

2010

INTERNATIONAL TRADE STUDY

Full Study



**International Trade: A Driver of Output and Employment in Oregon and
Portland/Vancouver**

A Report Prepared for

The Portland Business Alliance

December 2010

International Trade: A Driver of Output and Employment in Oregon and Portland/Vancouver

Findings

Few subjects are as controversial – and misunderstood – today as international trade. A thorough analysis of the impacts of trade on Oregon and the Portland/Vancouver region makes one conclusion abundantly clear: trade – both exports and imports – has been good for the region's economy and jobs. Notably,

- Exporting creates output and supports jobs. Over 100,000 jobs in Oregon are tied to exporting manufactured goods alone. Oregon manufacturers and their workers depend on foreign customers for one in four dollars of sales and a quarter of the sector's jobs. Export-dependence is higher for several key State sectors: more than half of the State's shipments of chemicals and 45 percent of its sales of machinery, for example, were sold to customers outside the United States.
- Imports keep costs down not only for Oregon families, but also regional farmers, manufacturers and services providers, who import raw materials, components and machinery to support local production. Lower costs help producers and their workers compete in highly cost conscious domestic and international markets.
- Most Oregon exporters are small businesses, and small businesses employ over half of Oregon's private-sector workforce.
- Exported services as well as goods are increasingly important to the region's economy. For example, Portland's architectural and engineering firms are translating Portland's reputation for incorporating values like sustainability, environmental sensitivity and renewable energy into success on the international stage.
- Foreign investment in Oregon means jobs. More than 44,000 people work for foreign-owned companies throughout Oregon. Subsidiaries of major foreign companies employ thousands of workers in the Portland/Vancouver area.
- An improving international trade environment will be a critical factor in a local economic recovery and could play a significant role in reversing or at least slowing a loss of jobs from Multnomah County. Early 2010 export figures show strong growth in trade. Evidence indicates that increased international trade increases wages for all workers in the industry, not just those working for firms directly involved in trade, helping address the state's below-average median income.

Portland has a natural advantage in the international trade economy relative to other areas of the country due to its geographic location on the Pacific Rim, deep-water and inland port system, international air connections and extensive road and rail infrastructure and land availability. However, the region's small size means it is a transshipment point rather than an end consumer. Relative to other metropolitan areas on the West Coast, that means local, regional and national policy makers and business must work harder to lower costs to remain competitive with ports located in larger economies by facilitating investments in infrastructure and tax and trade policies that promote international trade.

International Trade: A Driver of Output and Employment in Oregon and Portland/Vancouver

Introduction

With its location on the West Coast and home to a major port handling international trade, it is not surprising that Oregon's economy and workers – and the economy and workforce of the Portland/Vancouver area – would be closely linked to the international marketplace. The range of goods and services produced in Oregon ensures that the importance of trade is both broad and deep. And the Portland/Vancouver area is home to manufacturers and services providers and their employees who are actively engaged in international trade. President Obama's goal to double U.S. exports in five years and expand employment by 2 million jobs will no doubt redound to the benefit of Oregon and Portland/Vancouver area farmers, manufacturers, services producers and workers.

Trade is about more than exports, however. Imports support local production and jobs as well. Efforts to liberalize U.S. barriers to trade will also benefit Oregon consumers, which include not only families but also farmers, manufacturers and services providers who are equally cost-conscious in an economic environment that requires attention to price and tight budgets. More competitive Oregon production enables local employers to maintain jobs in the region.

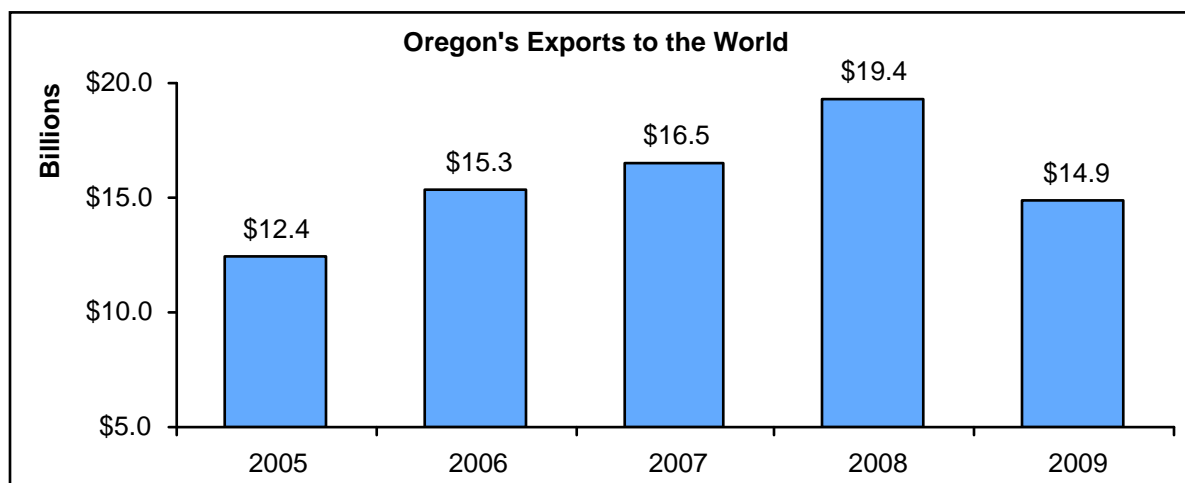
Finally, foreign investment – both in Oregon, Portland/Vancouver, and abroad – supports output and jobs in the State. Foreign investors locate in the region to take advantage of its talented labor force, access to resources, and proximity to global markets.

Overall, trade and investment fuel economic growth and support employment, both nationally and locally. They encourage resources to flow to sectors where U.S. workers and other inputs to production shine: where they are able to produce a good or service at a price that offers greater value to customers than the same or similar goods and services made by others. Imports contribute as well, by making U.S. industries and their workers more competitive through lower costs, and by increasing U.S. consumers' buying power. More competitive industries grow faster and support higher-wage jobs. Consumers with more income to spend fuel growth and jobs as well. A recent study found that total trade – exports and imports of goods and services – in 2008 supported 38 million jobs, more than one in five jobs in the United States, and more than 286,000 in Oregon.¹

¹ Laura M. Baughman and Joseph F. Francois, *Trade and American Jobs, The Impact of Trade on U.S. and State-Level Employment: An Update*, prepared by Trade Partnership Worldwide, LLC for the Business Roundtable, July 2010, http://www.tradepartnership.com/pdf_files/Trade_and_American_Jobs7.2010.pdf.

Trade Is an Integral Part of the Oregon and Portland/Vancouver Economies

Trade matters for Oregon and Portland/Vancouver companies and their employees. Merchandise exports exceeded \$19 billion in 2008, before the global recession hit. Prior to the recession, exports of Oregon goods registered impressive gains, rising at an average *annual* rate of 16.1 percent from 2005-2008 – faster than the 12.6 average annual growth in merchandise exports for the country as a whole. The global recession took a heavy toll on Oregon’s exports in 2009, which saw a 23 percent drop from 2008 levels, compared to a decline of 18.0 percent in 2009 for U.S. exports generally.² But data for the first eight months 2010 suggest that the growth trend has resumed. Oregon’s total merchandise exports leaped 29 percent from January-August 2010 compared to the same period in 2009.



