|---|---|---|---|
| | | Portland | US | | |
| 60 | Banking | 1.95% | 1.78% | 1.09 | 16,603 |
| 61 | Credit agencies | 0.58% | 0.42% | 1.39 | 4,944 |
| 64 | Insurance agents | 0.58% | 0.62% | 0.94 | 4,910 |
| 65 | Real estate and insurance | 1.65% | 1.23% | 1.33 | 14,044 |
| 62 | Security brokers | 0.28% | 0.45% | 0.62 | 2,419 |
| 63 | Insurance | 1.39% | 1.23% | 1.12 | 11,821 |
| 67 | Holding cos. | 0.22% | 0.18% | 1.23 | 1,847 |
| 70 | Hotel/motel | 1.12% | 1.47% | 0.76 | 9,565 |
| 72 | Personal services | 0.83% | 1.03% | 0.81 | 7,081 |
| 73 | Business services | 6.86% | 6.03% | 1.14 | 58,506 |
| 75 | Auto repair | 1.10% | 0.90% | 1.23 | 9,413 |
| 76 | Miscellaneous repair | 0.34% | 0.32% | 1.08 | 2,934 |
| 78 | Motion pictures | 0.49% | 0.43% | 1.16 | 4,222 |
| 79 | Amusement and rec. | 1.29% | 1.47% | 0.88 | 11,026 |
| 80 | Health | 6.97% | 9.40% | 0.74 | 59,475 |
| 81 | Legal | 0.74% | 0.82% | 0.91 | 6,353 |
| 82 | Education | 6.10% | 8.26% | 0.74 | 52,081 |
| 83 | Social | 2.57% | 2.33% | 1.10 | 21,913 |
| 84 | Museums | 0.12% | 0.09% | 1.44 | 1,050 |
| 86 | Membership orgs. | 1.11% | 0.85% | 1.31 | 9,499 |
| 87 | Engineering and management | 2.29% | 2.49% | 0.92 | 19,582 |
| 88 | Household workers | 0.24% | 0.30% | 0.78 | 2,013 |
| 89 | Miscellaneous | 0.05% | 0.05% | 1.03 | 451 |

Sources: computations based on employment data provided by the Oregon Employment Department (Clackamas, Multnomah, Washington and Yamhill Counties), the Washington State Employment Security Department (Clark County) and US Bureau of Labor Statistics (National totals). Data on some industries suppressed to protect employer confidentiality.

**Data Limitations:**

The employment statistics used for this analysis are aggregated from employer tax records filed for the purposes of computing and collecting unemployment insurance taxes levied by state and federal governments. Because they are based on tax records, they have some limitations that need to be kept in mind, particularly relating to coverage, confidentiality and completeness.

- Coverage: Different states extend their unemployment insurance systems to different groups of industries and workers. While most wage and salary workers in private, for-profit non-agricultural businesses are covered in all states, there are wide variations in some other areas. Many states do not cover workers in agriculture, especially when they are paid on a piecework, rather than an hourly basis. Similarly, in many states, workers for non-profit and religious organizations are exempt from unemployment insurance taxes.

- Completeness: The unemployment insurance tax covers only wage and salary workers. Self-employed individuals are not covered. This is a problem because rates of self-employment vary from state to state and change over time.

- Confidentiality: The confidentiality of information reflecting the employment and payrolls of individual firms is protected by law. In addition, confidentiality restrictions generally prohibit the publication of data for any group of firms that would reveal the position of any individual employer. For some industry groups only one or two firms account for all or nearly all of the employment and payroll. In these cases, data are not shown to protect the confidentiality of individual firm records.

**Methodology:**

Estimates of Metro area employment at the two-, three- and four-digit level were prepared as follows. First, we aggregated firm-level ES 202 data by four-digit SIC code for Clackamas, Multnomah and Washington Counties. These were then combined with four-digit employment totals for Clark County provided by the Washington State Department of Employment Security. These tabulations of employment levels for the five counties at the four-digit level were reaggregated at the three-digit level and then three-digit tabulations were reaggregated at the two-digit level.

**Data Sources:**

- Oregon Employment Department (Clackamas, Multnomah, Washington and Yamhill Counties)
- Washington State Employment Security Department (Clark County)
- US Bureau of Labor Statistics

**Worksheets:**

- PDXEmp by 4 digit SIC.xls, tabs LQ 2, LQ3, LQ4; raw data
- Clark County.xls, mdb

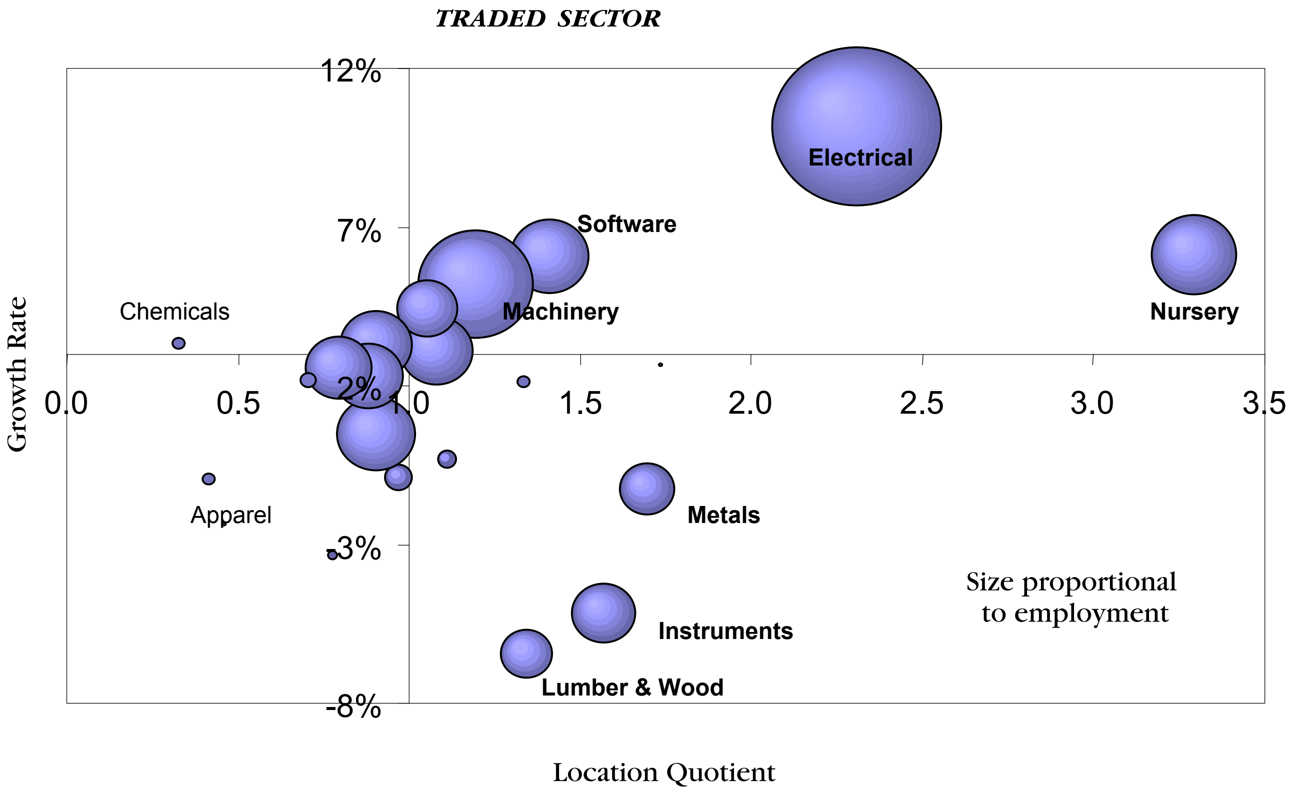
## H. STRATEGIC ANALYSIS

Strategic analysis combines the insights provide by our analysis of location quotients and employment levels with an examination of recent growth trends in major sectors of the economy. The strategic analysis is a graphical representation of which industries are most clearly contributing directly to the expansion of the regional economy.

The graphical analysis of the strategic contribution of the region's major manufacturing industries to regional growth is shown in figure 3.10. The horizontal axis represents the location quotient for each industry sector and illustrates the degree to which firms in the given industry are disproportionately found in the Portland metropolitan area. Industries on the right side of the chart are more concentrated in Portland than in the nation, industries on the left are less concentrated in Portland than the rest of the nation. The vertical axis represents the industry's regionwide growth rate in the Portland metropolitan area over the past six years. Industries above the horizontal line on the chart are growing faster than the region as a whole, industries below the line are growing more slowly (or are contracting). The size of each of the bubbles on the chart is proportional to the total employment in the industry sector–larger bubbles represent more employees, smaller bubbles, fewer. Figure 3.10 shows traded sector industries making a major contribution to the region’s growth. Industries with notable deviations from overall regional economic performances are labeled. Not all industries in Table 3.19 are shown.

In figure 3.10, industries with large bubbles in the upper right hand quadrant of the chart, represent industries which are already large employers in the metropolitan area, industries in which the region is already disproportionately represented, and which are growing faster than the rest of the regional economy. These industries are arguably driving the growth of the region's economy.

*Figure 3.10 Strategic Contribution of Selected Traded Sector Industries in the Portland Metropolitan Economy*




Source: See text

In the opposite quadrant of the diagram, in the lower left-hand corner, are industries that are growing more slowly than the rest of the regional economy and are less represented in the metro area than in the nation as a whole. Interestingly, none of the industries found in this quadrant are particularly large employers. The small industries that are found here, such as apparel, are industries in which the region appears to have little competitive advantage and little stake.

In the lower right hand corner of the diagram are three fairly large industries, metals, instruments and lumber and wood products. These industries are more concentrated in the Portland metropolitan area than in other regions, but their employment has been declining over the past six years. This suggests that the contribution of these industries to the regional economy has been declining, at least in terms of direct employment (it is likely however, that these industries contribute to the region's economy in other ways, i.e. through large payrolls, purchases from suppliers and so on.)

In the upper left hand corner of the diagram are industries which are growing faster than the rest of the regional economy, but which the region does not (yet) have a disproportionate concentration relative to the nation. These industries may represent potential future clusters of economic activity, because industries that grow faster than the regional economy (and faster than their national counterparts) become more concentrated in the region and (by definition) become larger employers.

Many of the region's industries are clustered very near the intersection of the horizontal and vertical axes of the strategic analysis chart. Industries at this location are growing at the same rate as the overall regional economy, and are no more or less) concentrated in the Portland area than in the national economy. Industries found at this location are more likely to be described as "riders", in that their expansion appears to be related to the expansion of the overall economy, rather than a result of Portland's particular specialization in that industry. Most local service industries would be classified as in this location.

