PORTLAND-METRO’S MANUFACTURING SECTOR
Paying dividends for Portland-metro families

Photo by HH Clift
Photo provided by Vigor
Why manufacturing matters

This report from the Value of Jobs Coalition examines the positive impact a healthy manufacturing sector has on wages and benefits for Portland-metro workers and their families.

Like previous research, the goal of this report is to inform policy-makers and the public about our region's economic challenges and point out opportunities where we can improve our quality of life through private-sector job creation and retention and better wages.

Our coalition's previous studies highlighted the important role of international trade and traded-sector industries in helping to grow private-sector jobs and increase wages. Previous studies also showed how increasing wages and job growth translate into a healthier public sector with better schools, livable neighborhoods and greater social equity.

This study looks at one critical part of the traded-sector economy — manufacturing. Although traded-sector services are of growing importance, the production of traded-sector goods (i.e., manufacturing) is still the backbone of Portland-metro's traded-sector employment. This report shows that a strong manufacturing sector translates into higher incomes and significantly better health and retirement benefits for Portland-metro workers in manufacturing careers.

Key findings include:

- Portland-metro has retained a larger manufacturing base (as a percent of total employment) than the average U.S. metro area;
- Manufacturing careers provide higher wages and better benefits than non-manufacturing jobs, particularly for non-whites and non-English-speaking workers;
- A strong manufacturing base can help a region's economy grow through research and innovation;
- Portland-metro is a national leader in specialized areas of manufacturing such as high-tech electronics and specialty metal fabrication; and
- Portland-metro excels in the efficient production of manufactured goods, especially high-tech electronics, ranking 25th in the nation in manufacturing productivity per capita in 2010.

Our region's strength in manufacturing demonstrates the need for action to address the challenges hampering growth in this sector. Our coalition's study on industrial lands shows that the region lacks a supply of readily developable sites for new industrial growth. We know that Oregon's high capital gains tax also presents a hurdle for some manufacturing investment. And there are ongoing challenges in matching the skills needed for manufacturing careers with our K-12 education system.

Our goal is for this study to catalyze a constructive dialogue among policy-makers, business leaders and other community stakeholders about how our region can help attract, retain and grow manufacturing careers. If we are successful, we will build a stronger and more diverse economy and provide opportunity for middle-class and family-wage careers for a greater share of the region's residents.

About this report

The data and analysis in this report were compiled by ECONorthwest for the Value of Jobs Coalition which includes the Portland Business Alliance, Associated Oregon Industries, Greater Portland, Inc., Oregon Business Association, Oregon Business Council and Port of Portland. This report was written by the Portland Business Alliance and reviewed by ECONorthwest. The Manufacturing 21 Coalition also assisted in the development of this report. It is one of a number of studies authored by the Value of Jobs Coalition examining the region's current and historical economic performance. The objectives of the reports are to identify key factors impacting employment, wages and incomes, highlight areas where the Portland-metro economy under-perform relative to various benchmarks; and begin a conversation with public-and private-sector leaders to define strategies to spur the economic growth.

Portland-metro in this report refers to the Metropolitan Statistical Areas of Portland-Vancouver-Hillsboro, OR-WA MSA. The other metro regions in this study are based on the Metropolitan Statistical Areas used by the U.S. Census Bureau.
Manufacturing in the U.S.

Manufacturing is good for workers

Manufacturing jobs pay higher wages and offer more generous benefits than non-manufacturing jobs. Figure 1 shows the average hourly wage for manufacturing workers in the U.S. was $29.75 in 2010, 8 percent higher than the $27.47 paid in non-manufacturing industries. Manufacturing workers earn 59 percent more ($8.52 per hour vs. $5.37) in benefits than non-manufacturing workers. In part, these differences reflect the fact that manufacturing workers are more likely to receive retirement benefits (78 percent vs. 62 percent) and health benefits (90 percent vs. 66 percent) than non-manufacturing workers.\(^1\)


\(^{2}\) City specific data on retirement benefits and the cost of benefits are not available; however, data on health insurance coverage indicate that differences in health insurance coverage by industry resembles the national data described above.

BY THE NUMBERS:


17. Rank of Portland-metro in percentage of jobs in manufacturing.

33.5. Percentage of Portland-metro manufacturing specialized in high-tech sector – twice the U.S. average.

32,600,000,000. Value in dollars of Portland-metro’s manufacturing sector output in 2010.