Leading Exported Merchandise Products

Companies and their employees in a number of sectors benefit from Oregon’s merchandise exports. Ten sectors account for 90 percent of the State’s total

² It is important to note another contributor to lower volumes of exports from Oregon in 2009 and 2010: a shortage of shipping containers on the West Coast. The economic downturn led global marine shipping companies to take roughly 13 percent of the global fleet and their containers, out of service. See U.S. International Trade Commission, *Small and Medium-Sized Enterprises: U.S. and EU Export Activities, and Barriers and Opportunities Experienced by U.S. Firms*, Inv. No. 332-509, USITC Pub 4169, July 2010, <http://www.usitc.gov/publications/332/pub4169.pdf>. Compounding the absolute reduction in containers is the fact that most U.S. imports arrive at East Coast ports, and most exports to Asia exit the United States out of West Coast ports. The ITC study notes that data for the Port of Portland alone show an annual deficit of nearly 70,000 containers in 2009. The rail cost of repositioning empty surplus containers on the East Coast to the West Coast has tripled. Container shortages have posed particular problems for agricultural exporters in Oregon.

merchandise exports (see Table 1). But more than half the State's total exports come from two sectors – computers and electronic products and agricultural products. Semiconductors and other components account for more than 80 percent of the value of Oregon's exports in the "computer and electronics products" category. Seeds account for 80 percent of Oregon's exports in the "agriculture products" category.

Intel is the largest private employer in Oregon. The 15,000 employees at its seven Hillsboro campuses engage in all aspects of Intel's work, including manufacturing, research and development, and corporate activities. Intel in Oregon is the largest and most complex of Intel's worldwide operations.

In 2009, Intel announced its largest ever investment in a single process technology. The investment includes \$1.5 billion to upgrade the Hillsboro facilities during 2009-2010 and comes on top of \$1 billion invested in 2008. Intel invested the money to prepare for its move to next-generation, 32-nanometer chip manufacturing technology. Substantial additional investments are expected in subsequent technology shifts.

What makes the consecutive-year, multi-billion-dollar investments possible? Exports. While the United States accounts for three-quarters of its semiconductor manufacturing, R&D budget, and capital investments, three-quarters of Intel's customers are outside the United States. As the largest U.S. manufacturing site, Intel Oregon is a leading producer of wafers for export. Malaysia, Costa Rica, and Vietnam, where Intel maintains Assembly and Test Facilities, are all major export destinations for wafers produced in Oregon.

Oregon supplies significant shares of total U.S. exports of wood products, computers and electronics, and agricultural products. In 2009, the State's exports of wood products represented nearly 8 percent of total U.S. wood product exports. Sawmilled wood, veneer, plywood and engineered wood products account for most of Oregon's exports in this sector. Its exports of computers and electronics and parts accounted for over 4 percent of total U.S. exports of these products, and that share has been solidly increasing since 2005. Oregon's exports of agricultural products represent over 4 percent of total U.S. agricultural product exports. The state is the largest exporter of seeds among all U.S. states.

While exports of Oregon's leading products dropped in 2009 as international markets felt the full impact of the global recession, data so far for 2010 suggest a strong recover is under way. Exports of Oregon's two most significant categories of goods

Table 1
Oregon Merchandise Exports, Total and by Leading Sector, 2005-Present
(Millions and Percent)

	2005	2006	2007	2008	2009	Jan.-Aug. 2009	Jan.-Aug. 2010
Total	\$12,407.2	\$15,302.6	\$16,530.9	\$19,352.1	\$14,907.4	\$9,122.0	\$11,756.4
Computers & electronics, pts	4,600.7	6,541.9	6,293.5	7,980.2	6,757.7	4,072.8	5,429.3
Agricultural products	1,496.7	1,490.5	2,218.0	2,801.8	2,114.1	1,208.5	1,383.0
Non-electric machinery	1,344.6	1,579.1	1,690.3	1,626.4	1,136.8	691.1	1,013.9
Chemicals	520.2	499.8	661.7	1,260.5	1,023.9	637.3	940.4
Transportation equip.	1,660.7	1,899.7	1,774.5	1,480.1	739.6	467.99	501.4
Primary metal products	369.1	495.0	603.3	704.1	435.3	305.3	366.2
Waste & scrap	135.0	306.9	406.9	568.4	420.4	278.4	259.1
Food products	306.1	321.4	403.4	393.6	372.3	232.2	301.1
Wood products	344.0	372.5	419.5	466.9	323.9	195.6	313.8
Miscellaneous manufactures*	136.8	213.1	259.5	297.4	270.6	176.5	183.6
Other sectors	1,493.3	1,582.6	1,800.2	1,772.7	1,312.7	856.3	1,064.7
Oregon's Share of U.S. Total							
Total	1.4%	1.5%	1.4%	1.5%	1.4%	1.4%	1.4%
Wood products	7.3	7.2	8.0	8.8	7.7	7.3	8.8
Computers and electronics	2.7	3.5	3.4	4.2	4.2	4.0	4.4
Agricultural products	4.7	4.1	4.6	4.5	4.2	4.0	4.1
Waste & scrap	1.3	1.9	1.8	1.9	1.9	2.1	1.4
Primary metal products	1.2	1.2	1.3	1.2	1.1	1.2	1.0
Non-electrical machinery	1.3	1.3	1.3	1.1	1.0	0.9	1.1
Food products	1.0	1.0	1.0	0.8	0.8	0.8	0.9
Chemicals	0.4	0.4	0.4	0.7	0.7	0.6	0.8
Transportation equipment	1.0	1.1	0.9	0.7	0.4	0.5	0.4

* "Miscellaneous manufactures" includes a diverse range of products, such as medical equipment and supplies, jewelry, sporting goods, toys, and office supplies.

Source: U.S. Census Bureau

were up strongly during the first eight months of 2010, compared to the same period in 2009: computers and electronics, up 33.3 percent, and agricultural products, up 14.4 percent. Exports of wood products (up 60.4 percent), chemicals (up 47.6 percent) and non-electrical machinery (up 46.7 percent) have also surged in the first eight months of 2010.

Exports are important to the output – and related employment -- of several sectors in Oregon. For manufactured goods as a whole, one out of four dollars earned came from an export sale. Table 2, which details those sectors for which exports

represented at least 10 percent of total shipments, shows that Oregon exports more than half of the chemicals manufactured in the state, and nearly half of machinery produced in the State goes to overseas customers.

Table 2
Oregon Exports' Share of Merchandise Shipments, 2008
(Percent)

Total	24.6%
Chemicals	54.9
Machinery	44.7
Computers & electronics	37.0
Transportation equipment	36.7
Electrical equipment, appliances and components	36.0
Miscellaneous manufacturing*	20.2
Primary metal products	16.7
Nonmetallic mineral products	14.9
Plastics and rubber products	14.5
Paper products	10.9

* "Miscellaneous manufactures" includes a diverse range of products, such as medical equipment and supplies, jewelry, sporting goods, toys, and office supplies.

Source: Derived from U.S. Census Bureau data

Small and Medium-Sized Exporters

Oregon's small and medium-sized firms (SMEs) account for the bulk of Oregon's exporters. In 2008, 88.1 percent of Oregon's 4,637 exporters were SMEs.³ These are companies with direct export shipments; it does not include the many related SMEs who indirectly exported by selling parts or components that were subsequently incorporated into an export shipment, for example. Indeed, many SMEs are indirect exporters, selling inputs to larger companies who in turn export the finished product or services.⁴ The heavy involvement of Oregon SMEs in trade is important to the State's employment base because, according to the U.S. Small Business Administration, 57 percent of

³ Bureau of the Census, <http://ita.doc.gov/td/industry/otea/edb/index.html>. SMEs are defined as firms with fewer than 500 workers.

⁴ The U.S. International Trade Commission will issue late 2010 an assessment of the degree to which SMEs are indirect exporters by virtue of their position in the domestic supply chain.