In general, growing industries represent greater opportunities for economic development than do declining industries. We use the growth rates in regional employment for the six-year period 1990 to 1996 to classify industries according to their growth trend. If employment increased by less than one percent per year or declined over that five-year period, we classify the industry as lagging. If the industry increased employment, between 1.0% and 4.0% per year, we classify it as “average growth.” Finally, if an industry’s growth exceeds 4.0%, we classify it as “leading.”

### Classifying Industries by Concentration in the Region

We know that industry location patterns tend to be quite durable over time–industries already disproportionately located in the region tend to be better economic development prospects than those who show no affinity for the Portland metropolitan area. We classify industries based on their location quotients. Industries with a location quotient of less than .75 are classified as not concentrated in Portland. Industries with a location quotient between .75 and 1.2, are classified as "balanced," meaning they are just about as likely to be found in the metro area as in the national economy as a whole. Industries with a location quotient of greater than 1.2 are classified as "concentrated" in Portland.

### A Matrix of Strategic Opportunities

We can combine these two factors: growth rates and location quotients to analyze the best opportunities for economic development in the region. We do this graphically by created a three-row by three-column table. The rows of this table correspond to the growth rate in the industry, and the columns corresponding to the concentration of industries in the Portland area. Table 3.20 assigns each private sector two-digit industrial classification to the appropriate cell in this three-by-three matrix. (Due to the data availability, these estimates are based on employment for the Oregon portion of the metropolitan area; industries with fewer than 1,000 employees in 1996 are omitted to protect the confidentiality of firm-level data. Data are for private sector industries only.)

*Table 3.20 Strategic Analysis of Metropolitan Portland Industries Ranked by Growth and Location*

| | Not Concentrated in Portland [Location Quotient less than .75] | Balanced [Location Quotient .75 to 1.2] | Concentrated in Portland [Location Quotient more than 1.2] |
|---|---|---|---|
| Leading [Annual average growth more than 4%, vs. regional average of 3% per year from1990 to 1996.] | Chemicals<br>Fishing<br>Agriculture services<br>Security brokers<br>Household workers | Machinery<br>Fabricated metals<br>Apparel and accessories<br>Food and kindred<br>Professionals<br>Heavy construction<br>Rubber and plastic<br>General construction<br>Amusement and recreation<br>Banking<br>Social<br>Eating and drinking<br>Building material–retail<br>Furnishings | Crop production*<br>Electrical machinery<br>Non-durable wholesaling<br>Transportation services<br>Business services<br>Air transportation<br>Credit agencies<br>Building trades<br>Real estate and insurance<br>Auto repair<br>Motion pictures |
| Lagging [Annual average growth between 1% and 3%] | Hotel/ motel<br>Furniture<br>Personal services<br>Food stores<br>Miscellaneous retail<br>Health | Transportation<br>Printing<br>Stone, clay and glass<br>Trucking/ wholesaling<br>Legal<br>Insurance agents<br>Trucking/ warehousing<br>Communication<br>Auto dealers | Non-metal mining<br>Holding companies<br>Durable wholesaling<br>Membership organizations<br>Local transit<br>Insurance |
| Declining<br><br>[Annual average growth less than 1% or negative] | Textiles<br>Leather<br>Stock production<br>Apparel<br>Oil and gas mining<br>Education | Miscellaneous<br>Paper and allied products<br>Electric/ gas utilities<br>Miscellaneous repair<br>General merchandise | Forestry<br>Primary metals<br>Instruments<br>Lumber and wood<br>Petroleum<br>Water transportation<br>Museums |

Source: Impresa calculations based on ES 202 data.

* not all states in the US cover agricultural workers under covered employment, as a result, the location quotient for crop production may be exaggerated.

This matrix suggests a way of identifying which industries are likely to provide the greatest opportunities for economic development in the region. In general, fast growing industries with a preference for central city location represent the best candidates for development. Table 3.21 summarizes the strategic opportunities for each cell in the matrix.

*Table 3.21 Strategies for Dealing with Various Industries*

| | Non-Concentrated | Balanced | Concentrated |
|---|---|---|---|
| Leading | Despite growth prospects, these industries generally don't locate in the region. | Can you encourage these fast growth industries to do more in the region? | These industries are driving the region; what will keep them going? |
| Lagging | Very limited opportunities. | There may be some hidden opportunities here. | Can you accelerate the growth of these industries? |
| Declining | Ignore these industries; region has no advantage and they are declining. | Decline here may have some affect on the region | Possible risk to region; what can be done to sustain or revive? |

Some cells represent greater opportunities than others. Table 3.22 offers a ranking of development opportunities for each cell. The greatest opportunities are in the upper right hand corner of the matrix, and the industries with the least opportunity for the region are shown in the lower left-hand corner.

*Table 3.22 Region Opportunities Ranked by Importance*

| | Non-Region | Mixed | Region |
|---|---|---|---|
| Leading | 4 | 2 | 1 |
| Lagging | 5 | 3 | 2 |
| Declining | 6 | 4 | 3 |

**Data Sources:**
- ES 202 Data

**Worksheets:**
- Strategic.xls

# I. INDUSTRY LINKAGES

The most direct and obvious source of impacts of particular industries on the regional economy is their hiring of employees (from among the local population) to work in their firms. Since payroll is typically the largest single expense for most firms, it is appropriate to look first at employment levels when measuring the economic impact of a firm or cluster.

But industrial activity produces other economic impacts other than just the hiring of local labor. In addition to purchasing labor in the local labor market, firms buy inputs and supplies from other businesses as well. Many of these purchases are made in the local marketplace. To get some idea of the size of purchases made by businesses, we examined the national level input-output tables for various industries that represented either a major portion of the region's employment or which seemed to be disproportionately concentrated in the metropolitan area.

Input-output tables are constructed by the US Bureau of Economic Analysis (BEA) from census and other data about the purchasing patterns of different firms. Input-output data documents the flow of goods and services among different industries. Table 3.23 shows the purchasing patterns of the semiconductor industry nationally as estimated by the BEA. The industry's largest purchases are payments to employees for labor provided, followed by other value added (including the return to capital and profit), and then payments for a variety of inputs, including semiconductors (components one semiconductor firm purchase from other semiconductor firms, a variety of chemicals, and plating services). Each dollar of sales by a semiconductor firm results in about 2.3 cents in purchase from chemical firms.

The value of these input-output data is that they reveal the structure of the inter-industry relationships between different sectors of the economy. These data make it clear that chemicals, plating, electronic components and other goods are important inputs to the semiconductor industry, and that firms that sell these products are likely to be important suppliers. Where we find concentrations of firms and their suppliers in a particular location, it is a good indicator of an industrial cluster.

*Table 3.23 Quantitative Analysis of Industry Linkages*

***Example: Semiconductor Industry in 1992 Backward Linkages: What the Semiconductor Industry Buys from Other Industries***

| Inputs to Semiconductor Manufacturing (SIC 367) (1992) | "Inputs" (millions) | % of Total VA | % of Purchases |
|---|---|---|---|
| Compensation of employees | 9,594 | 31.6% | |
| Other value-added | 8,055 | 26.6% | |
| Semiconductors and related devices | 2,312 | 7.6% | 18.3% |
| Wholesale trade | 1,365 | 4.5% | 10.8% |
| Industrial inorganic and organic chemicals | 691 | 2.3% | 5.5% |
| Plating and polishing | 602 | 2.0% | 4.8% |
| Other repair and maintenance construction | 585 | 1.9% | 4.6% |
| Other electronic components | 575 | 1.9% | 4.5% |
| Primary nonferrous metals, n.e.c. | 497 | 1.6% | 3.9% |
| Electric services (utilities) | 492 | 1.6% | 3.9% |
| Legal services | 360 | 1.2% | 2.8% |
| Advertising | 359 | 1.2% | 2.8% |
| Real estate agents, managers, operators, and lessors | 339 | 1.1% | 2.7% |
| Computer and data processing services | 267 | 0.9% | 2.1% |
| Indirect business tax and nontax liability | 227 | 0.7% | 1.8% |
| Banking | 196 | 0.6% | 1.5% |
| Industrial and commercial machinery and equipment, n.e.c. | 194 | 0.6% | 1.5% |
| Coating, engraving, and allied services, n.e.c. | 192 | 0.6% | 1.5% |
| Miscellaneous repair shops | 192 | 0.6% | 1.5% |
| Noncomparable imports | 165 | 0.5% | 1.3% |
| Engineering, architectural, and surveying services | 150 | 0.5% | 1.2% |
| Automotive repair shops and services | 149 | 0.5% | 1.2% |
| Telephone, telegraph communications, and communications services | 137 | 0.5% | 1.1% |
| Air transportation | 129 | 0.4% | 1.0% |
| Trucking and courier services, except air | 124 | 0.4% | 1.0% |

Source: Bureau of Economic Analysis, Input-Output Tables for the United States, 1992

Calculated using BEA ioxtract program.

Additional industry input-output analysis is conducted in Section IV of this document for several industry clusters in the Portland economy.

**Data Sources:**

- Bureau of Economic Analysis, Input-Output Tables for the United States, 1992

**Worksheet:**

- RegionalIO Analysis.xls

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# IV. IDENTIFICATION OF POTENTIAL INDUSTRY CLUSTERS

The Standard Industrial Classification (SIC) system is a useful tool for constructing a taxonomy of different kinds of economic activity, but it is less useful for understanding the interrelationships between different kinds of activity in the regional economy.

Economic prosperity is not an isolated phenomenon; it reverberates throughout the metropolitan region. The primary drivers behind the boom include obvious forces, like the stunning growth of the high technology industry, based primarily in Washington County, to smaller and less visible elements of success: a diverse metals and machinery cluster that has grown 3.7%, the nation's leading concentration of microbreweries, steadily expanding nursery trade and so on.

Growth in these industries triggers corresponding changes in other parts of the metro economy in two ways, one that we understand automatically and the other which is frequently concealed from view. The obvious effect of growth is the direct employment impact of new hiring on the firms that are growing and in the construction sector of the economy. The economic multiplier effect associated with new jobs and income produces additional consumer spending in the local economy, which propels growth in the retail and personal services sectors—grocery stores, banks, dry cleaners, barber shops, movie theaters, restaurants—and all manner of businesses that make their trade selling to local households.

But there is a second effect that is often ignored, simply because we lack the data to see it: growth in certain key sectors of the economy triggers additional spending, not just on wages for the workers these firms employ, but on additional supplies of goods and services–the inputs these companies use to make their end products. So while high tech companies are growing and increasing their payrolls, they are also increasing their purchases of wiring, electronic components, metal cases, plastic injection molded parts, chemicals, wholesaling and shipping, engineering and legal services, advertising and everything else. And, as it turns out, the total amount a company spends on purchased parts and services is often many times larger than its total payroll.