55. Number of employees in average Portland-metro manufacturing plant.

8. Percentage by which manufacturing wages and salaries exceed those of non-manufacturing jobs.

49. Percentage more in wages a non-white manufacturing worker earns compared to a non-white, non-manufacturing worker.

59. Percentage by which manufacturing benefits exceed those of non-manufacturing jobs.
The higher wages and benefits of manufacturing careers are not due to manufacturing attracting a higher share of workers with college degrees or more experience. For instance, Figure 2 presents the average wage (left panel) and share with health insurance (right panel) for manufacturing and non-manufacturing workers by education level. At all levels of education, manufacturing workers earn more on average than non-manufacturing workers. At all levels of education, manufacturing workers are more likely to have health insurance.

Over the past 20 years, however, wage growth in manufacturing has been slower than in non-manufacturing at all levels of education (and was negative for low-skilled workers). As such, the manufacturing wage premiums are smaller today than they were 20 years ago, but they appear to have grown in recent years.\(^3\)

Manufacturing workers are half as likely to quit their job as are other private-sector workers,\(^4\) and manufacturing workers have higher productivity and higher value-added per worker than their non-manufacturing counterparts.\(^5\)

### Manufacturing is good for innovation and long-term economic growth

Some economists consider innovation the “single, most important component of long-term economic growth.”\(^6\) Over the long-term, regions grow through one of two means. First, a region can accumulate more of the four forms of capital – workers and skills, machines and infrastructure, natural resources or social institutions and trust. Second, a region can grow by getting more output from the resources they already have – in other words, they innovate. A substantial proportion of growth stems from existing businesses through innovating.\(^7\)

Innovation results from a variety of factors, including efforts to create new products or processes and from employing people with the skills and training to come up with new ideas. That means that innovation is closely related to investments in research and development and the employment of workers with Science, Technology, Engineering and Mathematics (STEM) training. Compared to other sectors, manufacturing firms invest a much larger amount in research and development, and they employ a much bigger share of STEM workers. As a result, they produce more innovation.

---

7 Rosenberg (2004).
Manufacturing is good for research & development

In 2009, $400 billion was invested in research and development in the U.S. Figure 3 shows $195 billion of this was from manufacturing firms: 49 percent of the overall total and 69 percent of the total invested by private industry.

In 2009, Oregon ranked 13th among states in research and development investment as a share of Gross Domestic Product. Oregon’s relatively high ranking stems from very high business investment in research and development. Eighty-four percent of Oregon’s research and development dollars comes from business investment with the remainder primarily from government sources.

Figure 3. Funds in billions spent for R&D performed in the United States, 2009


Manufacturing is good for STEM workers

Manufacturing employs a higher percentage of workers with science, technology, engineering and mathematics (STEM) degrees than other sectors. Nationally, one-third of college-educated workers in manufacturing have a STEM job. In contrast, only one-tenth of college educated workers outside of manufacturing had a STEM job. STEM concentrations are even higher in Oregon, where 45 percent of college-educated workers in manufacturing have a STEM job. By contrast, only 19 percent of college-educated non-manufacturing workers have a STEM job (Figure 4).

Figure 4. Percent of STEM employment in Oregon by industry and educational attainment, 2010

Source: ECONorthwest analysis of American Community Survey, IPUMS USA

Greater research and development investment and more STEM workers explain in part why manufacturing firms are much more likely to report innovation. Between 2006 and 2008, 22 percent of manufacturing firms reported that they introduced a new or significantly improved product or service, and 22 percent of manufacturing firms reported a new or significantly improved process. In contrast, only 8 percent of non-manufacturing firms reported introducing a new or significantly improved product, service or process.

Based on these facts, many economists argue that a functioning manufacturing sector is important – and perhaps critical – for economic innovation and thus a healthy economy.

Laurie Miller
Self Sustaining Technician (SST)
Intel Corporation
Years with company: 32
Oregon employees: 17,000
Manufacturing is good for the local sector

Nearly all manufacturing falls in the “traded sector.” In other words, most manufacturing firms make products in one place and sell them to consumers in other places. A previous report, conducted for the Value of Jobs Coalition, showed the important role played by traded-sector firms in regional economies. One of the main themes of that report is the effect of a healthy traded sector on the local (or non-traded) sector.