Oregon’s private-sector workers are employed by small businesses. Oregon small businesses created 81 percent of the State’s net new jobs form 2003-2006.⁵

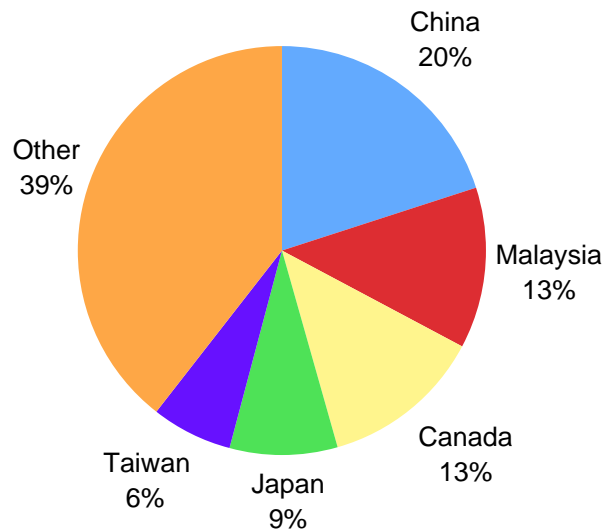
Rogue Ales, which started in a basement in Ashland, has been brewing high-quality beers since 1988. Today, Rogue brews all of its beer in Newport, operates 11 restaurants in Oregon, Washington, and California, two distilleries in Oregon, and sells its products in all 50 states.

Consumers throughout the world love Rogue’s beers as much as Americans do, and Rogue’s beers have won nearly 700 medals at international competitions over 22 years. Rogue exports to 28 countries, with Canada its leading export market.

Key Global Markets for Merchandise Exports

Policy makers often note that 95 percent of the world’s consumers live outside the United States, and Oregon exporters know this. The State exports to 220 countries and territories. That said, Oregon exports are increasingly – and heavily – focused on Asia, the state’s largest regional export market. Exports to Asia grew at an average *annual* rate of 20.9 percent from 2005-2008 (see Table 3). Export growth to China has been significantly stronger, at 49.4 percent *per year* during that period. Exports to China even continued to grow in 2009, when China became Oregon’s largest export market, displacing Canada. Moreover, exports from Oregon to China rose nearly 60 percent in the first eight months of 2010 compared to the same period in 2009, boosting Asia’s share of all Oregon exports up from 59.0 percent in the first eight months of 2009 to 64.4 percent during the same period of 2010.

Top Oregon Export Markets, 2009



⁵ Based on data for 2006, the most recent available. Small Business Administration, Office of Advocacy, “Small Business Profile: Oregon,” 2008, <http://www.sba.gov/advo/research/profiles/09or.pdf>.

One large focus of that export activity in Asia is a tightly knit network of computer and electronic co-production relationships. The State and its workers are an integral part of co-production chains that have developed for computers and electronics products with producers across Asia, and in particular China.⁶ Semiconductors and electronic parts comprised more than 60 percent of Oregon's 2008 exports to China, 83 percent of its exports to Malaysia, more than half its exports to Taiwan, and 27 percent of its exports to Korea. Exports of Oregon-sourced semiconductors and parts are incorporated into finished computer and electronic goods which are later imported back into the United States (and elsewhere), with "Made in China" or "Made in Malaysia" labels, for example.⁷ As the Intel profile demonstrates, high-wage design and manufacturing jobs in Oregon – semiconductor manufacturing jobs in Oregon paid on average \$97,000 in 2009, 80 percent more than manufacturing jobs generally⁸ -- are linked to assembly jobs outside the United States, and the value of those jobs is incorporated into the final price of an imported computer or electronics product.

"Global demand is the most fundamental driver of our business."

-Tamara Lundgren, President and CEO, Schnitzer Steel Industries

Schnitzer Steel Industries, headquartered in Portland, is one of the largest U.S. recyclers of scrap metal, which it uses recycled to manufacture finished steel products. It is also a leading provider of used and recycled auto parts.

Exports accounted for more than 90 percent of Schnitzer's ferrous scrap revenues in fiscal year 2009. Despite the global economic downturn, Schnitzer exported a record volume of ferrous scrap, with the strongest demand in developing countries. China, Thailand, India, and Turkey are all leading markets for Schnitzer, which exported to 14 countries in 2009.

⁶ See "Role of China in Competitiveness of U.S. CE Industry," prepared by Trade Partnership Worldwide, LLC for the Consumer Electronics Association, 2007, http://www.tradepartnership.com/pdf_files/2007_CEA_China_Study.pdf

⁷ One recent study has estimated that only 4.6 percent of the value of China's computer exports represents Chinese value-added (the rest is foreign in origin), and just 14.9 percent of its telecommunications equipment exports is Chinese content. See Robert Koopman, Zhi Wang, Shang-Jin Wei, "How Much of Chinese Exports is Really Made In China? Assessing Domestic Value-Added when Processing Trade is Pervasive," NBER Working Paper No. 14109, Issued June 2008, <http://www.nber.org/papers/w14109>.

⁸ Oregon Employment Department, Worksource Qualifyinfo.org, "Oregon Statewide 2009 Covered Employment and Wages Summary Report," <http://www.qualityinfo.org/olmisj/CEP?action=summary&areacode=01000000&indtype=N&periodcode=01002009&submit=Continue>.

Seeds and grains are also significant exports to Asian markets. Such seeds accounted for over half of Oregon's exports to Japan, nearly one-third of its exports to Korea and one-fifth of its exports to Taiwan.

Exports to North American Free Trade Agreement (NAFTA) partners matter to Oregon. The trade relationship with these partners is mature and relatively stable, increasing at an average annual rate of 4.3 percent from 2005 through 2008. Iron and steel lead the state's exports to Canada (15.9 percent of total exports to Canada in 2008), followed by (finished) motor vehicles (9.9 percent), agricultural and construction machinery (7.2 percent) and motor vehicle parts (6.3 percent). Half of Oregon's exports to Mexico in 2008 were motor vehicle parts and engines. Another 6.1 percent were rubber products, and 5.2 percent were agricultural and construction machinery. The recession's toll on the motor vehicle and construction markets also shrank Oregon's exports to Canada and Mexico in 2009.

Another growth market for Oregon merchandise exports is South America. Although still small compared to Asia, growth in exports to South America has averaged 54.1 percent per year from 2005-2008. Two Free Trade Agreement (FTA) partners, Chile and Peru, increased their purchases of Oregon goods in recession year 2009, a promising sign for the State's exporters as those FTAs are fully implemented over the next four to ten years, lowering still further barriers to Oregon's exports to Chile and Peru.

Oregon companies and their workers thus have a huge stake in the success – or failure – of a number of pending trade issues. Trade agreements that break down foreign barriers to exports of Oregon goods and services hold the potential to increase export sales. As local output grows, employment could expand as well.⁹ Oregon companies and workers also have a big stake in keeping trade – both exports and imports -- flowing smoothly for products for which local producers provide inputs to the production of another finished good. Efforts to restrict imports, whether they arise from retaliation for currency concerns or concerns about the trade deficit need to be carefully evaluated for potential unintended consequences.

⁹ In an economy facing high unemployment, a sufficient expansion of output would eventually necessitate the hiring of more workers; in an economy characterized by relatively full employment, worker wages would increase, but not the number of jobs.