Much of what companies spend on inputs for their production go outside the region. Microbreweries buy barley, aluminum smelters import bauxite, nurseries ship in fertilizer and so on. But a sizable fraction of the inputs to many industries in Portland comes from purchases from other businesses located in the metro area. Microbreweries buy ad services here, the nurseries spend locally on shipping and wholesaling, and so on.

The growth in basic sectors of the economy drives growth among suppliers in two ways. The first is simply size: as an industry grows, the market for its local suppliers grows as well. The second is subtler, but equally important: As the local production of a product increases, the opportunities increase for very specialized firms to find enough of a market to support a local niche. In the high tech industry, we've seen a growing number of specialist supplier firms to the electronics industry move into the Portland area because of the large number of local firms that can use their services or products.

There are three sources of growth in the regional economy. The first is firms that are increasing their share of national and international markets for goods and services, by successfully selling more of their product primarily outside the region. The second source is firms that sell inputs and services to these firms, and the third is firms that sell goods and services to households in the Portland region.

## A. Why Focus on Industry Clusters?

Businesses with common markets, with similar technological needs, with related workforce skills and that form a buyer-seller linkage and a value-added chain between raw materials and end users characterize an industry. In some cases, a number of such businesses are located or clustered in a small geographic area. When they are, proximity and interconnections among firms can produce dramatic and sustaining business advantages that stimulate the further development of the cluster.

And while many people have assumed that the emergence of the global economy has somehow diminished or reversed the importance of these localized processes, careful studies have shown the reverse is true. Harvard Business School's Michael Porter, one of the most influential business scholars of the past decade, documented in a wide variety of industries in every developed country that the creation and maintenance of competitive advantage hinges most critically on clusters of highly competitive firms, typically in a single urban region.

Paul Krugman has shown that, far from being the exception, the clustering of industries in particular metropolitan areas or regions is the norm, both in high tech and low-tech industries. He notes that one of the most famously clustered industries—the US auto production complex in Southern Michigan and the adjacent portions of Ohio and Indiana, is only slightly above the median level of spatial concentration for all US industries.[1] From jewelry in Providence, RI, to recreational vehicles in Elkhart, IN, to medical devices in Minneapolis-St. Paul, MN, such clustering is a common phenomenon.

## B. What Constitutes a Cluster?

Michael Porter's work, *The Competitive Advantage of Nations,* posed the notion of a diamond of competitive advantage that characterizes the existence of a cluster of businesses. Porter's study of concentrations of particularly successful industries throughout the world led him to conclude that four interconnected factors worked to form and sustain clusters.

[1] Krugman (1990)

Porter's analysis is summarized in the "Diamond of Competitive Advantage" shown in Figure 4.1. The four components to the diamond are: firm strategy and rivalry, demand conditions, related and supporting industries, and factor conditions. For some industries, certain locations provide a better combination of these four elements than do other locations in the state or the nation.

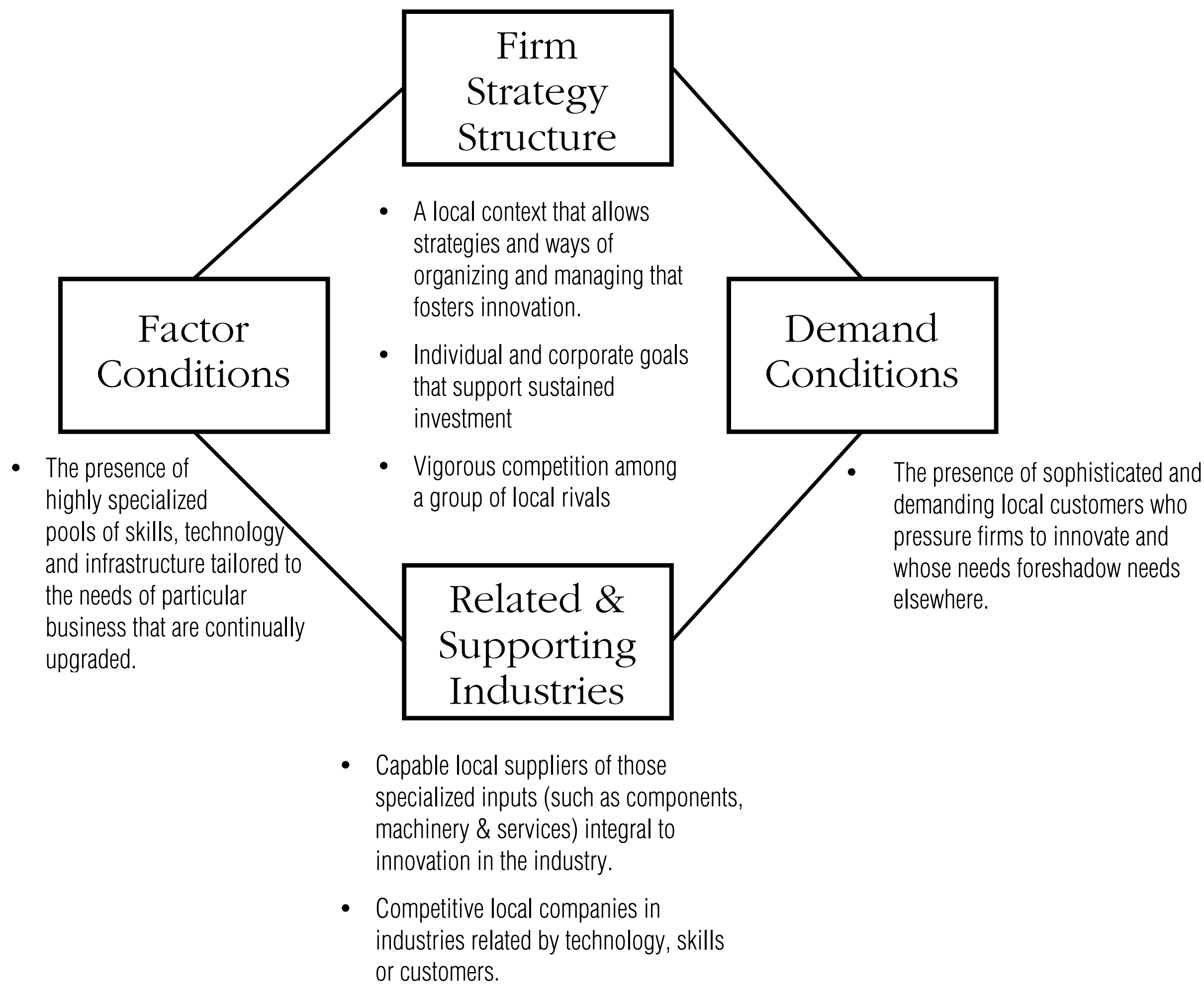
Although Porter originally developed the diamond to examine differences in concentrations of particular industries in different nations, his study led him to conclude that the forces of the diamond are an even more powerful explanation of the dynamic of regional development. He explained in a study of Massachusetts:

> *The forces in the diamond that are supercharged in an industry or cluster are geographically concentrated in a region or even in a city within a region. This heightens the speed of information flow, the responsiveness of institutions to needs for specialized investments, the pressures provided by capable suppliers, customers and competitors, and the extent to which pride and a sense of local responsibility stimulate dynamism even further.*[2]

[2] Porter (1991), page 11.

We can apply the Porter model to the Portland Metropolitan area to begin the process of identifying industry clusters that are driving the region's economy.

**Figure 4.1.**
**Porter's Diamond**
**The Determinants of Regional Competitive Advantage**



## C. Key Characteristics of a Cluster

Our analysis of the literature surrounding clusters suggests that there are four major criteria that should be considered in determining whether an industry constitutes a cluster.

**1. Exporting.** In order to qualify as a true cluster, the firms should not solely sell their goods and services in local markets. Cluster firms should sell some (and typically a majority) of their output in markets outside the metropolitan area. Firms that export successfully outside the region are not only bringing additional income into the Portland area, but they are testing the quality of their products against the best in the nation or the world.

**2. Multiple Firms.** A single firm does not constitute a cluster. While one large firm may be a dominant player in an industry, and an important force in the regional economy, a single firm, by itself, doesn't constitute a cluster. A cluster consists of a group of firms, often competitors in the same market or closely related markets, and their suppliers. Part of the dynamic quality of a cluster is that it evolves and thrives independent of the fate of individual firms. Some firms in the cluster may fail, but start-ups or spin-offs take their place.

**3. Concentrated Activity.** Clusters should by definition be more focused in one or a few areas than typical industries. An industry that is evenly distributed in every metro area in the US can hardly be considered clustered. Measures of geographic concentration, such as a location quotient, should show activity is concentrated in the Portland metro area. Alternatively, dynamic measures, such as shift share analysis, should show the industry is growing significantly more rapidly in Portland than elsewhere.

**4. Includes a Diamond.** Clusters should exhibit each of the aspects of a cluster in Porter's Diamond shown in Figure 4.1: rivalry and competition among firms in the marketplace, the presence of demanding local customers, the proximity of suppliers and the availability of inputs. Typically, the existence of these "diamond" characteristics can't be gleaned from published data; they instead require a qualitative examination of the industry.

## D. Identifying the Region's Candidate Clusters

Based on the information assembled in this report (representing Part I of our research project) we have developed a list of candidate clusters for further analysis. Based on the strength of the data accumulated to date, we are able to divide the list into two major categories: evident clusters (those for which the available data presents a strong case that a cluster is firmly in place in the regional economy) and latent clusters (those industries for which at least some data suggests that their might be a cluster, but for which there may be contradictory indicators or incomplete data to conclude that the cluster is firmly established.

Evident clusters are those industries which export (from the region) large portions of their product, have high location quotients, show a positive shift in share, and which our analysis of input-output data suggests that there are a number of related industries that serve as suppler or customers for the cluster. Based on these criteria, we find five evident clusters:

***Evident Clusters***

- Electronics/ high-technology
- Metals, machinery and transportation equipment
- Lumber and wood products
- Nursery products
- Specialty food/ craft beverages

***Latent Clusters***

In addition to these evident clusters, we note that there are an additional six latent clusters; sectors of the economy that exhibit some, but not necessarily all of the aspects of a cluster. Listing as a latent cluster signifies only that the statistical evidence, taken by itself, does not allow one to conclude that a cluster is apparent. Further investigation and the development of more specific information (particularly from industry sources) may show that all or at least a portion of a latent cluster exhibits the characteristics of an industry cluster. Our list of latent clusters includes the following six industries.

- Distribution and transportation
- Creative and professional services
- Temporary employment
- Biotechnology
- Recreation industries
- Tourism

A central issue affecting most of the latent clusters is the fact that at least portions of these latent clusters may in fact be part of other clusters, especially those in our list of evident clusters. We know that important portions of distribution and transportation, for example, include the wholesale functions associated with particular evident clusters, for example the wholesaling of electronics goods and services. A critical issue is whether to treat such activities as part of an electronics cluster or to treat them as part of a distribution cluster. This question is best resolved by further research with the firms involved.