Several recent studies document the effects of manufacturing on the local economy. Comparing places where large manufacturing facilities were built to the other areas considered for the same plant, these studies find that adding a large manufacturing plant to an economy increases property values by 1.1 to 1.7 percent. They also find that local firms in the same industry in the winning location experience faster productivity growth, suggesting that winning the plant generates spillover benefits for other local businesses and employers.

Generally speaking, more manufacturing generates more activity in the local sector and is associated with higher property values, greater employment in the local sector, higher wages outside of manufacturing and greater productivity within manufacturing.

Manufacturing, as part of the traded sector, generates the same positive effects on local sector employment, income and activity. On average, each additional manufacturing job generates 1.5 jobs in the local economy.

Several recent studies document the effects of manufacturing on the local economy. Comparing places where large manufacturing facilities were built to the other areas considered for the same plant, these studies find that adding a large manufacturing plant to an economy increases property values by 1.1 to 1.7 percent. They also find that local firms in the same industry in the winning location experience faster productivity growth, suggesting that winning the plant generates spillover benefits for other local businesses and employers.

Manufacturing as part of the traded sector, generates the same positive effects on local sector employment, income and activity. On average, each additional manufacturing job generates 1.5 jobs in the local economy.

Several recent studies document the effects of manufacturing on the local economy. Comparing places where large manufacturing facilities were built to the other areas considered for the same plant, these studies find that adding a large manufacturing plant to an economy increases property values by 1.1 to 1.7 percent. They also find that local firms in the same industry in the winning location experience faster productivity growth, suggesting that winning the plant generates spillover benefits for other local businesses and employers.

Generally speaking, more manufacturing generates more activity in the local sector and is associated with higher property values, greater employment in the local sector, higher wages outside of manufacturing and greater productivity within manufacturing.

Manufacturing, as part of the traded sector, generates the same positive effects on local sector employment, income and activity. On average, each additional manufacturing job generates 1.5 jobs in the local economy.

Several recent studies document the effects of manufacturing on the local economy. Comparing places where large manufacturing facilities were built to the other areas considered for the same plant, these studies find that adding a large manufacturing plant to an economy increases property values by 1.1 to 1.7 percent. They also find that local firms in the same industry in the winning location experience faster productivity growth, suggesting that winning the plant generates spillover benefits for other local businesses and employers.

Generally speaking, more manufacturing generates more activity in the local sector and is associated with higher property values, greater employment in the local sector, higher wages outside of manufacturing and greater productivity within manufacturing.

Manufacturing is good for Portland-metro’s economy

Manufacturing in Portland-metro is highly productive and large relative to other metro areas. Portland-metro’s manufacturing sector accounts for 107,000 jobs, earning the rank of 17 among the largest 100 metro areas in the U.S.

Manufacturing workers make up nearly 11 percent of Portland-metro’s workforce. In contrast, manufacturing makes up only about 8.5 percent of total employment in other metro areas.

In 2010, Portland-metro’s manufacturing sector produced $32.6 billion worth of output, which constitutes more than 26 percent of total regional output. Manufacturing’s share of total output in Portland-metro is substantially higher than the U.S.-metro average of 11 percent and is only slightly lower than San Jose-metro, which has the highest share among large metro areas. Output per worker in Portland-metro’s manufacturing sector is approximately $300,000, approximately twice the U.S.-metro average.

Consistent with its very large output per worker, an important segment of Portland-metro’s manufacturing sector is specialized in information technology and very high-tech manufacturing. Approximately 34 percent of Portland-metro’s manufacturing qualifies as very high-tech, nearly twice the U.S. average.

Manufacturing in Portland-metro is highly productive and large relative to other metro areas. Portland-metro’s manufacturing sector accounts for 107,000 jobs, earning the rank of 17 among the largest 100 metro areas in the U.S.

Manufacturing workers make up nearly 11 percent of Portland-metro’s workforce. In contrast, manufacturing makes up only about 8.5 percent of total employment in other metro areas.