Table 3
Oregon Merchandise Exports, Total and by Leading Export Markets, 2005-Present
(Millions and Percent)

	2005	2006	2007	2008	2009	Jan.-Aug. 2009	Jan.-Aug. 2010
Total	\$12,407.2	\$15,302.6	\$16,530.9	\$19,352.1	\$14,907.4	\$9,122.0	\$11,756.4
Asia	6,332.5	7,962.9	8,326.8	11,012.0	9,164.8	5,377.9	7,569.0
China	807.3	1,396.1	1,426.4	2,468.8	2,969.5	1,762.5	2,789.4
Malaysia	915.0	1,215.3	1,076.6	1,989.5	1,930.5	1,076.3	1,782.0
Japan	1,219.0	1,254.3	1,469.5	2,006.2	1,296.0	836.2	951.6
Taiwan	639.8	854.6	939.4	1,110.5	920.8	505.4	449.5
Korea	1,311.9	1,288.6	1,336.0	1,252.5	704.5	427.1	589.9
Hong Kong	229.8	253.0	309.2	338.4	326.5	184.4	188.9
Philippines	609.5	870.8	782.6	906.2	296.7	226.0	243.8
Singapore	356.7	491.1	432.8	327.1	201.5	109.6	216.4
Others	243.5	339.1	554.3	612.8	518.8	250.4	357.5
North America	3,155.9	3,554.6	3,754.1	3,548.5	2,097.8	1,425.5	1,795.5
Canada	2,343.1	2,698.3	2,800.3	2,801.0	1,897.4	1,290.3	1,653.0
Mexico	812.7	856.3	953.7	747.5	200.4	135.2	142.5
Europe	1,720.2	1,969.1	2,187.0	2,502.8	1,848.7	1,169.0	1,207.2
Netherlands	173.9	173.0	288.3	396.3	384.7	234.2	230.7
Germany	320.1	386.0	416.0	399.8	362.3	240.8	229.9
United Kingdom	220.8	296.3	289.7	338.5	194.0	130.5	141.4
Others	1,005.4	1,113.8	1,052.4	1,368.2	907.7	563.5	605.1
South America	128.4	186.3	349.4	452.4	318.1	205.1	317.1
Brazil	40.3	62.7	188.8	283.3	117.5	65.4	196.2
Peru	15.7	15.8	38.9	31.9	76.0	60.6	33.1
Chile	20.6	38.5	26.4	30.5	34.8	19.6	19.2
Others	51.8	69.3	95.3	106.7	89.8	59.5	68.6
Others	1,070.3	1,629.6	1,913.6	1,836.4	1,478.0	944.5	867.4
Australia	350.3	870.8	782.6	906.2	296.7	92.1	163.7
Costa Rica	264.7	584.1	542.9	715.8	678.8	483.5	352.6

Shares of Oregon's Total Exports

Asia	51.0%	52.0%	50.4%	56.9%	61.5%	59.0%	64.4%
China	6.5	9.1	8.6	12.8	19.9	19.3	23.7
North America	25.4	23.2	22.7	18.3	14.1	15.6	15.3
Europe	13.9	12.9	13.2	12.9	12.4	12.8	10.3
South America	1.0	1.2	2.1	2.3	2.1	2.2	2.7
Others	8.6	10.6	11.6	9.5	9.9	10.4	7.4

Countries in boldface type are U.S. free trade agreement partners with the United States. The data in bold represent years for which the FTA was in effect.

Source: U.S. Census Bureau

Services Exports

Like the U.S. economy generally, Oregon's economy is heavily services focused. According to U.S. Census data, 62 percent of the state's output in 2008 came from services sectors. Sectors producing internationally traded services (e.g., banking, insurance, tourism-related services, management, transportation, for example) make up 22 percent of Oregon's economy, comparable to the 19 percent of output derived from manufacturing. Nationally, while goods exports dominate, U.S. services exports are highly competitive internationally and consistently record trade surpluses. Unfortunately, the U.S. Government does not routinely publish state services export data.¹⁰ But given the similarities in structure between the Oregon and the United States generally, it is reasonable to expect that State services export profiles and trends mirror those for the United States generally. This suggests that Oregon shines in exporting business, professional and technical services (e.g., consulting, architectural and engineering services), and that travel and tourism exports (foreign tourists visiting Oregon) are also important to the region.

ZGF Architects LLP (ZGF) is known for its design excellence in a broad range of commercial and institutional building types. ZGF's Portland headquarters employs 240 architects, interior designers and urban planners, more than half of the 450 people that work in five ZGF offices in the U.S.

While the bulk of its work is U.S.-focused, ZGF frequently provides services to overseas clients. Currently, ZGF is designing – exporting design services -- state-of-the-art children's hospitals in Canada, China, and Vietnam. It is also designing several large mixed-use developments in China that combine housing, retail, office, hotel, and parking facilities. In addition to these projects, ZGF has provided design services in Singapore, Syria, Thailand, Laos, South Africa, Turkey and Italy.

“Historically, ZGF was very selective about the projects we pursued overseas. However, as the world has become smaller, I have seen a definite increase in the number of international projects that interest us and we are focusing more on those opportunities.” -Nancy Fishman, Principal at ZGF

Exports of services to international markets make up a significant share of Oregon business sales. In 2002, architectural, engineering and related services registered the largest value of Oregon's exports to the world, and those exports accounted for over 10 percent of the industries' total revenues in that year (see Table 4). Other leading services exports were computer systems design and software publishing which, combined with architectural and engineering services, accounted for nearly three-quarters of Oregon's total services exports in 2002.

Table 4

Snapshot: Oregon's Exports of Selected Services, 2002

¹⁰ In fact, the 2002 Census was the first and, so far, only time such data were published for Oregon. An update is expected in the 2007 Census report, which is scheduled to be released in March 2011.

	Revenue from Exports	Exports' Share of Total Revenue
Architectural, engineering and related services	\$158,126	10.8%
Computer systems design and related services	58,608	6.2
Scientific research and development services	12,711	5.4
Commercial, industrial, machinery, equipment, repair/maint.	4,222	4.7

Portland State University (PSU) believes that education must have an international dimension if it is to be relevant to students who will live and work in a multi-lingual, multi-cultural global economy. PSU therefore seeks to prepare its students for careers associated with global connections. Internationalization is woven into the academic curricula at all levels. One key component of fulfilling that mission is to bring international students to PSU -- an Oregon services "export". International student enrollment at PSU is rapidly growing, now accounting for more than 6 percent of its 30,000-student enrollment, the largest international enrollment in Oregon. Over the last five years, PSU's international student community has increased 35 percent, to 1,750 students. They come from 97 countries especially Asia and the Middle East. The economic impact of PSU's exports of education services is approximately \$50 million dollars to the Portland metropolitan area per year, according to NAFSA 2008-09 calculations published for Oregon.

The Value of Intellectual Property

Quantifying the value of the export and import of goods and services is critical to understanding the scope of international trade's importance to the economy. But, it does not give a complete picture of value of trade to Oregon businesses that may not be directly exporting to or importing from Oregon.

Take, for instance, the activewear sector. Oregon receives more patents for footwear than any other state. For an economy Oregon's size, this is a remarkable achievement. But, it is understandable when you realize that the Portland metro region contains the nation's largest concentration of activewear companies and competes successfully for talent and capital with the likes of Los Angeles, New York, and Boston. Nike, Columbia, Adidas, Leatherman, Danner, Pendleton, Keen -- these are just a few of the names of major companies in the activewear sector that call the Portland metropolitan region home and that create valuable intellectual property.

While manufacturing and distribution of the goods created by Oregon activewear companies occur largely outside of the state and country, the research, design, marketing and global management of manufactured goods jobs they create within the state are no less dependent on international trade. Moreover, these jobs tend to pay higher wages because they represent the value of the intellectual property behind a brand. According to the Oregon Employment Department, the average wage in the state's activewear industry in 2009 was \$82,700. This is 79 percent higher than the average wage for all workers in Oregon (\$46,233). A report released recently by the Portland Development Commission found that 700 activewear firms in Oregon employ more than 14,000 Oregonians with a combined payroll of nearly \$1.2 billion. The PDC estimates that another 3,200 self-employed individuals provide services to the activewear sector generating another \$100 million in annual revenue.