Another important aspect facing evident clusters is the ambiguity of whether these sectors represent export sectors or not. In many cases, firms in these latent clusters serve primarily local markets, but also reach some national and international markets. Most professional services, for example, are the architectural, accounting and legal services consumed by the region's households. But some firms in each of these areas are effectively competing nationally and internationally.

Finally, in at least two cases, our ability to accurately measure the key attributes of these sectors is obscured by the anachronistic way data is collected. Some industries, like biotechnology, don't merit a separate industrial classification, and may get lumped in with firms in agricultural services, chemicals, pharmaceuticals, or research. Ferreting out the level of biotechnology employment, therefore, requires detailed analysis going well beyond the published statistics.

The objective of this report is to identify candidate clusters that compose the Portland regional economy based on available statistical data. A final determination of the existence of clusters depends on a detailed analysis of the industry structure and competition, inputs, demand and suppliers, all of which require in-depth qualitative analysis that will be the subject of Phase II of the Regional Connections project.

## E. EVIDENT INDUSTRY CLUSTERS

### 1. ELECTRONICS / HIGH TECHNOLOGY

***SIC Code(s):***

- Computer and office equipment (357)
- Electrical machinery (36)
- Instruments (38)
- Computer and data processing services (737)
- Electrical goods (506)

***History of Industry in Portland Region:***

The history of the technology industry in Oregon goes back nearly a half a century. The advent of World War II brought advances in electronics technology which were brought home to Oregon by entrepreneurs like Howard Vollum, Jack Murdock and Douglas Strain. They created companies such as Brown Engineering, Tektronix, and Electro Scientific (ESI) that capitalized on the post-war boom in consumer and industrial electronics. These small businesses grew into major enterprises and were the parents of Oregon's high-technology industry.

By the 1960s and 1970s, a critical mass of technology and talent was forming in the region that helped create an economic boom in Oregon. In the 1970s, Oregon's well-educated workforce and moderate climate helped attract rapidly expanding California-based giants, Hewlett-Packard and Intel to our region. During this same period, locally based Tektronix became a billion-dollar enterprise.

In the 1980s Oregon's original electronics giants and the California immigrants became the launching pad for a number of spin-off companies. Over 170 high-tech firms started up, taking advantage of large infusions of venture capital in the region and favorable revisions in tax laws. Many firms also took advantage of the "PC Revolution" which caused an explosion of activity in the technology industry. The 1980s also marked the arrival of a number of Japanese firms to what is now commonly referred to as the "Silicon Forest."

The mid-1990s saw nearly $13 billion in investment in plant expansion and new facilities by semiconductor companies. By 1996, high technology surpassed lumber and wood products to become Oregon's largest manufacturing employer. In addition to the original base in electronic design, automation tools, test and measurement, and semiconductor manufacturing, new companies represent applications software, multimedia, the Internet, and convergent technologies that combine computing, consumer and communications.

***Top 10 Leading Firms (Ranked by Worldwide Revenue):***

- Hewlett- Packard Company
- Intel Corporation
- Cap Gemini
- Tektronix Inc.
- LSI Logic Corp.
- ADP Dealer Services Inc.
- Comsys Technical Services
- Sequent Computer Systems Inc.
- Integrated Device Technology Inc.
- Synopsys Inc.

*Source: The Business Journal, 1997*

***Major Concentrations:***

- Beaverton
- Hillsboro
- Lake Oswego
- Portland
- Vancouver, WA
- Wilsonville

***Key Products /Description of Industry:***

- Software: custom (financial especially) and shrink-wrap (including turn-key business systems)
- Semiconductors for use in multiple markets including: computing, networking, communications, aircraft, government, automobiles, and consumer electronics
- Ink-jet printers
- Multimedia projection products, video systems, panel displays
- Products for medical industry: imaging systems, patient-monitoring instruments and systems
- Information technology consulting
- Printed circuit boards
- Embedded computers

***Employment:***

- In 1995, 48 out of every 1,000 private sector workers in Oregon were employed by high-tech firms. There were 1,845 high-tech firms in Oregon in 1995 and 2,700 in 1997.[3]
- Table 4.1 offers 1996 employment data for the electronics/ high technology cluster.

*Table 4.1 High-tech Industry Employment Portland Metropolitan Area, 1996*

| Industry Sector | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Computer and Office Equipment | 39 | 7,894 | $49,054 |
| Electrical Machinery | 201 | 25,145 | $48,491 |
| Instruments | 150 | 8,979 | $48,743 |
| Computer and Data Processing Services | 1,073 | 10,732 | $51,745 |
| Electrical Goods | 586 | 4,447 | $46,053 |
| High-technology Cluster | 2,049 | 57,196 | $49,053 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

***Employment Growth Rate (1990 to 1996):***

- Table 4.2 offers a comparison of 1990 and 1996 employment data for the electronics/ high-technology cluster for Oregon counties only.

*Table 4.2 Employment Growth in High-tech Industry Portland Metro Area, 1990 to 1996 (Oregon counties only)*

| Industry Sector | Number of Jobs 1990 | Number of Jobs 1996 | % change |
|---|---|---|---|
| Computer and office equipment | 2,984 | 4,907 | 64.4% |
| Electrical machinery | 12,811 | 21,827 | 70.4% |
| Instruments | 11,291 | 8,525 | -24.5% |
| Computer and data processing services | 7,072 | 10,198 | 44.2% |
| Electrical goods | 3,554 | 4,125 | 16.1% |
| High-technology Cluster | 37,711 | 45,582 | 31.5% |

Source: 1990 - 1996 ES-202 Data, Oregon Employment Department

***Exports:***

According to the *1997 Oregon Technology Benchmarks*, high technology has become Oregon's largest foreign export industry. In 1996, the Oregon high-technology industry reported an export revenue of $4.7 billion, almost 50% of the state's total export revenues.

The 1997 benchmarks also notes that, according to their survey sample, while foreign exports accounted for close to 50% of the largest companies' revenues, the smaller companies reported a much higher percent of revenue generated within the United States.

[3] US Department of Commerce, US Department of Labor, as published in American Electronics Association, Cyberstates, 1997

### *Location Quotient/Shift-Share:*

- Shift share 1985 to 1995 for electronics: 1.18%
- Table 4.3 lists the 1996 location quotient for the electronics/ high-technology cluster for Oregon counties only.

*Table 4.3 1996 Location Quotient for High-tech Industry Portland Metropolitan Area (Oregon counties only)*

| Industry Sector | Location Quotient |
|---|---|
| Computer and office equipment | 3.39 |
| Electrical machinery | 2.65 |
| Instruments | 1.64 |
| Computer and data processing services | 1.41 |
| Electrical goods | 1.34 |
| High-technology Cluster | 2.04 |

Source: 1996 ES-202 Data, Oregon Employment Department

### *Linkages to Other Local Clusters:*

- In 1996, companies that participated in the Oregon Technology Benchmarks survey reported spending over $1.2 billion on in-state vendors.
- Based on our analysis of national input–output tables, we find the key suppliers for the high-technology industry to be the following:

*Table 4.4 Input – Output Analysis for Electronics/ High Technology Industry*

| Input | Percentage of Total Inputs |
|---|---|
| Other electronic components | 15.8% |
| Wholesale trade | 11.0% |
| Semiconductors and related devices | 7.2% |
| Computer peripheral equipment | 4.6% |
| Computer and data processing services | 4.5% |
| Electronic computers | 4.1% |
| Miscellaneous plastics products, nec | 3.6% |
| Real estate agents, managers, operators, and lessors | 2.8% |
| Advertising | 2.6% |
| Non-comparable imports | 2.5% |
| Indirect business tax and non-tax liability | 2.0% |
| Telephone, telegraph communications, and communication services, nec | 1.7% |

| Input | Percentage of Total Inputs |
|---|---|
| Legal services | 1.6% |
| Electronic services (utilities) | 1.6% |
| Blast furnaces and steel mills | 1.5% |
| Banking | 1.5% |
| Metal stampings, nec | 1.4% |
| Other repair and maintenance construction | 1.4% |
| Nonferrous wiredrawing and insulating | 1.3% |
| Plating and polishing | 1.2% |
| Electron tubes | 1.2% |
| Relays and industrial controls | 1.0% |
| Plastics materials and resins | 1.0% |

Source: 1992 Input-Output Accounts of the US Economy

## 2. METALS, MACHINERY, TRANSPORTATION EQUIPMENT

***SIC Code(s):***

- Railroad Equipment (374)
- Primary Metals (33)
- Fabricated Metals (34)
- Machinery (except 357) (35)
- Transportation (37)

***History of Industry in Portland Region:***

Local demand and government policy have played essential roles in the development of Oregon's metal industry. Portland's early development was as an export and service center for the region's lumber and food products industries. Because it was a major center for transportation and shipping, related industries developed in the metro area. Key firms in shipbuilding and repair, truck manufacturing, and railcar construction can trace their origins in many cases to companies that got their start as family owned businesses.

Service demand from the lumber and wood products industry and from the food products industry created a local market for the repair of harvesting and production machinery, as well as transportation products. Local firms such as Omark and others built their expertise in serving local markets into a worldwide competitive advantage.

In the 1930s and 1940s, government policy greatly stimulated Oregon's metals related industries. In part to capitalize on its investment in hydropower production by Columbia River dams, the federal government subsidized the construction of a series of aluminum smelters in the Pacific Northwest. The Bureau of Mines located a major research facility in Albany. The following decades saw Oregon's growth as a major center for the production of non-ferrous metals, such as aluminum and titanium.

During WWII, the federal government financed a massive expansion of the local shipbuilding industry, which produced hundreds of Liberty and Victory cargo ships, and escort aircraft carriers for the war effort. Thousands of workers were attracted to the Portland area to staff this industry, and many stayed, building the cadre of the region's metalworking workforce.

Portland's distance from most consumer markets has meant that the metals industry has chiefly focused on these specialized industries, rather than on the development of consumer goods like appliances, cars and furniture.

Since WWII the industry has evolved into a small but integrated metals market that serves local, national, and international markets. What is thriving is the manufacturing of products whose frequent design changes and engineering components give them a marketing value that outweigh high freight costs.[4]

***Leading Area Firms:***

- Oregon Steel Mills Inc.
- ESCO Corp.
- Precision Castparts
- Myers Container Corporation
- Oregon Cutting Systems
- Viking Industries Inc.
- Enoch Manufacturing Co.
- Western Wire Works
- Anodizing Inc.
- Wade Manufacturing Co.
- Atlas Copco Wagner Inc.
- Davis Tool Inc.
- PACE Clean-Pak
- Sulzer Bingham Pumps
- Landa Inc.
- Freightliner Corporation
- Warn Industries Inc.
- Boeing
- Zidell Explorations Inc.
- Gunderson

***Major Concentrations:***

- Portland
- Vancouver
- Milwaukie
- Hillsboro
- Tualatin
- Sherwood
- Tigard

***Key Products / Description of Industry:***

The local market is geared more towards steel than nonferrous metals because of the preponderance of heavy machinery and equipment makers in the region. Aluminum products are gaining in market share. No city in the Northwest has the variety and depth of metals companies that the Portland area does (Portland Area Metals Industry Analysis).

