
FRBSF WEEKLY LETTER

August 21, 1987

Made in the Western U.S.A.

In contrast to the rest of the United States, employment in manufacturing has actually grown during recent years in the states making up the Twelfth Federal Reserve District (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington). Between 1973 and 1986, the number of jobs in manufacturing in the West rose 10 percent, from 2.3 to 2.9 million, while the number of manufacturing jobs in the rest of the country declined by 9 percent. Manufacturing jobs in the West do make up a smaller percentage of all jobs compared to the rest of the U.S. (in 1987, they represented just 16 percent of total employment in the Twelfth District, compared with 19 percent nationwide), but the smaller share is due only to relatively faster job creation in the service sectors. There has been substantial manufacturing growth in the West in recent years.

This *Letter* investigates the sources of this growth. It considers the nature of manufacturing in the West and how it differs from that of the rest of the country. In particular, although manufacturing growth in the West is partly a result of the overwhelming presence of new high-growth, high-tech industries (defined as industries with a higher than average number of employees with advanced and scientific degrees), it also represents expansion of nearly all manufacturing sectors. Thus, even if some electronics and other high-technology firms were to relocate as they mature, the West should retain a strong and well-diversified industrial base.

Measures of industry health

In gauging the health of an industry, the growth of output is a representative measure of industry growth. Output data, however, are available at the state level only every fifth year (most recently in 1982). At the state and regional levels, only one measure of the health of manufacturing industries — the level of employment — is regularly available. This measure is less representative because changes in manufacturing employment reflect both changes in production processes as well as changes in industry output.

For example, as an industry's level of output rises or falls, employment will rise or fall when there are no other changes. However, if at the same time, machinery becomes more sophisticated and production processes become more efficient, labor productivity could rise and reduce the number of workers needed to produce a given quantity of goods. Furthermore, shifting production to overseas locations, often to capture the benefits either of low cost labor or of proximity to input or output markets, can cut employment at home without affecting total output; management and profits in such a case remain in U.S. hands. These developments have been responsible for the lack of growth in overall U.S. manufacturing output, which has been stable at about 20 percent of total output for the last 25 years. Because of rising productivity, the stable output share has been accompanied by the steady decline of manufacturing employment as a share of total employment.

Nevertheless, employment levels and growth rates, when used to compare different regions at the same point in time, can provide valuable information about the relative performances of different industries and regions.

Scope of western manufacturing growth

The growth in manufacturing employment in the Twelfth District has exceeded growth at the national level in nearly all manufacturing industries. Between 1973 and 1984, only four of the eighteen major manufacturing sectors in the U.S. added jobs: rubber products, printing, electrical equipment (including electronics), and scientific instruments. In contrast, in the West, jobs were added in all but three sectors: textiles, lumber, and primary metals.

The difference between the western experience and that of the rest of the U.S. is illustrated in the chart. Clearly, the most dramatic difference lies in the electrical and electronic equipment industry. Between 1973 and 1984, employment in this industry (which includes manufactured electronic components and accessories, electrical

FRBSF

machinery, radio and television receiving equipment, lighting fixtures, and home appliances) grew 84 percent in the Twelfth Federal Reserve District, compared to 4 percent in the rest of the country. Much of this employment growth in the West has occurred in California, although growth rates were much higher than the national average in all states in the region except Alaska and Hawaii.

While the electronics industry is clearly important in the West, it is far from the only source of growth. Much growth has occurred in other high-tech industries. Those with the largest shares of employment in the West are office and computing equipment, communications equipment, aircraft, guided missiles, and space vehicles. These categories, together with electronics, accounted for 29 percent of manufacturing employment in the West in 1984. They dominate manufacturing in California and Arizona, with 31 and 51 percent of their manufacturing employment respectively, compared to only 9 percent in the rest of the country.