The value of intellectual property in trade extends beyond activewear, of course. Other firms such as Nacco Materials Handling Group, which manufactures Hyster trucks and equipment, have their research and development, testing, and administrative headquarters in the Portland region, even though their manufacturing exists in other parts of the United States and the world. The hundreds of local jobs creating and maintaining the company's brand – its intellectual property -- depend on and therefore benefit from the company's ability to sell its products in foreign markets.

Exports and Jobs

Exports support employment in Oregon. Focusing on manufacturing, the Commerce Department reports that 41,600 manufacturing jobs were directly or indirectly related to Oregon's exports of manufactured goods in 2008 (see Table 5). Another 71,800 non-manufacturing jobs helped to make those exports possible, for a total of 113,400 jobs in 2008. Export-related jobs accounted for 24 percent of Oregon's manufacturing employment and 7.8 percent of total State private-sector employment, according to the Commerce Department.

Table 5
Oregon Employment Supported by Manufacturing Exports, 2008

	Number	Share of Total
Total	113,400	100.0%
Manufacturing	41,600	36.7
Non-manufacturing	71,800	63.3
Business services	22,700	20.0
Transportation	8,700	7.7
Wholesale, retail trade	21,100	18.6
Other (ag., forestry, other services)	19,200	16.9

Source: U.S. Department of Commerce

The Commerce data reflect manufactured exports only, but as noted above services exports are also important. One recent study by the Brookings Institution has attempted to estimate the number of jobs associated with selected metropolitan area exports of goods and services, including Portland/Vancouver/Beaverton. Brookings estimates that the number of jobs tied to exporting is much higher than the Commerce estimates for the State as a whole: 125,626 based on 2008 exports.¹¹¹²

¹¹ Brookings Institution, Metropolitan Policy Program, "Export Nation: Profile for Portland-Vancouver-Beaverton, OR-WA MSA," 2010, http://www.brookings.edu/~media/Files/rc/reports/2010/0726_exports/0726_exports_profiles/PortlandOR.pdf. Brookings did not estimate jobs tied to trade at the state level.

¹² All of these estimates focus only on exports. Trade supports jobs in importing as well, and may cost jobs in import-competing sectors as well. A comprehensive picture of the impact of trade on jobs needs to consider exports and imports of goods and services, as well as the impacts of trade on consumers (be they companies or families) and national income. Such an evaluation of the impacts of trade is described in Appendix A to this report. It finds that, on balance, U.S. trade supports nearly 470,000 jobs in Oregon, and 268,000 in the Portland/Vancouver area. This represents one in five workers in Oregon – in other words, one in five jobs in Oregon would not exist but for trade. For Portland/Vancouver, the share is much higher: 30 percent of jobs in the region depend on trade.

Studies that focus on the impact on wages of workers at exporting firms relative to other firms have concluded that export-related jobs pay more. What is striking is that while the methodologies differ considerably, the results are remarkably similar. Richardson and Rindal estimated that exporting *plants* in 1992 paid on average 13-18 percent more than non-exporting plants.¹³ Looking at the question by *sector*, Davis reported that average 1994 wages for all workers whose jobs were directly or indirectly supported by goods exports were 13 percent higher than the national average. Wages for workers whose jobs were directly supported by goods exports were 20 percent higher than the national average. Bernard and Jensen used a different methodology but got similar results: they found that the average wage of workers at exporting *firms* was 9-18 percent higher than non-exporting firms; their estimates for plants was similar to that of Richardson and Rindal, 11-18 percent.¹⁴ A recent analysis reached the same results: focusing only on exports, Brookings research on metropolitan exports found that, for every \$1 billion in exports of a metro area industry, workers in that industry earn roughly 1 to 2 percent higher wages.¹⁵ For example, workers in an industry with \$10 billion in metropolitan exports earn 10-20 percent higher wages than workers in a non-exporting industry located in the same metro area. Even workers without high school diplomas earn the export wage premium.

How Oregon Workers Benefit from Trade

Designing, making and moving goods both out of and into the United States generate billions of dollars in Oregon output, and hundreds of thousands of employees are needed to generate that output. The contribution to jobs of exporting is well recognized. Workers at Oregon manufacturing plants or services providers design a product or service, and produce it. Someone is hired to advertise it, perhaps still others to sell it to foreign customers. Truckers, rail workers, and workers on ships or with air cargo companies transport goods to ports and, ultimately, to foreign customers. Workers at hotels, restaurants and parks and other vacation venues sell services to foreign visitors. Teachers educate foreign students in Oregon schools and universities. These are all jobs related to exports.

Jobs associated with imports are less well recognized but no less significant. Oregon-based workers may design a product and work with foreign companies to manufacture it. When it is imported, workers at the Portland and Vancouver ports unload it from ships, truckers move it to warehouses, and warehouse workers send it to Oregon manufacturers or retailers. Other workers advertise and finance the product. Overall, jobs across a range of industries and sectors exist because of trade.

¹³ J. David Richardson and Karin Rindal, "Why Exports Matter: More!" (Washington, DC: The Institute for International Economics and The Manufacturing Institute), February 1996.

¹⁴ Andrew B. Bernard and J. Bradford Jensen, "Exceptional Exporter Performance: Cause, Effect, or Both?," National Bureau of Economic Research Working Paper 6272, November 1997, www.nber.org/papers/w6272.

¹⁵ Emilia Istrate, Jonathan Rothwell, and Bruce Katz, "Export Nation: How U.S. Metros Lead National Export Growth and Boost Competitiveness," Metropolitan Policy Program, Brookings Institution, July 2010, pp. 17-18.

Exporting Oregon Values

International engagement does more than merely generate business for Oregon traders and investors and their employees. It also offers opportunities for Oregon companies to influence the way international business is conducted. Oregon companies are well-positioned to encourage their trading partners to embrace such important concepts as sustainability and environmental consciousness by incorporating specific sourcing requirements into their purchasing or sales contracts. In this way, Oregon exports ideas as well as goods and services.

A number of Oregon exporters are embracing this effort to export values as they trade. **Rejuvenation**, a Portland manufacturer and leading U.S. direct marketer of authentic reproduction lighting and house parts, imports components for custom lighting from a variety of sources including China, India, Taiwan, Brazil, and others. Rejuvenation is committed to socially responsible business practices. For example, it uses water-based ultrasonic degreasing equipment at its Portland manufacturing facility to produce cleaner parts with non-toxic materials. Rejuvenation's dedication to sustainable growth does not stop at the border. It works with overseas partners to "green" its supply chain. According to Dennis Conner, VP of Operations, "Rejuvenation wants our foreign suppliers to strive for the high environmental standards we set for ourselves. We review waste, water, and recycling practices at all potential suppliers in Asia, Europe, and the Americas before we qualify them for Rejuvenation work. Moving forward, we will begin benchmarking suppliers in 2011 to use as a starting point for improving sustainability practices. Importing component parts helps us keep costs down, but we don't want those savings to come at the expense of the environment in developing countries."