- *Primary Metals Industries:* steel mill products, iron and steel foundries, nonferrous foundries, misc. primary metal products
- *Fabricated Metal Products:* metal cans and shipping containers, cutlery, hand tools, and hardware, screw machines products, bolts, etc., metal forgings and stampings, metal plating, coating and finishing, misc. fabricated metal products
- *Industrial Machinery and Equipment:* farm and garden machinery, construction and related machinery, tool, dies, and metalworking machinery, special industry machinery, general

[4] Portland Area Metals Industry Analysis, December 1996.

industrial machinery, refrigeration and service industry machinery, misc. commercial and industrial machinery

- *Transportation Equipment:* motor vehicles and equipment, aircraft and parts, ship and boat building and repairing, railroad, trailers and misc. transportation equipment

### *Employment:*

- Firm size ranges from four employees to over 1200 employees.
- Table 4.5 offers 1996 employment data for the metals, machinery, and transportation equipment cluster.

*Table 4.5 Metals Cluster Employment Portland Metropolitan Area, 1996*

| SIC | Sector | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|---|
| 33 | Primary metals | 60 | 7,998 | $39,490 |
| 34 | Fabricated metals | 382 | 10,742 | $32,150 |
| 35 | Industrial machinery and equipment | 541 | 11,781 | $37,323 |
| 37 | Transportation equipment | 146 | 10,412 | $41,844 |
| | TOTAL | 1,129 | 40,934 | $37,539 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

### *Employment Growth Rate (1990 to1996):*

- Table 4.6 offers a comparison of 1990 to 1996 employment data for the metals, machinery, and transportation equipment cluster for Oregon counties only.

*Table 4.6 Employment Growth for Metals Cluster - Portland Metropolitan Area (Oregon counties only) 1990 - 1996*

| SIC | Sector | Number of Jobs 1990 | Number of Jobs 1996 | % changes |
|---|---|---|---|---|
| 33 | Primary metals | 7,712 | 7,157 | -7.2% |
| 34 | Fabricated metals | 8,137 | 9,728 | 19.6% |
| 35 | Industrial machinery and equipment | 10,092 | 10,083 | -0.1% |
| 37 | Transportation equipment | 9,876 | 10,166 | 2.9% |
| | TOTAL | 35,817 | 37,134 | 3.7% |

Source: 1990 - 1996 ES-202 Data, Oregon Employment Department

### *Exports:*

In 1992 shipments by the metals industry in Portland Metro area totaled almost $4.4 billion. Of these, about 66% of the shipments came from businesses in SICs 35 and 37. Those industries mainly produce final products that have high value-added contents. The primary and fabricated metal products industries (33 and 34) accounted for 45 percent of total shipments in 1992. Most of their products were sold to the construction and manufacturing industries.

*Table 4.7 Estimated Value of Shipments 1992 by Portland Area Metal Businesses*

| SIC | Sector | Value of Shipments (millions) | Percent of total |
|---|---|---|---|
| 33 | Primary metal industries | $1,044.9 | 23.9% |
| 34 | Fabricated metal products | $ 913.7 | 20.9% |
| 35 | Industrial machinery and equipment | $ 978.8 | 22.3% |
| 37 | Transportation equipment | $1,443.5 | 32.9% |
| | TOTAL | $4,380.9 | |

Source: Portland Area Metals Industry Analysis, December 1996

### *Location Quotient/Shift-Share:*

- Table 4.8 lists the 1996 location quotient data for the metals, machinery, and transportation equipment cluster for Oregon counties only.

*Table 4.8 1996 Location Quotients for Metals Cluster - Portland Metropolitan Area (Oregon counties only)*

| SIC | Sector | Location Quotient |
|---|---|---|
| 33 | Primary metals | 1.89 |
| 34 | Fabricated metals | 1.18 |
| 35 | Industrial machinery and equipment | 1.15 |
| 37 | Transportation equipment | .92 |
| | TOTAL | 1.18 |

Source: 1996 ES-202 Data, Oregon Employment Department

### *Linkages to Other Local Clusters:*

- The metals industry is a supplier to other industries including computer and other high tech manufacturing, wood products, construction, waste treatment, recreation, and transportation.

Based on our analysis of national Input–Output tables, we find the key suppliers for the metals industry to be the following:

*Table 4.9 Input-Output Data for Metals Industry*

| Input | Percent of Total Inputs |
|---|---|
| Wholesale trade | 10.6% |
| Motor vehicle parts and accessories | 10.1% |
| Blast furnaces and steel mills | 9.9% |
| Aircraft and missile equipment, nec | 5.3% |
| Automotive stampings | 3.0% |
| Trucking and courier services, except air | 2.6% |
| Misc. plastic products, nec | 2.5% |
| Automotive repair shops and services | 2.3% |
| Electric services (utilities) | 2.2% |
| Aluminum rolling and drawing | 2.2% |
| Primary aluminum | 2.1% |
| Industrial and commercial machinery and equipment, nec | 2.0% |
| Iron and steel foundries | 1.7% |

| Input | Percent of Total Inputs |
|---|---|
| Internal combustion engines, nec | 1.4% |
| Indirect business tax and non-tax liability | 1.3% |
| Real estate agents, managers, operators, and lessors | 1.3% |
| Primary nonferrous metals, nec. | 1.2% |
| Primary smelting and refining of copper | 1.2% |
| Scrap | 1.2% |
| Advertising | 1.1% |
| Banking | 1.1% |
| Screw machine products, bolts, etc | 1.1% |
| Aluminum castings | 1.0% |
| Other repair and maintenance construction | 1.0% |

Source: 1992 Input-Output Accounts of the US Economy

## 3. LUMBER & WOOD PRODUCTS

***SIC Code(s):***

- Forestry (SIC 08)
- Lumber and wood (SIC 24)
- Furniture (SIC 25)
- Paper and allied (SIC 26)
- Lumber and construction materials (SIC 503)
- US Forest Service

***History of Industry in Portland Region:***

The history of the lumber and wood products industry is as old as the state itself. As early as 1827, Dr. John McLoughlin of the Hudson's Bay Company sent the first shipload of lumber destined for a foreign market (the Sandwich Islands, today's Hawaii) down the Columbia River.[5] That essentially marked the beginning of the region's trade in wood products, as the area coupled enormous timber resources with its accessibility via its numerous waterways.

Settlement began in earnest during the second half of the 1800's as pioneers came to the state along the Oregon Trail. In this early economy, the industry focused on providing raw lumber to

[5] Beuter, J. H. *Legacy and Promise: Oregon's Forests and Wood Products Industry*, 1998, p.9.

others who then created secondary goods for market. It wasn't until the middle of the 1900s that the industry began to focus more intently on the production of secondary wood products. In 1991, the secondary wood products industry accounted for 40% of all forest products manufacturing employment in Oregon. In that year, the secondary wood products industry added 3,300 jobs while primary forest product manufacturers lost over 2,000 jobs.

Today the industry is in the midst of a major transition. In the early 1980s a recession coupled with high interest rates severely cut into the market for Oregon's construction grade wood products. Between 1980 and 1997 the number of sawmills in Oregon dropped by 56% and the number of veneer and plywood mills by 62 %. Employment in this sector dropped by 32%. Firms that have survived the changes of the 1980s have focused on strengthening their competitive advantages. Oregon's long history in the wood products industry has provided it with infrastructure, community interrelationships, and knowledge and human skills that will help it to retain a place in the marketplace. By working smarter to address environmental issues and to provide high quality wood products, the industry can be expected to continue to grow.

***Top 10 Area Firms (ranked by number of employees):***

- Willamette Industries, Inc.
- Boise Cascade Corp.
- Fort James (James River)
- Georgia-Pacific Corp.
- Smurfit Newsprint Corp.
- WTD Industries Inc.
- Crown Pacific Partners LP
- Hampton Affiliates
- Stimson Lumber Co.
- Louisiana-Pacific Corp.
- Columbia Forest Products Inc

*Source: The Business Journal, Book of Lists, 1998*

***Major Concentrations:***

- Portland
- Hillsboro
- Clackamas
- Tigard
- Milwaukie
- Oregon City

***Key Products /Description of Industry:***

The industry cluster is organized into four sub-clusters: lumber, pulp and paper, millwork, panel and structural members, and wood household furniture and partitions. Below are some key products for each of these sub-clusters.

Millwork, Panel and Structural Members

- Door and window frames
- Fencing materials
- Paneling, stair cases and railings
- Plywood, strand board, and fiberboard

Wood Household Furniture and Partitions

- Cabinetry
- Furniture
- Office partitions

Lumber

- Structural lumber
- Laminated beams and veneer lumber

Pulp and Paper

- Newsprint
- Coated and uncoated papers
- Paper bags and containers
- Cardboard and packaging materials
- Household paper products
- Wood residues used in glues, resins, etc.
- Toys and gifts
-

***Employment:***

- Table 4.10 describes 1996 employment trends for the lumber and wood products industry in the six-county area.

*Table 4.10 Lumber and Wood Products Cluster Employment – Portland Metropolitan Area, 1996*

| Industry Sector | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Forestry | 109 | 1,123 | $33,345 |
| Lumber and Wood | 480 | 8,503 | $32,791 |
| Furniture | 109 | 2,312 | $25,880 |
| Paper and Allied Products | 63 | 7,031 | $47,284 |
| Lumber and Construction Materials | 440 | 4,146 | $49,861 |
| TOTAL | 1,202 | 23,115 | $39,596 |

Source: 1996 ES-202 data, Oregon and Washington Employment Departments

- In 1995, nearly 22,000 persons were employed in the secondary wood products industry in the average month; 55,700 in manufacturing of forest products and furniture/fixtures (SIC 24 and 25). There are 800 secondary wood products firms in Oregon.[6]
- Primary processing (traditional sawmills and plywood mills) employs only three persons per million board feet processed, and furniture manufacturers employ an average of sixty persons per million board feet (WPCC August, 1993).
- Table 4.11 illustrates some of the employment trends for the secondary wood products industry in Oregon.