In 2010, Portland-metro’s manufacturing sector produced $32.6 billion worth of output, which constitutes more than 26 percent of total regional output. Manufacturing’s share of total output in Portland-metro is substantially higher than the U.S.-metro average of 11 percent and is only slightly lower than San Jose-metro, which has the highest share among large metro areas. Output per worker in Portland-metro’s manufacturing sector is approximately $300,000, approximately twice the U.S.-metro average.

Consistent with its very large output per worker, an important segment of Portland-metro’s manufacturing sector is specialized in information technology and very high-tech manufacturing. Approximately 34 percent of Portland-metro’s manufacturing qualifies as very high-tech, nearly twice the U.S. average.
As shown in Figure 5, 24 percent of manufacturing employment in Portland-metro is in the semiconductor and other electronic component sector.

Overall, nearly 75 percent of Portland-metro’s manufacturing employment is in the durable goods sector (the blue parts of the pie). Sectors with relatively large shares of total manufacturing employment include fabricated metal products, food, machinery and transportation equipment.

**Figure 5. Composition of Manufacturing Employment in Portland-metro, 2010**

In recent decades, employment in manufacturing declined in Portland-metro and throughout the U.S. In 1990, approximately 125,000 people worked in Portland-metro’s manufacturing industry, but by 2011 Portland-metro’s manufacturing employment fell to approximately 110,000. As shown in Figure 6, the decline in employment in Portland-metro, however, has been slower than in the U.S. overall and slower than in metro areas such as Seattle, Minneapolis, and Denver.

Portland-metro’s slower decline in manufacturing, in part, stems from the substantial growth in the semiconductor industry in the 1990s. As shown in Figure 7, for nearly all manufacturing industries for which there is data, employment fell between 1990 and 2011; however, employment in the semi-conductor industry more than doubled, increasing by 109 percent over this period. This trend demonstrates why continued investment by Intel and similar firms has been critical to Portland-metro’s economic vitality.

**Figure 6. Change in manufacturing employment in Portland-metro and comparators since 1990**

Manufacturing is good for Portland-metro’s communities of color and recent immigrants

Manufacturing traditionally has been an entry point for workers from a variety of backgrounds into higher wage jobs.

Portland-metro non-white workers and workers who do not speak English at home are significantly better paid if they work in the manufacturing sector than if they work in the non-manufacturing sector. As shown in figure 8, non-white workers earn nearly 50 percent more in manufacturing careers than in non-manufacturing jobs. Workers who don’t speak English at home – mostly recent immigrants – earn 47 percent more in manufacturing than non-manufacturing jobs.

Manufacturing is good for workers with different education attainment levels

As the makeup of Portland-metro’s manufacturing has changed, manufacturing employment has also changed. Figure 9 shows the change in educational attainment over time for manufacturing and non-manufacturing workers in Portland since 1950. In 1950, nearly all manufacturing workers had no post-secondary education.

By 2010, the share of manufacturing workers with no post-secondary education fell to 30.7 percent. Over the same time, non-manufacturing saw a similar shift; however, manufacturing firms are still more likely to employ workers with no college education (30.7 percent vs. 26.8 percent).
Given the higher pay and better benefit levels, workers with no post-secondary education have a better chance at a family-wage job in the manufacturing sector than any other sector.

**Figure 9. Employment by industry & education attainment in Portland-metro**

![Employment by industry & education attainment in Portland-metro](image)

Source: ECONorthwest analysis of American Community Survey, IPUMS USA

### Manufacturing is good for small businesses

While there are a number of large manufacturers in Portland-metro, the majority of Portland-metro’s manufacturing firms are small or very small companies. Roughly 70 percent of all manufacturing firms in the region have fewer than 20 employees.

There is a connection between small and large manufacturers. As seen in the coalition’s traded sector report, small firms such as PECO and BOWCO manufacture parts that are purchased by larger firms like Boeing and PCC Structurals.

### The future of manufacturing

Many may look at the downward trend in manufacturing employment and argue (or simply assume) that the manufacturing sector’s role in the U.S. economy will continue to wane. Some may also argue that manufacturing will continue to lose workers due to technological advancement or competition from countries with lower labor costs, etc.