High-tech growth, however, is not uniform across the region. Some states have concentrations in one or two high-tech industries. For example, Washington has 18 percent of its manufacturing employment in aircraft production alone, while Utah is especially strong in defense-related aerospace. Some states have little high-tech industry. The share of employment in high-tech manufacturing is below the national average in Alaska, Hawaii, Idaho, Nevada, and Oregon. Manufacturing employment in Alaska and Hawaii is almost entirely in food processing, whereas Oregon's largest manufacturing industry is lumber and wood processing.

The West has a strong productive base in more traditional sectors as well. Most of the capital-intensive industries here, which provide relatively high paying jobs, out-performed their counterparts elsewhere. Between 1973 and 1984, employment in machinery industries in the West grew 56 percent, compared to a 4 percent decline in the rest of the country. During the same period, employment in rubber production grew 40 percent in the West but only 5 percent elsewhere. Similarly, employment in chemical industries, petroleum refining, and fabricated metal production have all expanded in the West, as has employment in the labor-inten-

sive apparel industry. Food processing, a largely capital-intensive industry and the fourth largest manufacturing sector in the West, had employment gains of 19 percent between 1973 and 1987, compared with only 7 percent growth elsewhere.

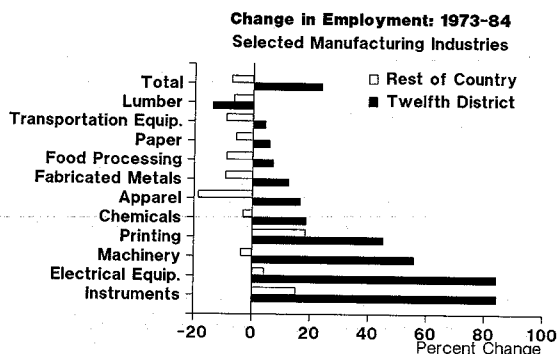
Within the West, the growth in manufacturing employment has been geographically concentrated. In 1987, California had 70 percent of the region's manufacturing employment, compared with only 64 percent of the total number of jobs in the West. Manufacturing employment growth has been most rapid in California, Arizona, and Utah. Nevada has had high growth rates but still has little manufacturing. Manufacturing employment in Oregon, Alaska, and Idaho showed little growth but is still on a more expansionary path than the rest of the country. Hawaii is the only western state to follow the national trend of declining manufacturing employment.

The product cycle

Our major concern about the rate of manufacturing employment growth in the West centers on the continued success of the electronics industry. Recent trends in that industry contrast with the pattern of high growth established until 1984. Since 1984, 100,000 of the 2.59 million jobs in the electronics industry in the U.S. have disappeared — 22,000 from California's Silicon Valley alone. These job losses stem from several sources. Domestic demand for electronics products has lagged for several years. And foreign competition has been stiff. The U.S. electronics trade balance with the rest of the world dropped from a surplus of \$1.1 billion in 1983 to a deficit of \$13.1 billion in 1986.

One result has been the shifting of some production off-shore. Part of this shift overseas is undoubtedly due to the faster growth of foreign markets. The share of total sales of U.S. firms to foreign markets rose from 29 percent in 1983 to 33 percent in 1986, for example. Another reason for the relocations in the electronics industry lies in what is called the product cycle.

The locational requirements of industries change as their products are developed, introduced to the market, and eventually mass-produced. In high-tech industries, the first requirements are for intensive research and design efforts. Once a product is ready for mass-production and mar-



keting, the manufacturer's proximity to adequate labor and material input and output markets becomes more important. Thus we should continue to expect some shuffling of production sites in electronics and other relatively young industries.

Industry reports indicate that semi-conductor and components producers were the first to move electronics production overseas in search of low-cost labor. More recent reports suggest that assemblers of computers and peripherals will follow, not particularly to take advantage of low-cost labor (on average, labor costs only make up about 5 percent of total assembly costs) but to regain proximity to the source of components.