[6] Wood Products Association Press Release, June 11, 1996

*Table 4.11 The Secondary Wood Products Industry in Oregon*

| Description of Sector | Number of Employees | Number of Firms |
|---|---|---|
| Furniture manufacturers | 2,237 | 198 |
| Non-classified | 3,147 | 157 |
| Millwork plants | 7,421 | 141 |
| Kitchen cabinet manufacturers | 1,291 | 125 |
| Mobile home and prefabricated wood building mfgrs, wood preservers, pallet mfgrs, hardwood dimension producers, structural wood member mfgrs. | 5,295 | 122 |
| Box and other wood container manufacturers | 170 | 106 |
| TOTAL | 19,761 | 849 |

Source: Oregon Economic Development Department, Directory of Oregon Wood Products Manufacturers, 1991 as printed in Northwest Wood Products Association fact sheet; Oregon Employment Division

### *Employment Growth Rate (1990 – 1996):*

- Table 4.12 compares 1990 and 1996 employment trends for the lumber and wood products industry for the Oregon counties only.

*Table 4.12. 1990 – 1996 Employment Growth for Lumber & Wood Products Cluster – Portland Metropolitan Area – Oregon Counties only*

| Industry Sector | Number of Jobs 1990 | Number of Jobs 1996 | % Change |
|---|---|---|---|
| Forestry | 2,056 | 1,065 | -48.2% |
| Lumber and wood | 9,992 | 6,679 | -33.2% |
| Furniture | 1,952 | 2,251 | 15.3% |
| Paper and allied products | 4,080 | 3,675 | -9.9% |
| Lumber and construction materials | 3,961 | 3,940 | -0.5% |
| TOTAL | 22,041 | 17,610 | -20.1% |

Source: 1990 - 1996 ES-202 data, Oregon and Employment Department

### *Exports: n/a*

### *Location Quotient /Shift-Share*

- Table 4.13 lists the 1996 location quotients for the lumber and wood products industry in the Portland Metro area (Oregon counties only.

*Table 4.13 1996 Location Quotients for Lumber and Wood Products Cluster – Portland Metropolitan Area, Oregon Counties only*

| Industry Sector | Location Quotient |
|---|---|
| Forestry | 5.09 |
| Lumber and wood | 1.71 |
| Furniture | .72 |
| Paper and allied products | 1.86 |
| Lumber and construction materials | 2.58 |
| TOTAL | 1.68 |

Source: 1996 ES-202 data, Oregon Employment Department

### *Linkages to Other Local Clusters:*

Based on our analysis of national input–output tables, we find the key suppliers for the lumber and wood products industry to be the following:

*Table 4.14 Input-Output Analysis for Lumber and Wood Industry*

| Input | Percent of Total Inputs |
|---|---|
| Paper and paperboard mills | 14.9% |
| Logging | 11.5% |
| Wholesale trade | 10.3% |
| Sawmills and planing mills, general | 8.8% |
| Forestry products | 4.9% |
| Trucking and courier services, except air | 4.5% |
| Misc. plastics products, nec | 3.8% |
| Pulp mills | 3.2% |
| Electric services (utilities) | 2.9% |
| Industrial inorganic and organic chemicals | 2.5% |
| Plastics materials and resins | 1.9% |
| Indirect business tax and non-tax liability | 1.6% |
| Other repair and maintenance construction | 1.5% |
| Railroads and related services | 1.4% |
| Agricultural, forestry, and fishery services | 1.3% |
| Paperboard containers and boxes | 1.3% |
| Reconstituted wood products | 1.3% |
| Hardware, nec | 1.3% |
| Veneer and plywood | 1.3% |
| Broadwoven fabric mills and fabric finishing plants | 1.2% |
| Banking | 1.2% |
| Blast furnaces and steel mills | 1.2% |
| Petroleum refining | 1.1% |
| Advertising | 1.0% |

*Source: 1992 Input-Output Accounts for US*

## 4. NURSERY PRODUCTS

***SIC Code(s):***

- Landscape and horticultural services (078)
- Greenhouse and nursery products (018)

***History of Industry in Portland Region:***

The nursery industry was first founded in Oregon in 1847 by individuals capitalizing on qualities that still exist today: an ideal soil condition, and a moist mild climate. Today the industry is comprised of both national horticulture manufacturers along with established family farms that have been in business for decades.

Oregon's nursery industry has a national reputation not only as the largest producer of nursery products in the US but also for its level of expertise, high quality standards, and consistent innovation in the field of variety and practice. The state is known for its diversity producing over 5,000 varieties of plants from small seedlings to mature trees.

The industry is ranked third in the nation in gross sales behind California and Florida. (OAN, 1996). Oregon's ornamental horticulture industry is the state's largest agricultural commodity and is Oregon's largest agricultural employer. Roughly 70% of the nursery stock grown in Oregon is exported to other states or countries. Leading shipping destinations include Washington, California, Ohio, Michigan, New York, Pennsylvania, New Jersey, and Connecticut.

***Top 10 Leading Firms: n/a***

***Major Concentrations:***

- The tri-county area of greater Portland (Multnomah, Washington, Clackamas counties) accounted for nearly $223 million in nurseries sales in 1996, almost 50% of the industry's total in the state. If Marion and Yamhill counties are included, the total equals $392 million or 88% of all nursery sales in Oregon (OAN, September 1997). Table 4.15 describes the breakdown of the nursery industry by county.

*Table 4.15 Top Nursery Producing Counties in Oregon 1996*

| County | Rank | Gross Sales |
|---|---|---|
| Clackamas | 1 | $103.5 million |
| Marion | 2 | $98.3 million |
| Washington | 3 | $86.6 million |
| Yamhill | 4 | $71.6 million |
| Multnomah | 5 | $32.4 million |

Source: 1997 Oregon Agricultural Statistics Survey, US Department of Agriculture, as published in Oregon Association of Nurserymen, Inc. News Release, September 24, 1997

### *Key Products/Description of Industry:*

There are two types of classifications within the Oregon nursery industry: growers and retailers. Those in the grower category classify themselves as follows:

- Large nurseries (+ $2 million in sales) = 41 total, 2% of nurseries in the state
- Medium nurseries ($500,000 to $2 million in sales) = 122 total, 6% of nurseries in the state
- Small nurseries (less than $500,000 in sales) = 1,820 total, 92% of nurseries in the state

Sales growth is concentrated in the larger nurseries – they reported a 16% increase in 1996, while medium nurseries had an 11% increase. Small nurseries reported an 18% decline in sales revenue (OAN, September 1997).

Key Products:

- Container sales (plants grown and shipped in plastic pots or other types of containers)
- Bareroot stock
- Balled and burlapped material
- Greenhouse plants
- Other (roses, holly, bulbs, sod, cut flowers, dried flowers)
- Christmas trees
- Grass seed

### *Employment:*

In September of 1997 the Oregon Association of Nurserymen published the results from the 1997 Oregon Agricultural Statistics Survey, which was conducted by the US Department of Agriculture. Some of the findings from that survey show that:

- there were 1,983 growers and 3,370 retailers in Oregon in 1996;
- the number of workers in the growers industry has remained relatively consistent during the 1990's (1991 = 19,333, 1995 = 19,485); and
- the number of full-time workers in the growers industry has increased to 7,250 in 1995 from 6,219 in 1991. This indicates a trend to hire more full-time, year round workers.
- Table 4.16 shows 1996 employment data for the nursery cluster in the region.

*Table 4.16 Industry Employment Data, Portland Metropolitan Area – 1996*

| Industry Sector | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Greenhouse and nursery products | 170 | 5,138 | $16,911 |
| Landscape and construction materials | 631 | 3,643 | $21,731 |
| TOTAL | 801 | 8,780 | $18,911 |

Source: 1996 ES-202 data, Oregon and Washington Counties

### *Employment Growth Rate (1990 – 1996):*

- Table 4.17 compares 1990 and1996 employment data for the nursery cluster in the region (excluding Clark County).

*Table 4.17 1990 to 1996 Employment Growth for Nursery Cluster, Portland Metropolitan Area (excluding Clark County)*

| Industry Sector | Number of Jobs 1990 | Number of Jobs 1996 | % Change |
|---|---|---|---|
| Greenhouse and nursery products | 4,129 | 5,173 | 25.3% |
| Landscape and construction materials | 2,132 | 3,753 | 76.0% |
| TOTAL | 6,261 | 8,926 | 42.6% |

Source: 1990 - 1996 ES-202 data, Oregon Employment Department

### *Exports:* *n/a*

### *Location Quotient /Shift-Share:*

- Table 4.18 shows 1996 location quotient date for the nursery cluster in the region (excluding Clark County).

*Table 4.18 1996 Location Quotient for Nursery, Portland Metropolitan Area (Oregon counties only)*

| Industry Sector | Location Quotient |
|---|---|
| Greenhouse and nursery products | 4.95 |
| Landscape and construction materials | .48 |

Source: 1996 ES-202 data, Oregon Employment Department

NOTE: Oregon is unlike other states in that it includes agriculture workers in covered employment. This may result in creating a skewed location quotient for the nursery industry.

### *Linkages to Other Local Clusters:*

Based on our analysis of national input–output tables, we find the key suppliers for the nursery industry to be the following:

*Table 4.19. Input-Output Data for Nursery Industry*

| Input | Percent of Total Inputs |
|---|---|
| Greenhouse and nursery products | 40.2% |
| Wholesale trade | 7.5% |
| Indirect business tax and non-tax liability | 5.1% |
| Real estate agents, managers, operators, and | 3.9% |
| Air transportation | 3.8% |
| Legal services | 3.5% |
| Electric services (utilities) | 3.3% |
| Agricultural, forestry, and fishery services | 3.2% |
| Nitrogenous and phosphatic fertilizers | 3.1% |
| Petroleum refining | 2.8% |
| Other repair and maintenance construction | 2.7% |
| Automotive rental & leasing, without drivers | 2.5% |

| Input | Percent of Total Inputs |
|---|---|
| Trucking and courier services, except air | 1.8% |
| Insurance carriers | 1.4% |
| Advertising | 1.3% |
| Banking | 1.2% |
| Pesticides and agricultural chemicals, n.e.c. | 1.2% |
| Telephone, telegraph communications, and communication services, nec | 1.2% |
| Other business services | 1.1% |

Source: 1992 Input-Output Accounts for the US

## 5. SPECIALTY FOOD/ CRAFT BEVERAGE

***SIC Code(s):***

- Beverages (208)
- Beer, wine, and distilled beverages (518)
- Roasted Coffee (2095)
- Frozen Fruits, Fruit Juices and Vegetables (2037)

***History of Industry in Portland Region:***

*Specialty Food Processing:* Legend has it that the Northwest's first orchard was established in 1828 at Fort Vancouver from seeds left in the dinner jacket of Sir George Simpson, the Overseas Governor of the Hudson's Bay Company. Commercial fruit and vegetable canning began in 1874 when Elizabeth Lovejoy, the wife of one of the founders of Portland, started canning surplus cherries and pears. A few years later she established A.L. Lovejoy and Sons, of Oregon City, Oregon.

