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# FRBSF WEEKLY LETTER

Number 92-20, May 15, 1992

## Agricultural Production's Share of the Western Economy

Agriculture has always been singled out as one of the major industries in the western states. While no one doubts that agriculture is a highly visible industry—and one that commands significant political power—there is considerable disagreement on how to quantify the industry's importance to the economy. According to some analysts, agriculture is the largest industry in the West, generating as much as a quarter of all employment. Other analysts, though, argue that the agricultural sector accounts for only 2 percent of the West's employment.

In large part this disparity results from different definitions of agricultural employment. Broad measures count all employment in industries that in some way use or depend on agricultural products, including retail sales of food and clothing. The narrowest measures count only employment on the farm.

In this *Letter*, we calculate a measure of agriculture's contribution to employment in the nine states of the Twelfth Federal Reserve District by looking at employment in industries that are directly linked to the process of growing crops, raising livestock, and the initial processing of those products. This measure addresses the question of *how important it is to have agricultural production physically located in a state to that state's total employment*. Our findings suggest that about 3.8 percent of total employment in the West is directly the result of the presence of agriculture in the region.

### USDA employment shares

Determining the importance of any particular industry to the economy is inevitably difficult because of the interrelationships that exist among most industries. Nearly all industries use products from other industries or produce outputs that are used by other industries. One way to meas-

ure this importance is with input-output models that track the flow of inputs and outputs between firms. Using these models, it is possible to construct multipliers that indicate how much additional income and employment are generated by an increase in activity by one type of industry.

Two problems make multiplier analysis difficult to use. First, multipliers provide only a snapshot. They cannot predict the long-run impact of changes in a given industry, because they cannot predict how other industries will respond. For example, a decline in an industry frees up resources that can be used by other industries in ways not anticipated by the input-output model. Second, compounding this problem, multipliers often are significantly out of date. For example, the latest input-output model created by the State of California relies on relationships as they were in 1976, even though the economy has changed radically since that time.

Because of these problems, alternative measures of an industry's importance are often created using more current employment data at the detailed industry level. By summing up the employment of all industries that are linked to agricultural production, a measure of agriculture's importance can be derived.

Majchrowicz (1992) of the U.S. Department of Agriculture (USDA) has derived one such measure, combining the employment of all the industries that are strongly linked to the production and sale of food and fiber. Using detailed industry data, he summed up employment in all industries that (according to national input-output models) had a least "50 percent of their national workforce employed in providing goods and services necessary to satisfy domestic final demand for agriculture production." The USDA's measures are shown as the white bars in the Chart using

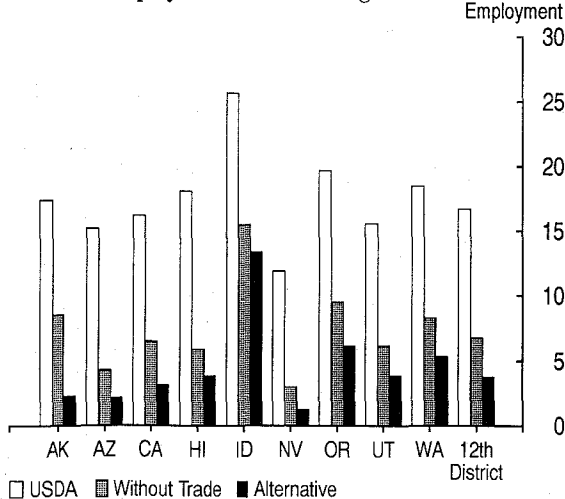
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## THE WESTERN ECONOMY

*The Western Economy* is a quarterly review of economic conditions in the Twelfth Federal Reserve District. It is published in the *Weekly Letter* on the third Friday of February, May, August and November.

# FRBSF

Share of Employment Related to Agriculture % of Total Employment



data for 1988. As shown by those statistics, agriculture is a very important industry in the western states, ranging from 11.9 percent of total employment in Nevada to 25.7 percent in Idaho.