Glumac, an engineering consulting firm in Portland, sets itself apart from competitors with its commitment to sustainability: Glumac has more than 80 LEED Accredited Professionals, including 25 in its Portland office, and each of its projects include at least one LEED certified engineer. Its numerous international projects – which represent services exports – include the Symantec LEED® Certified R&D facility in Chengdu (China). It is in the process of opening an office in Shanghai, which it expects will rely heavily on the expertise of the Computational Fluid Dynamics and Energy Analysis groups' Portland employees. Glumac's work in Asia not only creates new job opportunities in Portland; it also promotes environmental consciousness in rapidly growing countries like India and China. "It's great to take our extensive portfolio of sustainable design projects and apply those proven technologies in new countries like India and China," reports Steven Straus, CEO.

Growing straight out of Oregon's culture for environmental sustainability is the "Electronic Product Environmental Assessment Tool" (EPEAT), a standard that enables purchasers of computers and monitors to ascertain how "green" the product is. It also helps manufacturers promote products on the basis of their environmental attributes. Developed in Oregon, the standard went "national" in 2006, and is now international as well, used by manufacturers to market their products in 40 countries, including China and Brazil. EPEAT was developed in Oregon and continues to be administered by Portland's Zero Waste Alliance and the Green Electronics Council.

*Imports Matter,
Too*

Imports contribute to the Oregon economy as well. Contrary to popular belief, most U.S. imports are *not* finished consumer goods, but instead raw materials, components and machinery and equipment used by U.S. farmers,

manufacturers and others to grow and produce goods and services in the United States (see *Box*). The make-up of imports into Oregon, destined for final purchasers in Oregon, is similar, with approximately 60 percent of 2008 imports composed of raw materials, components, machinery and equipment purchased by Oregon farmers, manufacturers and services providers. Table 6 details leading products imported by final purchasers in Oregon in 2008 and 2009. As such, imports enable regional manufacturers or services providers and their employees to compete for sales to increasingly cost-conscious consumers in global as well as national and local markets.

As noted above, Oregon producers are integral parts of a network of production for some products, notably computers and electronics, with trading partners in Asia. Thus, the content of Oregon's imports of finished computers and electronics undoubtedly includes Oregon-produced components.

U.S. Imports by End Use, 2008
(Billions and Percent)

	Value	Share of Total
Total	\$2,085.7	100.0%
Finished consumer goods	799.8	38.4
Non-consumer goods	1,223.9	58.7
<i>Raw materials</i>	446.1	21.9
<i>Processed raw materials & components</i>	459.1	22.0
<i>Machinery and industrial equipment*</i>	308.7	14.8
Non-classifiable**	62.0	3.0

* When a category, like computers or telecommunications equipment, could be used by consumers or businesses, total imports were split evenly between the two categories of end users.

** U.S. goods returned, reimports, minimum value shipments, other special transactions and miscellaneous imports.

Source: The Trade Partnership from U.S. Census Bureau data

Table 6
Oregon Merchandise Imports, Total and by Major Sector, 2008 and 2009
(Millions and Percent)

	2008	2009
Total	\$16,575.1	\$11,808.5
Ten Leading Categories	10,087.6	7,039.6
Motor vehicles	3,151.4	1,902.6
Engines, turbines, transmissions	947.1	938.9

Columbia Sportswear, founded in Portland in 1938, is a leading seller of outdoor apparel, footwear, equipment and accessories. It employs more than 1,100 workers in the Portland area, with approximately 800 employees at the corporate headquarters in Washington County and another 300 workers at the highly automated Rivergate distribution center in North Portland. Columbia Sportswear also has a retail presence in Oregon, including a flagship store in Portland.

Many jobs at Columbia Sportswear are tied to importing clothing and accessories from around the world. In 2009, the company imported products from 13 countries, including China, India, Vietnam, and Indonesia, as well as least developed countries Bangladesh and Cambodia.

Asian suppliers also represent dynamic market opportunities for Columbia. In 2009, 40 percent of total revenue came from foreign sales. China, Korea, and Japan in particular are large and growing markets, even as the U.S. and European struggle to recover from the global economic downturn.

“Open trade and markets are critical to the success of Columbia Sportswear. Trade creates new opportunities that allow us to make significant and growing investments in our talent and facilities. Our highly skilled workforce in the Portland area includes world-class designers and merchants, supply chain specialists, global marketing experts, IT management and developers, and many other professions.” -Peter Bragdon, Senior VP of Legal and Corporate Affairs

Foreign investment in Oregon also contributes to the region’s economy and job base. In 2007 (the most recent year for which full data are available), majority-owned

affiliates of foreign firms employed 44,300 workers in Oregon. Subsidiaries of foreign owned firms engaged in manufacturing in Oregon employed 26 percent of total employment of foreign firms in Oregon – 11,700 jobs. Foreign investors employed 3 percent of the private sector workforce in Oregon.

Leading Foreign Firms Located in the Portland/Vancouver Region

BASF Catalysts LLC (chemical catalysts, Germany)
bioMerieux, Inc. (culture media & microbiological products, France)
Bridgestone Americas (tires, Japan)
Daimler Trucks N.A. (Heavy-duty truck production, Germany)
Glaxosmithkline (pharmaceuticals, U.K.)
Iberdrola Renewables (wind power manufacturer, Spain)
Oldcastle Precast Enclosures, Inc. (precast products, Ireland)
Sodexo (food service provider, France)
SolarWorld Industries America (solar cell and wafer manufacturer, Germany)

Evrz Inc. NA formed in 2007 when Evraz Group S.A. of Russia acquired Oregon Steel Mills. At the time, Oregon Steel was a regional producer with manufacturing facilities in Portland and Pueblo, CO. With its purchase by Evraz Group, Oregon Steel Mills – now called Evraz Inc. NA – gained access to new capital and additional financing options that enabled it to acquire several other U.S. and Canadian steel operations.

Today, the employees at the corporate headquarters of Evraz Inc. NA's in Portland oversee a North American organization that includes eight manufacturing facilities and an R&D center. Evraz Inc. NA has the capacity to produce more than five million tons of specialty and commodity steel products annually. The expansion from a regional steel company to a vertically integrated producer provided flexibility and stability that allowed the organization to ride out the market downturn that hit the entire North American steel industry in 2008-2009.

Oregon Steel's manufacturing operations also benefited from the investment, which provided access to one of the world's lowest cost slab producers (an Evraz Group facility in Russia). Slab is a primary raw material for Evraz Oregon Steel, but the slab market can fluctuate widely in terms of both cost and availability. Evraz Group's vertical integration provides the Portland mill operations greater flexibility to fulfill customer needs.

"The growth of Oregon Steel into what it's become as Evraz Inc. NA simply would not have been possible without our acquisition by Evraz Group S.A.," said Mike Rehwinkel, president and CEO of Evraz Inc. NA. "The infusion of capital and access to raw materials positions us for continued success, to the benefit of both our workers and the Portland region."

"SolarWorld is a great Oregon success story. This next phase opens the doors of opportunity for hundreds of Oregonians seeking employment and advances the production of clean, renewable energy."

-Oregon Governor Ted Kulongoski

In May 2010, Hillsboro-based **SolarWorld USA**, a global company with world headquarters in Bonn, Germany, announced the launch of the final phase of a renovation U.S. expansion that will allow the company to convert raw silicon into photovoltaic wafers and cells. SolarWorld expects to create 350 jobs and bring total employment at its Hillsboro facilities to 1,000. Elected officials lauded the "Oregon" company's announcement of new jobs in a clean technology industry.

In 2007, SolarWorld purchased a silicon wafer production facility that had been mothballed because of weak demand in the 1990s. Since that time, the Bonn, Germany-based company has invested approximately \$500 million to upgrade the Hillsboro factory and add a second plant. By 2011, it

Siltronic AG established its first production facility outside Germany in Portland in 1979, expanding its production capabilities there in the mid-1990s. **Siltronic Corporation** produces in Portland hyperpure silicon wafers for top-tier chip manufacturers in the United States. The Portland facility employs 850 individuals at family wages. Its supply chain extends to over 200 businesses in the Portland area alone, and it particularly seeks to generate relationships with local small businesses. The company is recognized for its safety and environmental protection excellence, having received numerous city, state and national awards for environmental protection, health and safety standards.