By the 1920's, the fruit processing industry had become a major part of the region's export base. Approximately 90 percent of fruits and vegetables processed in the Northwest during this period were shipped eastward. Such a large export market lead to the rise in supplier industries such as cratemakers, metal workers, transportation workers, machinery manufacturers, and refrigeration workers. It also served to strengthen many of the region's rural communities where many of the processing factories were located.

*Brewing Industry:* Oregon is one of the few states where all of the ingredients for beer are grown. Fourteen varieties of hops are grown in Oregon. Barley, yeast and fresh mountain water are available locally. Craft beer sales in Oregon amounted to 9% of all beer sales in the state in 1995, and in 1997 craft beer sales exceeded 10%. Nationwide, the craft beer segment comprises a little over 2.5% of all beer sold.

*Wineries:* Many of the first wineries in the region were family owned. Today these firms are joined by California vintners and even foreign investors. The signature grape is the Pinot Noir along with the Chardonnay. Though wine grapes have been cultivated in the Willamette Valley since the middle of the 19th century, the modern wine industry as we know it today began in the 1950's. The first commercial winery in the region was The Eyrie Vineyard in Dundee which was established in 1966. Today the state has over 110 bonded wineries.

***Leading Area Firms:***

Breweries

- Blitz Weinhard/ Strohs
- Widmer Breweries
- Full Sail Brewery
- Portland Brewing Co.
- McMenamins Brewery

Wineries

- Oak Knoll
- Ponzi
- Sokol Blosser
- Argyle
- Rex Hill

Specialty Food Processors

- Stone Mill Foods
- Steinfeld's Products, Inc.
- Reser 's Fine Foods, Inc.
- Northwest Packing Co.
- Wholesome & Hearty Foods

***Major Concentrations:***

- Portland Metro Area – Breweries
- Yamhill County – Wineries
- Multnomah, Washington, and Clackamas – Food Processing

***Key Products / Description of Industry:***

Three segments of the cluster:

- *Breweries*, specifically microbreweries
- *Wineries*: Pinot Noir, Pinot Gris, Chardonnay, Gewurztraminer
- *Specialty Food Processing*: frozen and canned berries (especially strawberries and cherries), corn, green beans, fruit juices, specialty salads, dressing, soups

***Employment:***

- Currently there are 72 microbreweries in the state with 22 additional outlets owned by these breweries (Oregon Brewers Guild)
- Average wages in the brewing industry range from $7.51 - $20.79 an hour
- 120 wineries in Oregon as of 1998 vs. 66 in 1988 (Oregon Wine Advisory Board)
- Table 4.20 describes 1996 employment trends for the cluster. Due to issues of confidentiality, industry segments within the cluster have been suppressed.

*Table 4.20 Employment for Specialty Foods Cluster – Portland Metropolitan Area, 1996*

| Industry | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Specialty food /craft beverages | 136 | 3,556 | $30,458 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

***Employment Growth Rate (1990 to 1996):***

- Table 4.21 compares 1990 to 1996 employment trends for the cluster. Due to issues of confidentiality, industry segments within the cluster have been suppressed. The information does not include Clark County data.

*Table 4.21 1990 to 1996 Employment Growth for Specialty Foods Cluster – Portland Metropolitan Area, excluding Clark County*

| Industry | Number of jobs 1990 | Number of Jobs 1996 | % Change |
|---|---|---|---|
| Specialty food /craft beverages | 2,873 | 3,773 | 31.3% |

Source: 1990 - 1996 ES-202 Data, Oregon Employment Department

***Exports:*** *n/a*

***Location Quotient /Shift-Share:***

- Table 4.22 lists 1996 location quotients for the cluster. Due to issues of confidentiality, industry segments within the cluster have been suppressed. The data presented does not include information for Clark County.

*Table 4.22 1996 Location Quotients for Specialty Foods Cluster – Portland Metropolitan Area, excluding Clark county*

| Industry | Location Quotient |
|---|---|
| Specialty food /craft beverages | 1.42 |

Source: 1996 ES-202 Data, Oregon Employment Department

***Linkages to Other Local Clusters:***

Based on our analysis of national input–output tables, we find the key suppliers for the specialty food/ craft beverages industry to be the following:

*Table 4.23 Input-Output Data for Specialty Food Cluster*

| Input | Percent of Total Inputs |
|---|---|
| Indirect business tax and non-tax liability | 17.2% |
| Metal cans | 12.3% |
| Fruits | 12.0% |
| Wholesale trade | 9.4% |
| Glass containers | 7.1% |
| Advertising | 3.9% |
| Trucking and courier services, except air | 3.8% |
| Paperboard containers and boxes | 3.8% |
| Vegetables | 3.8% |
| Malt | 2.9% |
| Miscellaneous plastic products, nec | 2.1% |
| Metal foil and leaf | 1.8% |
| Frozen fruits, fruit juices, and vegetables | 1.3% |
| Wines, brandy, and brandy spirits | 1.3% |
| Electric services (utilities) | 1.3% |
| Banking | 1.0% |

Source: 1992 Input-Output Accounts of the US Economy

Some of the local industries that support the microbrewery industry:

- Pacific Coast Container
- Associated Hose Products
- Columbia Distributing
- Great Western Malting
- Mt. Hood Beverage Co.
- Maletis Beverage
- Taylor Boiler & Equipment
- AJ Adhesives
- FH Steinbart Co
- Food Quality Analysts, Inc.
- Vitro Packaging Inc.

Some of the local industries that support the food processing industry:

- The Amalgamated Sugar Co.
- Amerigold Corp.
- Arthur Forsyth Chemical Co
- Continental Can Company
- Epsen Hillmer Graphics, Co.
- Henningsen Cold Storage Company
- Northwestern Ice & Cold Storage (
- Palmco, Inc.
- Silgan Container Corporation
- Weyerhaeuser Company

# F. LATENT INDUSTRY CLUSTERS

## 1. CREATIVE AND PROFESSIONAL SERVICES

***SIC Code(s):***

- Advertising (731)
- Miscellaneous business services (SIC 738)
- Motion pictures (78)
- Legal (81)
- Business associations (861)
- Professional organizations (862)
- Engineering, architectural and surveying services (871)
- Accounting, auditing, and bookkeeping (872)
- Research and testing services (873)
- Management and public relations (874)

***Employment:***

- Table 4.24 offers employment data for the creative and professional services cluster in the six-county region.

*Table 4.24 Creative and Professional Services Cluster Employment, Portland Metropolitan Area, 1996*

| Industry Segment | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Advertising | 222 | 1,876 | $46,904 |
| Miscellaneous business services | 1,082 | 10,676 | 19,887 |
| Motion pictures | 381 | 4,211 | 17,266 |
| Legal | 1,117 | 6,338 | 42,065 |
| Business associations | 150 | 836 | 35,153 |
| Professional organizations | 51 | 288 | 37,076 |
| Engineering, architectural and surveying services | 780 | 8,946 | 46,365 |
| Accounting, auditing and bookkeeping | 843 | 3,666 | 32,985 |
| Research and testing services | 235 | 2,945 | 29,311 |
| Management and public relations | 1,091 | 3,985 | 46,812 |
| TOTAL | 5,952 | 43,767 | $34,004 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

***Employment Growth Rate (1990 to 1996):***

- Table 4.25 compares 1990 and1996 employment data for the creative and professional services cluster in the region (excluding Clark County).

*Table 4.25 1990 to 1996 Employment Growth Rate Creative and Professional Services Cluster, Portland Metropolitan Area, excluding Clark county*

| Industry Segment | Percent Change 1990 to 1996 |
|---|---|
| Advertising | 9.7% |
| Miscellaneous business services | 28.5% |
| Motion pictures | 93.3% |
| Legal | 3.6% |
| Business associations | 26.3% |
| Professional organizations | 14.7% |
| Engineering, architectural and surveying services | 50.9% |
| Accounting, auditing and bookkeeping | 6.7% |
| Research and testing services | 19.7% |
| Management and public relations | 31.3% |
| TOTAL | 28.6% |

Source: 1990 to 1996 ES-202 Data, Oregon Employment Department

### *Location Quotient /Shift-Share:*

- Table 4.26 identifies the 1996 location quotients for the creative and professional services cluster in the region (excluding Clark County).

*Table 4.26 1996 Location Quotients for Creative and Professional Services Cluster, Portland Metropolitan Area, excluding Clark County*

| Industry Segment | Location Quotient |
|---|---|
| Advertising | 1.19 |
| Miscellaneous business services | 1.07 |
| Motion pictures | 1.31 |
| Legal | 1.03 |
| Business associations | 1.16 |
| Professional organizations | .75 |
| Engineering, architectural and surveying services | 1.59 |
| Accounting, auditing and bookkeeping | .98 |
| Research and testing services | .73 |
| Management and public relations | .74 |

Source: 1996 ES-202 Data, Oregon Employment Department

## 2. RECREATION-RELATED

***SIC Code(s):***

- Amusement and recreation services (79)
- Miscellaneous apparel and accessories (238)
- Apparel, piece goods and notions (513)

***Employment:***

- Table 4.27 identifies employment information for the cluster. Due to issues of confidentiality, industry segments within the cluster have been suppressed.

*Table 4.27 Recreation-related Employment, Portland Metropolitan Area, 1996*

| Industry | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Recreation- related industry | 836 | 15,675 | $34,555 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

***Employment Growth Rate (1990 to 1996):***

- Table 4.28 compares 1990 and 1996 employment growth rates for the cluster. Due to issues of confidentiality, industry segments within the cluster have been suppressed. The data presented does not include information for Clark County.

*Table 4.28 1990 to 1996 Employment Growth for Recreation-related Employment, Portland Metropolitan Area, excluding Clark County*

| Industry | Number of jobs 1990 | Number of Jobs 1996 | % change |
|---|---|---|---|
| Recreation- related industry | 8,794 | 14,864 | 69.0% |

Source: 1990 - 1996 ES-202 Data, Oregon Employment Department

***Location Quotient /Shift-Share:***

- Table 4.29 lists 1996 location quotients for the cluster. Due to issues of confidentiality, industry segments within the cluster have been suppressed. The data presented does not include information for Clark County.

*Table 4.29 1996 Location Quotient for Recreation-related Employment, Portland Metropolitan Area, excluding Clark County*

| Industry | Location Quotient |
|---|---|
| Recreation- related industry | 1.24 |

Source: 1996 ES-202 Data, Oregon Employment Department

## 3. TRANSPORTATION/ DISTRIBUTION

***SIC Code(s):***

- Local transit (41)
- Trucking /warehousing (42)
- Water transportation (44)
- Air transportation (45)
- Durable wholesaling (50)
- Non-durable wholesaling (51)

***Employment:***

Assessing information about the transportation /distribution cluster is complicated in that many other industries are contained within the SIC codes for the cluster. For example, within the durable and non-durable wholesaling segments of the cluster are classified portions of the high-technology (electrical goods), lumber and wood products (lumber and construction materials), specialty foods (beer, wine, and distilled beverages), and recreation-related (apparel, piece goods, and notions) clusters.