But a growing chorus of experts have begun to see signs of a manufacturing resurgence in the U.S. as the country’s manufacturing sector still produces more output than any other country. Additionally, approximately 75 percent of the manufactured products consumed in the U.S. are made in the U.S.¹¹ American-made products constitute substantial majorities of domestic consumption in many sectors, including food and beverages, wood and paper products and transportation goods.¹²

A growing number of experts argue that, for some manufacturing, the advantages of moving production offshore may diminish.¹³ A recent analysis by the Boston Consulting Group (BCG) suggests that by 2015 it may become more economical to manufacture many goods in the U.S. due to rising wages and currency appreciation in China.

Examining both labor costs and shipping costs, BCG clusters industries into three main groups:

- Industries likely to remain in the U.S.;
- Industries likely to remain overseas, and “tipping point” industries.

Tipping-point industries are those for which bringing production back to the U.S. may make more sense over the next several years. Seven tipping-point industries are listed in Figure 11.

The BCG report argues that this potential re-shoring of manufacturing puts the U.S. “in a strong position to add 2 to 3 million jobs in a range of industries and an estimated $100 billion in annual output by the end of the decade.” Given Portland-metro’s existing

---


¹² Sirkin et al (2012)

¹³ Sirkin et al (2012)

---

Fred Mitchell
Prototype Machinist
Chris King Precision Components
Years with company: 21
Oregon employees: 97
capacity in several of these areas, Portland-metro’s manufacturing sector is likely to benefit if these projections are realized.

Finally, other experts argue that manufacturing stands at the precipice of a “third industrial revolution.”\(^{14}\) Proponents of this view argue that technological advancements will lower production costs and increase production flexibility. In particular, these advancements may reduce labor requirements, reducing the advantage of moving production off-shore due to lower wages and encouraging producers to bring some of their work back to the U.S. and other countries.\(^{15}\)

Ultimately, no one can predict the future. The arguments outlined above may come to fruition or they may not. Nevertheless, it’s clear there are several plausible economic forces and trends that may help boost manufacturing in the U.S. and in Portland-metro.

\(^{14}\) The Economist devoted an issue (April 21, 2012) to this topic.

\(^{15}\) The Economist.
Conclusions

Over the decades, the Portland-metro region has been home to a strong manufacturing sector. Our region has a proud history of manufacturing work and innovation. This sector has provided good, family-wage jobs for workers with significantly higher benefits from a variety of education and economic levels and backgrounds.

Our region’s manufacturing sector has also driven large investments in research and development, leading to innovation. And, the traded-sector nature of manufacturing has contributed to positive private-sector job creation in other sectors of our economy.

Although manufacturing employment nationally has declined, Portland-metro manufacturing employment has been more stable and continues to support a larger number of jobs than the national average.

Additionally, Portland-metro manufacturing is more productive than many metro areas, particularly in very high-tech fields where we have a higher-than-average proportion of manufacturing jobs.

With our strong base of companies and skilled employees, we are well positioned for the possibility of manufacturing returning to the U.S. from overseas.

Our coalition’s latest analysis shows that manufacturing provides better wages and benefits for workers at all levels of education, and pays a bigger premium for workers with less than a college degree, limited English skills and communities of color. At a time when the region is striving to improve the educational attainment of students, it is important to also consider the positive influence manufacturing careers can have on issues of income equity and earnings opportunity.

A thriving modern manufacturing sector will benefit from improved natural, physical, human and social capital. The benefits of our manufacturing sector could be enhanced by:

- Tax and other public policies that encourage investment in state-of-the-art equipment, research and development to spur innovation;
- Expanded education programs that expose students to manufacturing careers and provide them with STEM skills;
- Investments in modern, affordable infrastructure that provides efficient movement of goods and workers; and
- Sufficient supplies of market-ready industrial land for growth of existing and recruitment of new firms.

We face challenges in finding the resources to achieve these investments. With targeted initiatives, however, our region can expand on its already strong manufacturing base, grow and retain private-sector job opportunities, increase wages for workers and boost our region’s overall quality of life.
About the Value of Jobs Coalition

The Value of Jobs Coalition is based on the premise that in order to have a prosperous, healthy Portland region with a good quality of life, we need more private-sector jobs. The coalition began with an economic study in the fall of 2010, which uncovered troubling economic data about the Portland-metro region. A number of other studies have followed that highlight the region’s economic opportunities and challenges. Find out more at: www.valueofjobs.com.