Portland/Vancouver and Trade

The Portland area in particular benefits from international trade, both exports and imports. The Ports of Portland and Vancouver process significant quantities of trade into and out of the United States (see Table 7). That trade is handled by companies and workers operating around the clock and knit together into a network of ocean shippers, transcontinental railways and truckers, river barging along the Columbia/Snake river system, and international airports.

The Port of Portland leads in exporting wheat from the United States, and is fourth in the nation for auto imports. While the recession dealt the ports a heavy blow, the recovery in international markets is expected to return business to “normal” – strong growth – by 2010 – assuming that transportation bottlenecks can be worked out.¹⁶ Already for the first eight months of 2010, exports through the Ports are up 17.0 percent driven by increases in raw materials destined for strongly growing Asian markets, and fertilizers. A 23.4 percent increase in transportation equipment imports is driving up import traffic through the Ports in 2010.

The Ports have also seen a noticeable increase in traffic as U.S. free trade agreements (FTAs) are implemented. The Ports have always facilitated trade with the 17 current U.S. FTA partners¹⁷, but increasingly so as those FTAs have gone into effect.

¹⁶ See footnote 2 above.

¹⁷ The FTA partners (and the dates the FTAs went into effect) are: Israel (1985), Canada and Mexico (1994), Jordan (2001), Chile (2004), Singapore (2004), Australia (2005), Morocco (2006), Bahrain

For example, in 1996 total trade (exports plus imports) with the 17 countries with which the United States now has FTAs accounted for 5.4 percent of non-China trade through the Ports (only four of the 17 had FTAs in effect at that time). By 2009, when all 17 FTAs were in effect, trade through the Ports with the FTA countries accounted for 6.7 percent of total non-China trade through the Ports. Significantly, the average annual growth in total trade with FTA partner countries from 1996-2009 was six times greater (4.3 percent) than the average annual growth in non-China trade through the port (0.7 percent).

Table 7
U.S. Trade through the Ports of Portland and Vancouver
(Millions)

	2005	2006	2007	2008	2009	Jan-Aug. 2009	Jan-Aug. 2010
Total Exports	\$4,194.0	\$5,585.8	\$7,058.6	\$9,393.0	\$7,105.1	\$4,411.9	\$5,162.4
Cereals	1,333.6	1,569.3	2,684.3	3,854.5	2,154.5	1,302.3	1,392.6
Electric machinery, sound equip., TV equip., parts	220.7	890.9	664.1	782.8	1,378.8	998.6	1,043.1
Fertilizers	264.1	205.8	350.9	821.5	564.8	333.5	599.3
Ores, slag and ash	175.4	339.6	515.1	624.3	477.8	253.5	465.5
Iron and steel	80.8	164.6	289.9	456.5	389.1	259.1	274.7
Other products	2,119.4	2,415.7	2,554.5	2,853.5	2,140.2	1,264.7	1,387.3
Total Imports	11,775.7	13,779.4	15,206.9	14,043.1	9,081.1	5,864.9	6,393.2
Transportation equip. & parts	7,645.1	9,091.0	9,427.5	8,787.1	5,212.0	3,170.2	3,912.4
Electric machinery, sound equip., TV equip., parts	468.5	529.1	732.5	401.1	779.7	527.6	254.4
Boilers, machinery & parts	651.9	643.2	714.4	605.2	557.0	415.8	263.1
Iron or steel products	175.8	254.2	337.5	393.6	392.7	310.8	172.6
Misc. chemicals	244.5	225.8	164.3	265.4	208.6	130.4	127.1
Other products	2,589.9	3,036.1	3,830.7	3,590.6	1,931.1	1,310.1	1,663.6

Source: U.S. Census Bureau

Analyses of their impacts on the regional economy uniformly find that the Ports have significant and far-reaching positive economic and jobs impacts. The most recent studies have found that the Port of Portland directly and indirectly supported in 2006 more than 30,400 jobs, and millions of dollars in personal income, business revenue and federal, state and local taxes.¹⁸ The Port of Vancouver directly and indirectly supported more than 15,500 jobs – and millions of dollars in personal income, business revenue and federal, state and local taxes as well.¹⁹

(2006), El Salvador (2006), Nicaragua (2006), Honduras (2006), Guatemala (2006), Dominican Republic (2007), Costa Rica (2009), Oman (2009), and Peru (2009).

¹⁸ Martin & Associates, "The Local and Regional Economic Impacts of the Port of Portland, 2006," prepared for the Port of Portland, January 31, 2007, http://www.portofportland.com/PDFPOP/Trade_Trans_Studies_Ecnmc_Impact_2006.pdf.

¹⁹ Port of Vancouver USA, http://www.portvanusa.com/sites/default/files/tiny_mce/files/Economic_Impacts_TableE.pdf.

The Portland/Vancouver region is more involved in the international marketplace than port traffic alone would indicate. The Brookings report noted above found that Portland/Vancouver/Beaverton exported 20.6 percent of its output in 2008, the second highest share in the country (after Wichita, Kansas).²⁰ It also experienced the second fastest growth in exports of all metropolitan areas over the 2003-2008 period. The highest contributing industry was computers and electronics. The study's authors noted that export-oriented metropolitan areas are significantly more innovative, defined by their rate of patent production. Other studies have found that innovation promotes exporting and exporting reinforces innovation through competition.

Conclusion

Oregon and the Portland/Vancouver area are clear "winners" from international trade, which supports hundreds of thousands of jobs in the region. Employers large and small profit from sales of "Made in Oregon" products throughout the world, while Oregon farmers, manufacturers, service providers, and families all benefit from the lower costs associated with imported products. Foreign investments support tens of thousands of jobs more, often in high-paying manufacturing jobs.

Oregon and the Portland/Vancouver region enjoy a significant natural advantage in international trade due to their position on the Pacific Rim, extensive infrastructure and land availability. However, the region's success as an international competitor is not a foregone conclusion in coming years. Other ports, states and nations are investing heavily in improved transportation facilities, making land available and implementing public policies to promote their competitiveness in attracting international trade and employment.

To remain competitive and potentially even increase the advantages the region derives from international trade, the following public policy recommendations need to be considered:

- Continue to invest in marine, rail and highway freight facilities, and identify new sources of land serviced by these facilities to enable manufacturing exporters to grow;
- Pursue national trade policy initiatives that will increase trade – both exports and imports -- by opening markets to exports of both goods and services, enabling U.S. manufacturers and services providers to take full advantage of global platforms for production, and protecting U.S. intellectual property and investments abroad, and

²⁰

Istrate *et al*, *op. cit.*

- Adopt national, state and local tax policies that enable U.S. companies to remain competitive internationally.

Appendix A

What Trade Means for Output and Jobs in the Region: A Comprehensive Impact Assessment

Most of the public dialogue of late focuses on the positive effects of U.S. exports on the U.S. economy and on U.S. jobs. As U.S. companies export more, they are able to increase U.S. production — and perhaps employment²¹ — in the United States. These are what are known as the “direct effects” of increases in exporting. But in addition to these direct effects are indirect ones: as U.S. production in exporting sectors expands, those producers draw inputs from supplier industries, and those industries increase output – and perhaps employment. The business of getting finished products to the docks for export also creates indirect effects from exports, in warehouses, transportation firms, and other related sectors. These direct and indirect job effects of trade are reported in this study in Table 5 for manufactured exports.