*Table 4.30 Transportation/ Distribution Cluster Employment, Portland Metropolitan Area, 1996*

| Industry Segment | Average Wage |
|---|---:|
| Local transit | $25,997 |
| Trucking/ warehousing | 31,690 |
| Water transportation | 45,943 |
| Air transportation | 31,855 |
| *Durable wholesaling | 41,272 |
| **Non-durable wholesaling | 40,989 |
| TOTAL | $37,936 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

* includes data from a segment of high-technology and lumber & wood products clusters

** includes data from specialty food and recreation-oriented clusters

- Table 4.31 shows the employment figures for the transportation and distribution cluster if we remove these industry segments.

*Table 4.31 Transportation/ Distribution Cluster Employment, Portland Metropolitan Area, 1996 (without duplicate industry segments)*

| Industry Segment | Average Wage |
|---|---|
| Local transit | $25,997 |
| Trucking/ warehousing | 31,690 |
| Water transportation | 45,943 |
| Air transportation | 31,855 |
| Durable wholesaling | 39,237 |
| Non-durable wholesaling | 33,580 |
| TOTAL | $34,866 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

### *Employment Growth Rate (1990 – 1996):*

- Table 4.32 compares 1990 and 1996 employment growth rates for the cluster. The data presented does not include information for Clark County.

*Table 4.32 1990 to 1996 Employment Growth Rates for Transportation/ Distribution Cluster, Portland Metropolitan Area*

| Industry Segment | % Change |
|---|---|
| Local transit | 19.6% |
| Trucking/ warehousing | 2.8% |
| Water transportation | -22.8% |
| Air transportation | 119.9% |
| *Durable wholesaling | 6.2% |
| **Non-durable wholesaling | 30.6% |
| TOTAL | 17.5% |

Source: 1990 - 1996 ES-202 Data, Oregon Employment Department

* includes data from a segment of high-technology and lumber & wood products clusters

** includes data from specialty food and recreation-oriented clusters

### *Location Quotient / Shift Share:*

- Table 4.33 lists 1996 location quotients for the cluster. The data presented does not include information for Clark County.

*Table 4.33. 1996 Location Quotients for Transportation/ Distribution Cluster, Portland Metropolitan Area*

| Industry Segment | Location Quotient |
|---|---|
| Local transit | 1.43 |
| Trucking/ warehousing | 1.31 |
| Water transportation | 2.08 |
| Air transportation | 1.72 |
| *Durable wholesaling | 1.50 |
| **Non-durable wholesaling | 1.45 |

Source: 1996 ES-202 Data, Oregon Employment Department

* includes data from a segment of high-technology and lumber & wood products clusters

** includes data from specialty food and recreation-oriented clusters

## 4. TEMPORARY EMPLOYMENT

### *SIC Code(s):*

736 Personnel supply services

### *Employment:*

- Table 4.34 shows employment data for the Temporary Employment cluster for the six-county area.

*Table 4.34 Temporary Employment Cluster, Portland Metropolitan Area, 1996 Employment*

| Industry Segment | Average Wage |
|---|---|
| Temporary Employment Cluster | $16,937 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

### *Employment Growth Rate (1990 to 1996):*

- Table 4.35 compares 1990 and 1996 employment growth data for the Temporary Employment cluster for the Portland Metro region, excluding Clark County.

*Table 4.35 1990 to 1996 Employment Growth for Temporary Employment Cluster, Portland Metropolitan Area, excluding Clark County*

| Industry Segment | Percent Change, 1990 to 1996 |
|---|---|
| Temporary Employment Cluster | 128.8% |

Source: 1990 to 1996 ES-202 Data, Oregon Employment Department

### *Location Quotient /Shift-Share:*

- Table 4.36 shows 1996 location quotient information for the Temporary Employment cluster for the metropolitan area, excluding Clark County.

*Table 4.36 Temporary Employment Cluster, Portland Metropolitan Area, 1996 Employment*

| Industry Segment | Location Quotient |
|---|---|
| Temporary Employment Cluster | 1.38 |

Source: 1996 ES-202 Data, Oregon Employment Department

## 5. TOURISM

### *SIC Code(s):*

70 Hotel/ Motel

### *Employment:*

- Table 4.37 shows employment data for the Tourism cluster for the six-county area.

*Table 4.37 Tourism Cluster, Portland Metropolitan Area, 1996 Employment*

| Industry Segment | Number of Firms | Number of Jobs | Average Wage |
|---|---|---|---|
| Tourism Cluster | 265 | 9,291 | $17,556 |

Source: 1996 ES-202 Data, Oregon and Washington Employment Departments

### *Employment Growth Rate (1990 to 1996):*

- Table 4.38 compares 1990 and 1996 employment growth data for the Tourism cluster for the Portland metro region, excluding Clark County.

*Table 4.38 1990 to 1996 Employment Growth for Tourism Cluster, Portland Metropolitan Area, excluding Clark County*

| Industry Segment | Number of Jobs 1990 | Number of Jobs 1996 | % Change |
|---|---|---|---|
| Tourism Cluster | 7,456 | 8,737 | 17.2% |

Source: 1990 to 1996 ES-202 Data, Oregon Employment Department

### *Location Quotient /Shift-Share:*

- Table 4.39 shows 1996 location quotient information for the Tourism cluster for the metropolitan area, excluding Clark County.

*Table 4.39. Location Quotient for Tourism Cluster, Portland Metropolitan Area, 1996 Employment*

| Industry Segment | Location Quotient |
|---|---|
| Temporary Employment Cluster | .79 |

Source: 1996 ES-202 Data, Oregon Employment Department

# V. REFERENCES

## A. LIST OF DATA SOURCES

| DATA SOURCE | DATA TYPE(S) | YEAR(S) |
|---|---|---|
| 1996 American Community Survey | • Poverty data<br>• Educational attainment | 1996 |
| Bureau of Economic Analysis, Input-Output Tables of the US Economy, 1992 Benchmarks | • Input-output information by SIC code | 1992 |
| Bureau of Economic Analysis, website: www.bea.doc.com, Regional Economics Information System, released 12/30/97 | • Employment and payroll data by SIC code<br>• Per capita income data<br>• State and regional personal income<br>• State gross domestic product<br>• Average wages and earnings<br>• Earnings data | 1969 - 1996 |
| Bureau of Labor Statistics, National Compensation Survey, August 1997 | • Distribution of wages in Portland – Salem CMSA | 1997 |
| Business Journal Top 50 List | • Top 50 private businesses | 1986 – 1996 |
| Center for Population Research and Census, Portland State University | • Population estimates<br>• Net migration | 1981 - 2000 |
| County Business Patterns, US Census | • Employment data by County | 1988 - 1995 |
| Current Population Survey, US Census, March 1997 | • Poverty data | 1996 |
| ES-202 data, provided by Oregon and Washington Employment Departments | • Employment data by SIC code, by firm<br>• Wage data by SIC code<br>• Location quotient information<br>• Strategic analysis | 1986 - 1996 |
| Exporter Location Series, US Census Bureau, prepared by the International Trade Administration, http:// www.ita.doc.gov | • Total exports from Portland metro area, Oregon | 1993 – 1996, 1990 -1996 |
| Holland, et al. (see references) | • Share of local output consumed locally | 1982 |
| Massachusetts Institute for Social & Economic Research (OM Export Series) | • Exports from Oregon, by selected industries | 1989 and 1996 |
| Metro | • Journey-to-work | 1980 and 1990 |
| National Center for Education Statistics | • Educational attainment | 1995 |
| Office of Economic Analysis, Department of Administrative Services | • State personal income, forecast | |
| Oregon Department of Revenue | • Income distribution<br>• Adjusted gross income<br>• Personal income taxes paid | 1985, 1990, 1995, 1996 |
| Oregon Employment Department, Workforce Analysis Section | • Employment by industry<br>• Annual covered wages<br>• Unemployment<br>• Tax revenues and benefits | 1956 – 1996 |
| Oregon State Health Division | • Population net migration data | 1970 –1980 |
| US Bureau of Labor Statistics | • Employment data | 1996 |
| US Census Bureau | • Population estimates<br>• Income distribution<br>• Poverty rates<br>• Educational attainment | 1960 – 1990 |
| Washington State OFM – Forecasting Division | • Net Migration data for Clark County | 1970 - 1997 |

## B. WORKSHEETS

| WORKSHEET | CONTENTS | STATUS (PUBLIC OR CONFIDENTIAL) |
|---|---|---|
| 1996_exp.xls | • 1990 – 1996 Export Data for Oregon by 2 digit SIC<br>• 1993 – 1996 Export data for Portland PMSA by 2 digit SIC | Public |
| 90income.xls | • 1990 income distribution for US and Portland PMSA | Public |
| Bea_6996.xls | • Employment and payroll data for 1969 – 1996 | Public |
| Clark County.xls | • Employment data<br>• Location quotient | Confidential |
| Clusters.xls | • Data on location quotients, employment, and employment growth for industry clusters in Portland PMSA, 1990 – 1996 | Confidential |
| County_b.xls | • Employment data by county codes, number of firms by number of employees 88 – 95 OR | Public |
| Edattain.xls | • Educational attainment | Public |
| Implan Analysis.xls | • Traded and non-traded sectors of the local economy | |
| Incomed.xls | • Income distribution analysis based on income tax records – 1985, 1990, 1996 | Public |
| Input-Output Analysis by cluster: food.xls, hi-tech.xls, metals.xls, nursery.xls, wood.xls | • Input – Output analysis | Public |
| Jtw8090.xls | • Journey-to-Work data 1980 and 1990 for Portland PMSA | Public |
| Manufact.xls | • Top 40 US manufacturing centers | Public |
| Metro area tax analysis, 1996.xls | • Personal income tax analysis | |
| Oeddata.xls | • Covered employment data from Oregon Economic Development Department<br>• Unemployment data | Public |
| Pdxecon.xls | • Income tax revenues vs. tax benefits – comparison of PDX PMSA with rest of State | Public |
| PDX emp.xls | • Employment data, ES-202 and BEA?<br>• Location quotient data | Confidential |
| PDXIncome.xls | • Per capita income data?<br>• Earnings and wage data<br>• Shift in share analysis | |
| Population.xls | • Population and net migration data | Public |
| Pov2.xls | • Poverty data, 1970 - 1996 | Public |
| Sicemp.xls | • Employment Data by SIC Code, excluding Clark County | Public |
| Strategic.xls | • Strategic analysis of Portland industries based on LQ, employment, growth rate | Public |
| Top 50.xls | • Top 50 analysis 1986 – 1996 | Confidential |
| Top 50 businesses.xls | • Top 50 businesses by industry | Confidential |

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