## Alternative measures

To isolate the importance of the presence of agricultural production in a state to its economy, we narrowed the list of industries in the USDA's measures substantially. First, we removed a group of industries in the wholesale and retail trade sector, including grocery stores, eating and drinking establishments, and clothing stores. This sector is the largest component of the USDA's measures for many states, and it shows the most rapid growth. We drop this sector because these activities occur in areas even with no food or fiber production, and do not depend for the most part on being located near such production. In fact, in Nevada, that measure includes casino workers, since they work in establishments that serve food and beverage. As shown by the grey bars in the chart, removing the trade industries has a large effect, causing the Twelfth District's share of total employment attributed to the farm-related sector to fall to 6.8 percent from 16.7 percent. These trade industries, therefore, account for 59 percent of the USDA's farm-related employment measure.

Finally, we removed a number of other industries that are linked to food and fiber inputs in general, but not necessarily to the agricultural production of the state in which they are located. These included landscaping and gardening services,

forestry services, apparel manufacturing, printing and publishing, and paper product manufacturing. Included in this measure are farm production, non-landscaping agricultural services, fisheries, agricultural input industries (excluding commodity brokers), food processing (except bakeries), and textile and leather raw processing (but not manufacturing). The narrower definition further reduces the estimated size of the farm-related sector to 3.8 percent, as shown by the black bars in the chart.

Using any measure, Idaho, Oregon, and Washington are the District states with the largest shares of total employment related to agriculture. Based on the narrow measure, employment related to agricultural production accounts for 13.4, 6.2, and 5.4 percent, respectively, of total employment in these three states. The level of agriculture-related employment in California is by far the highest of any District state, but when measured as a share of total employment, California ranks sixth out of the nine District states. According to the narrow measure, agricultural production accounts for 3.3 percent of total employment in California, slightly lower than the District average and well below the national average of 5.2 percent.

## Conclusions

This article has compared three measures of employment shares, one created by the USDA to measure all employment related to the production of food and fiber, and two alternatives that successively focus only on employment which depends on being linked closely to agricultural production activities.

Using this narrow definition, agricultural production is shown to have an important influence on employment in the western states, although significantly less than is indicated by the measure that includes retail and other industries that are more remotely connected to agricultural production. Our analysis suggests that employment related to agricultural production accounts for 3.8 percent of total employment in the Twelfth Federal Reserve District, ranging from 1.3 percent in Nevada to 13.4 percent in Idaho.

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## Reference

Majchrowicz, T. Alexander. 1992. "The Importance of Farm and Farm-Related Industries in the U.S. West." Paper presented at the Western Regional Science Association Meeting, February 23-27, 1992.