In addition to these direct and indirect effects of exports are associated indirect effects not reported. As jobs expand (high unemployment case) and/or worker income grows (low unemployment case), U.S. consumer spending grows and that, in turn, supports still more jobs in non-traded goods and services sectors of the economy. This dynamic happens in the cases of goods exports as well as services exports.

More controversial in the public dialogue has been the impacts of imports. In some instances, imports can replace U.S. production, at which point U.S. production and U.S. employment directly linked to that production decline. This is a direct negative impact on competing U.S. firms and workers. However, as is the case with exports, there are important indirect effects at play as well. They are not as obvious as imports replacing U.S. production, yet they are critical to the overall analysis. For example, jobs associated with bringing imports to their ultimate customer may increase with as imports expand— from the dockworkers to the truckers to the warehouse operators to retailers, among others. In addition, the lower cost of imported goods that are raw materials or machinery or other inputs to U.S. production can make U.S. farmers, manufacturers or services providers more competitive in global markets, helping to increase exports. This effect is uneven, as some sectors benefit more than others from access to lower-cost inputs. Finally, if imported goods and services are consumer products that cost less than competing U.S. goods, the savings consumers experience enable them to spend more on other goods and services (which creates new jobs or boosts income) or

²¹ In times of tight employment, the exporting sectors lure workers away with higher wages from other U.S. sectors that are not seeing an increase in their production. In this case, U.S. employment overall does not increase, instead it shifts from one sector of the economy to another. In times of high unemployment, the increased demand for workers can be supplied from a pool of unemployed workers at prevailing wages, so workers without jobs join the workforce and overall U.S. employment grows (jobs are “created”).

to save more (which lowers interest rates). In total, the job effects of imports are not necessarily a net negative.

To accurately and fully measure the net effects of all these channels of change, one must work through detailed data on production, trade and consumption. The ripple effects – greater production in export-intensive industries, lower production costs from competitively priced imports, and greater consumer income available to spend or save – have the potential to make the U.S. economy more efficient and workers more productive, boosting their incomes. These effects need to be balanced against the direct competition that imports place on U.S. jobs. Where the net effects are positive, they can increase U.S. GDP — the economy can generate and consume more goods and services at lower cost, even after accounting for any losses in U.S. production stemming from import competition.

Estimating the impact trade therefore is a complicated exercise because of all of the moving parts involved. To catch the interactions that make up the economy, one needs to resort to a multi-sector approach. In technical terms, a tool that meets this set of requirements is called a “computable general equilibrium” or CGE model. CGE models permit us to sort out many of the simultaneous and sometimes conflicting effects of trade to arrive at a *net* impact assessment. For this reason, we work with a CGE model here to estimate the impacts of U.S. trade in 2008.

CGE models are characterized by an input-output structure (based on regional and national input-output and employment tables) that explicitly link industries in a value added chain from primary goods, over continuously higher stages of intermediate processing, to the final assembling of goods and services for consumption. Inter-sectoral linkages are direct, like the input of steel in the production of transport equipment, and indirect, via intermediate use in other sectors. The model captures these linkages by modeling firms’ use of factors and intermediate inputs. The most important aspects of the model can be summarized as follows: (i) it covers all world trade and production; and (ii) it includes intermediate linkages between sectors. The details of the model and data we used are described in Baughman and Francois, 2008, as updated in Baughman and Francois, 2010, the studies from which this analysis draws.

The experiment conducted with the model involved imposing changes in trade for the United States as a whole, in this instance effectively eliminating U.S. exports and imports by imposing prohibitive duties against trade with the United States across the board.²² This allows us to trace changes at the border as they work through the U.S. economy. Our results tell us how much U.S. output and employment would decline were

²² We have modeled an extreme shock to the economy to show the extent to which sectors of the economy are tied to trade. We do not suggest that a prohibitive tariff is a likely policy option. It is useful to understand the job impact of complete elimination of both exports and imports, in order to quantify the opposite scenario: the job impact of actual U.S. trade in the experiment years.

the United States to cease exporting and importing goods and services. These results thus also measure the reverse scenario: how much 2008 levels of trade in goods and services contributed to U.S. and output and employment.

The model generates estimated impacts of trade – increases or decreases -- on U.S. output and employment, by sector. We then apportion those changes to state output and employment, by sector, and then again by counties within the State of Oregon. County output and employment effects are based state and county-level employment data reported by the U.S. Census Bureau and the U.S. Department of Agriculture. We apportion state-level output and employment data according to the sector employment data for each county. The sum of the sub-sectors may not add to the total reported for the county because the U.S. Census Bureau suppresses some data for detailed sectors on the county level to protect individual businesses' confidentiality. Specifically, to meet confidentiality standards, at least three firms in the same sector must report production data for Census to issue a total for that sector. That said, if less than three firms exist in a given county for a specific sector, while their information may not be released for that specific sector (e.g., steel manufacturing) in that county, it would be included in the broader totals (e.g., total manufacturing). Therefore, we include a "Government and other sectors" category to capture the output and employment that is suppressed by Census. It is the difference between the county's output or jobs related to State trade and the sum of the jobs related to exports for all reported subsectors; it can include jobs related to exports from multiple subsectors.

The results show that trade has a net positive impact on Oregon (Table A-1) and on the Portland/Vancouver area (Table A-2). In 2008, U.S. exports and imports of both goods and services supported \$24 billion in output in the State, and nearly 470,000 direct and indirect jobs. Oregon's services sectors in particular see the greatest gains from trade, with more than 90 percent of the output gains concentrated in services sectors, and 80 percent of the employment gains in services sectors. In Portland/Vancouver, trade generated \$15 billion in output and supported more than 286,000 jobs – in each case more than half the State total.

Table A-1
Estimated Impacts of Trade on Output and Employment in Oregon, 2008

	Output (millions)	Employment (number)
Total	\$23,940	469,197
Manufacturing	814	2,577
Services	22,243	371,853
<i>Wholesale trade</i>	*	20,625
<i>Retail trade</i>	3,095	57,740
<i>Transportation, warehousing and utilities</i>	1,133	19,144
<i>Information</i>	723	12,794
<i>Finance and insurance</i>	1,468	18,707
<i>Government and other sectors</i>	2,000	17,010

Table A-2
Estimated Impacts of Trade on Output and Employment in Portland/Vancouver,* 2008

	Output (millions)	Employment (number)
Total	\$15,005	286,078
Manufacturing	434	1,889
Services	11,694	223,426
<i>Wholesale trade</i>	**	14,811
<i>Retail trade</i>	2,042	30,661
<i>Transportation, warehousing and utilities</i>	744	11,949
<i>Information</i>	519	8,520
<i>Finance and insurance</i>	1,067	13,278
<i>Real estate, rental and leasing</i>	2,667	11,424
<i>Professional, scientific, and technical services</i>	888	16,209
<i>Administrative and waste management services</i>	750	15,601
<i>Accommodation and food services</i>	604	24,665
<i>Arts, entertainment and recreation</i>	***	7,660
<i>Other private services (e.g. health care, education)</i>	2,413	68,648
Other (Ag., forestry, construction, government)	2,877	60,763

* Covering four counties: Clackamas (OR), Multnomah (OR), Washington (OR) and Clark (WA).

** Included with retail trade

*** Included in other private services

Source: Authors' estimates

Laura M. Baughman and Joseph F. Francois. 2007. *Trade and American Jobs, The Impact of Trade on U.S. and State-Level Employment*, prepared by Trade Partnership Worldwide, LLC for the Business Roundtable.

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