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Equipment Spending in Manufacturing

This edition of the Economic Perspective provides a detailed analysis of equipment purchases by manufacturers.

- Petroleum refineries, semiconductor manufacturers, and pharmaceutical industries bought more equipment than any other industry.
- Average equipment spending per manufacturing industry was about \$270 million in 2007.
- The average manufacturing company spends about \$425,000 on equipment.
- Semiconductor manufacturing, a very important industry to the California economy, had equipment spending of \$38,333 per employee.

While households pay a majority of sales and use taxes, businesses also pay a large share of sales and use taxes on the goods they purchase for their own use. Business purchases are hard to estimate precisely, but our research indicates that businesses pay close to one-third of all sales and use taxes. Available data indicate that the majority of business purchases are for equipment. According to the U.S. Census Bureau, manufacturers buy the most equipment of any industry, accounting for about 22 percent of all business equipment purchases.¹

Economic Census Data

The U.S. Census Bureau conducts detailed surveys of businesses every five years. The surveys take years for the Census Bureau to tabulate, but they provide the most detailed information describing economic transactions of businesses. While the data we analyze in this discussion is national data and the latest figures available are for 2007, they offer a general description of the order of magnitude of equipment purchases by California firms in the same industries.

Detailed Manufacturing Survey Data

The Census Bureau tabulated survey data by North American Industrial Classification System (NAICS) code

¹ Source: U.S. Census Bureau, Annual Capital Expenditures Survey, www.census.gov/econ/aces/report/2013/csr.html

at the six-digit NAICS level.² These data show spending on new and used machinery and equipment purchases for 471 manufacturing industries. In 2007, these industries spent a total of about \$126.6 billion on new and used equipment. Less detailed 2011 Census Bureau data measuring the same manufacturing industries indicate a similar total, about \$125 billion.³

Top Ten Manufacturing Industries

Table 1 shows spending by the top ten of these 471 industries. As shown in the table, petroleum refineries spent more than twice as much on equipment than the next largest industry. Petroleum refineries, semiconductor manufacturers, and pharmaceutical industries bought the most equipment. Spending trails off very quickly from the top industry's (petroleum refineries) purchase of \$14.2 billion on equipment, to the tenth industry (automobile manufacturing), which spent \$1.7 billion. Average equipment spending per manufacturing industry is about \$270 million, more than six times lower than the tenth industry in the table.

TABLE 1
2007 Equipment Spending by Industry,
Top Ten industries

Industry	Billions of Dollars
Petroleum refineries	\$14.2
Semiconductor and related device manufacturing	\$5.9
Pharmaceutical preparation manufacturing	\$3.2
All other basic organic chemical manufacturing	\$2.9
Plastics material and resin manufacturing	\$2.8
All other plastics product manufacturing	\$2.6
Commercial lithographic printing	\$2.2
Iron and steel mills	\$2.1
Paper (except newsprint) mills	\$2.0
Automobile manufacturing	\$1.7

² Source: U.S. Census Bureau, Manufacturing: Industry Series: Detailed Statistics by Industry for the United States: 2007, factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

³ Source: U.S. Census Bureau, Measuring America, "Manufacturing in America," November 13, 2013, www.census.gov/hou/pdf/manufacturing_in_america.pdf

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Average per Company

The average manufacturing company spent about \$425,000 on equipment. Table 2 shows equipment spending per company for the top ten manufacturing industries. Once again, petroleum refineries top the list, spending an average of \$160 million per company. Other petrochemical companies are also represented in the top ten. As with spending by industry in Table 1, spending by company falls quickly, with the second ranking industry at \$37 million per company, dropping to \$9 million per company in the tenth ranking industry.

Average per Employee

Another way to view equipment spending is by spending per employee. Manufacturers spent an average of about \$9,500 per employee. However, the values comprising the average vary quite a bit. Table 3 shows average spending in dollars per employee.

TABLE 2
Average 2007 Equipment Spending per Company,
Top Ten Industries

Industry	Millions of Dollars
Petroleum refineries	\$160
Petrochemical manufacturing	\$37
Light truck and utility vehicle manufacturing	\$23
Guided missile and space vehicle manufacturing	\$15
Paper (except newsprint) mills	\$14
Paperboard mills	\$14
Cycle crude and intermediate manufacturing	\$11
Beet sugar manufacturing	\$10
Glass container manufacturing	\$9
Automobile manufacturing	\$9

TABLE 3
Average 2007 Equipment Spending per Employee,
Top Ten Industries

Industry	Dollars per Employee
Petroleum refineries	\$218,669
Petrochemical manufacturing	\$168,978
Ethyl alcohol manufacturing	\$164,087
Synthetic organic dye and pigment manufacturing	\$113,533
Cyclic crude and intermediate manufacturing	\$95,100
Cement manufacturing	\$70,926
Carbon black manufacturing	\$60,516
Lime manufacturing	\$45,597
All other basic organic chemical manufacturing	\$42,334
Nitrogenous fertilizer manufacturing	\$39,187

Top Ten Value Added Companies

Value added by industry is a very important measure of economic activity; the sum of all value added comprises gross domestic product. We first ranked industries by value added and then ranked the industries by equipment spending per employee. These calculations provide a measure of equipment spending for the companies most important to the overall economy. Table 4 displays these data by value added for the top ten industries.