While there is no data on exactly how many jobs have gone overseas in recent years, employment information from U.S. firms confirms reports of such moves. Between 1984 and 1985, domestic employment of U.S. electronics firms dropped from 2.59 to 2.54 million, while the worldwide employment of those same firms remained steady at 4.2 million. This indicates a relative shift of such employment out of the U.S.

Conclusion

There is a startling difference between the employment trends in manufacturing in the West and in the rest of the country. While the number of jobs in manufacturing has been declining in the rest of the country, it has grown rapidly in the West. This trend is most pronounced in the more industrialized states — California, Arizona, Washington and Utah. However, states with economies more dependent on natural resources, such as Oregon and Idaho, as well as Nevada with its continued emphasis on gaming industries, also exhibit manufacturing growth that is well above the national average. Only Alaska and Hawaii, with their specialized economies and the long distances between their factories and the markets in the rest of the country, reflect national employment trends.

Manufacturing employment growth in the West is more reliant on the young, high-technology industries than it is in the rest of the country. Locational changes can be expected in many of these industries as their new products shift from development phases to mass production and their locational and labor requirements change with them. However, it is clear that the West has outperformed the rest of the country in nearly all types of manufacturing, including more traditional industries, both capital- and labor-intensive. Thus, there should be little concern that job losses and shifting of production overseas recently seen in the electronics industry pose serious problems for the western manufacturing base. The manufacturing base here is well-diversified and on an expansionary path.

Laura Leete

Opinions expressed in this newsletter do not necessarily reflect the views of the management of the Federal Reserve Bank of San Francisco, or of the Board of Governors of the Federal Reserve System.

Editorial comments may be addressed to the editor (Gregory Tong) or to the author . . . Free copies of Federal Reserve publications can be obtained from the Public Information Department, Federal Reserve Bank of San Francisco, P.O. Box 7702, San Francisco 94120. Phone (415) 974-2246.

Alaska Arizona California Hawaii Idaho
Nevada Oregon Utah Washington

Research Department
Federal Reserve
Bank of
San Francisco

BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities Large Commercial Banks	Amount	Change	Change from 7/30/86	
	Outstanding 7/29/87	from 7/22/87	Dollar	Percent ⁷
Loans, Leases and Investments ^{1 2}	202,314	- 368	3,693	1.9
Loans and Leases ^{1 6}	179,113	- 436	1,705	0.9
Commercial and Industrial	51,207	- 341	1	0.0
Real estate	69,409	- 22	2,430	3.6
Loans to Individuals	37,099	126	4,158	10.0
Leases	5,437	8	79	1.4
U.S. Treasury and Agency Securities	16,221	50	5,662	53.6
Other Securities ²	6,980	19	497	6.6
Total Deposits	204,520	594	994	0.4
Demand Deposits	50,689	992	595	1.1
Demand Deposits Adjusted ³	35,352	157	11,723	24.9
Other Transaction Balances ⁴	19,409	- 151	3,127	19.2
Total Non-Transaction Balances ⁶	134,421	- 248	3,477	2.5
Money Market Deposit Accounts—Total	43,873	- 553	3,075	6.5
Time Deposits in Amounts of \$100,000 or more	31,648	- 99	4,300	11.9
Other Liabilities for Borrowed Money ⁵	23,123	903	1,449	5.8
Two Week Averages of Daily Figures	Period ended 7/27/87	Period ended 7/13/87		
Reserve Position, All Reporting Banks				
Excess Reserves (+)/Deficiency (-)	61	- 24		
Borrowings	21	18		
Net free reserves (+)/Net borrowed(-)	40	- 42		

¹ Includes loss reserves, unearned income, excludes interbank loans

² Excludes trading account securities

³ Excludes U.S. government and depository institution deposits and cash items

⁴ ATS, NOW, Super NOW and savings accounts with telephone transfers

⁵ Includes borrowing via FRB, TT&L notes, Fed Funds, RPs and other sources

⁶ Includes items not shown separately

⁷ Annualized percent change