TABLE 4
Average 2007 Equipment Spending per Employee,
Top Ten Industries in Value Added

Top Ten Industries in Value Added	Dollars per Employee
Petroleum refineries	\$218,669
Petrochemical manufacturing	\$168,978
Semiconductor and related device manufacturing	\$38,333
Pharmaceutical preparation manufacturing	\$20,349
Iron and steel mills	\$19,790
Light truck and utility vehicle manufacturing	\$18,898
Cigarette manufacturing	\$15,853
Commercial lithographic printing	\$7,031
All other plastics product manufacturing	\$6,078
Aircraft manufacturing	\$3,855

Semiconductor manufacturing is the third ranking industry in Table 4, with equipment spending of \$38,333 per employee, which demonstrates its importance to the California economy.

Selected Industries

We also selected ten other California industries with strong value added. Table 5 shows equipment spending per employee for these selected industries, ranked from highest to lowest. Equipment spending per employee varied from a low of \$4,380 for other electronic component manufacturing to a high of \$23,172 for automobile manufacturing.

Percentage of Sales

Percentage of sales is another way to view equipment spending. On average, manufacturing industries spent about 2.4 percent of their sales on equipment. Table 6 shows the top ten industries ranked by this measure. All the top ten industries spent much more than average manufacturing companies, varying from a high of 25 percent of sales to a low of seven percent of sales.

TABLE 5
Average 2007 Equipment Spending per Employee,
Selected Industries

Industry	Dollars per Employee
Automobile manufacturing	\$23,172
Electronic computer manufacturing	\$19,911
Other computer peripheral equipment manufacturing	\$8,205
Surgical and medical instrument manufacturing	\$7,953
Aircraft engine and engine parts manufacturing	\$7,794
Digital printing	\$6,703
Broadcast and wireless communications equipment	\$5,970
Search, detection, and navigation instruments	\$5,270
Guided missile and space vehicle manufacturing	\$4,660
Other electronic component manufacturing	\$4,380

Percentage of Sales: Selected Industries

Equipment spending as a percentage of sales for the selected industries for the Table 5 industries is shown in Table 7. Spending varied from a high of 4 percent of sales to a low of 1 percent of sales.

Equipment Rentals

Companies rent some equipment in lieu of purchasing it. Manufacturing industries rented about six percent of all equipment, while 94 percent was purchased. Rented equipment averages \$1,282 per employee, far lower than the \$9,910 average for purchased equipment. Table 8 shows the top ten industries renting equipment.

TABLE 6
Average 2007 Equipment Spending as a
Percentage of Sales, Top Ten Industries

Industry	Equipment Spending as a Percentage of Sales
Synthetic organic dye and pigment manufacturing	25%
Cement manufacturing	12%
Lime manufacturing	11%
Concrete pipe manufacturing	10%
Brick and structural clay tile manufacturing	9%
Semiconductor and related device manufacturing	8%
Ethyl alcohol manufacturing	8%
Cutlery and flatware (except precious) manufacturing	8%
Magnetic and optical recording media manufacturing	8%
Audio and video media reproduction	7%

TABLE 7
Average 2007 Equipment Spending as a
Percentage of Sales, Selected Industries

Industry	Equipment Spending as a Percentage of Sales
Digital printing	4%
Surgical and medical instrument manufacturing	3%
Other electronic component manufacturing	2%
Other computer peripheral equipment manufacturing	2%
Automobile manufacturing	2%
Search, detection, and navigation instruments	2%
Aircraft engine and engine parts manufacturing	2%
Guided missile and space vehicle manufacturing	1%
Electronic computer manufacturing	1%
Broadcast and wireless communications equipment	1%

TABLE 8
Average 2007 Equipment Rental Costs per Employee,
Top Ten Industries

Industry	Dollars per Employee
Petroleum refineries	\$4,953
Lime manufacturing	\$4,865
Petrochemical manufacturing	\$4,769
Alumina refining	\$4,293
Asphalt paving mixture and block manufacturing	\$2,975
Alkalies and chlorine manufacturing	\$2,970
Beef sugar manufacturing	\$2,946
Fluid milk manufacturing	\$2,944
Soybean processing	\$2,785
All other basic organic chemical manufacturing	\$2,757

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Online Resources

For more information about topics covered in this publication and previous issues, please visit any of the websites listed below.

California Department of Finance
www.dof.ca.gov

California Employment Development Department (EDD),
Labor Market Conditions in California
www.labormarketinfo.edd.ca.gov

Federal Reserve Bank of Philadelphia, Survey of
Professional Forecasters
www.phil.frb.org

National Association for Business Economists
www.nabe.com

U.S. Bureau of Economic Analysis
www.bea.gov

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