**District Indicators**  
(Seasonally Adjusted)

	92Q1	91Q4	91Q3	91Q2	91Q1	90Q4	90Q3	90Q2	% Change From	
									91Q4	91Q1
<b>AGRICULTURE</b>										
U.S. CROP PRICES, 1985=100	109.7	110.7	114.7	116.4	113.4	114.3	115.8	117.3	-0.89	-3.21
DISTRICT CROP PRICES, 1985=100	114.2	107.2	120.2	130.8	107.3	111.9	112.5	110.7	6.49	6.47
FARM CASH RECEIPTS, MILLION \$	2224.2	2694.2	2529.5	2698.3	2529	2629.7	2630.7	2631.9	-17.44	-12.05
CATTLE ON FEED, 1985=100	86.5	80.2	84.1	92.6	92.4	86.7	88.5	88.7	7.84	-6.37
CATTLE PRICES, CALIFORNIA, \$/CWT.	59.9	62.1	62.6	66.4	64.5	63.9	65.9	66.6	-3.44	-7.13
<b>FORESTRY</b>										
LUMBER PRODUCTION, MILLIONS BOARD FEET	1430.6	1433.5	1531.7	1518.9	1408.1	1360.5	1528.7	1649.1	-0.2	1.6
NORTHWEST LUMBER INVENTORY, MIL. BOARD FT.	2153.3	2296.6	2423.2	2324.4	2366.2	2334.4	2473.7	2624.1	-6.24	-9.07
U.S. LUMBER PRICES, 1986=100	157.1	137.2	131.2	138.3	113.8	120.6	129.6	131.6	14.45	38.03
<b>ENERGY</b>										
SPOT PRICE OF OIL, \$/BARREL	18.9	21.8	21.6	20.8	22.1	32.1	26.2	17.8	-13.44	-14.53
U.S. RIG COUNT	650.9	789.1	802.6	924.3	951.1	1096.3	1003.5	1050.8	-17.51	-31.58
DISTRICT RIG COUNT	55.6	60.9	73.3	83.8	73.2	74.5	75.1	73.7	-8.67	-23.96
FUEL MINING EMPLOYMENT, 1985=100	69.8	69.9	72.7	73.6	74.8	73.9	74.1	74.1	-0.15	-6.61
U.S. SEISMIC CREW COUNT	78.9	89.7	98.4	110.2	117.9	120.3	122.7	128	-12	-33.03
<b>MINING</b>										
MINERAL PRICES, 1986=100	105.3	103.2	105.6	109.2	108.2	112.2	129	127.4	2.05	-2.67
METAL MINING EMPLOYMENT, 1985=100	180.9	180.7	184.1	185.9	193.1	197.1	197.3	199.7	0.09	-6.35
<b>CONSTRUCTION</b>										
NONRESIDENTIAL AWARDS, 1985=100	115	103.7	93.4	103.1	106.3	101.1	111.8	111.4	10.92	8.16
RESIDENTIAL PERMITS	19780	19496	18524	19833	17667	18524	22940	25736	1.46	11.96
WESTERN HOUSING STARTS, THOUSANDS	21.7	19.5	24.1	25.5	15.6	18.6	29.1	31.2	11.28	38.81
CONSTRUCTION EMPLOYMENT, THOUSANDS	906.2	912.1	929.3	938.8	957.7	1001.8	1034.7	1056.3	-0.64	-5.37
<b>MANUFACTURING</b>										
WAGES, CALIFORNIA, \$/HOUR	12.1	12	11.9	11.8	11.7	11.7	11.5	11.4	0.97	3.38
EMPLOYMENT, THOUSANDS	2947.2	2956.4	2982.4	3005.8	3050.3	3102.4	3135.2	3155.5	-0.31	-3.38
DURABLES, 1985=100	93.7	94.4	95.6	96.6	98.3	99.8	101.3	102.4	-0.74	-4.67
CONSTRUCTION DURABLES, 1985=100	97.9	97.1	98.8	99.2	101.5	104.6	108.1	110.5	0.9	-3.49
AEROSPACE, 1985=100	102.8	104.7	106.1	108.3	110.7	113.1	115.5	117.8	-1.79	-7.11
ELECTRONICS, 1985=100	87.8	88.3	89.9	91.4	92	92.3	92.8	93.2	-0.52	-4.51
SEMICONDUCTOR ORDERS, MILLIONS \$, NOT S.A.	1472.3	1391.8	1263.5	1294.2	1217.9	1207.1	1236.8	1235.5	5.79	20.89
<b>WHLS/RETAIL TRADE EMPLOYMENT, THOUSANDS</b>										
RETAIL SALES, PACIFIC DISTRICT, MIL. \$	4704.9	4693	4713.4	4725.7	4725.7	4792.1	4812.6	4805.8	0.25	-0.44
RETAIL SALES, PACIFIC DISTRICT, MIL. \$	25838	24726	25098	24942	24542	25101	25123	24977	4.5	5.28
<b>SERVICES EMPLOYMENT, THOUSANDS</b>										
HEALTH CARE, 1985=100	5496.5	5488.5	5471.9	5445	5404.5	5440	5417.4	5389.9	0.15	1.7
BUSINESS SERVICES, 1985=100	132.1	131.5	130.1	129.1	128.2	127.1	125.6	124.2	0.49	3.1
HOTEL, 1985=100	119.8	118.1	118.2	119.3	118.4	116.3	116	116	1.44	1.15
RECREATION, 1985=100	136.8	137.4	135	135.1	134.9	135.7	133.8	132.6	-0.48	1.38
RECREATION, 1985=100	142.6	142	140.4	141.5	141.6	140.8	138.4	136.4	0.42	0.69
<b>FINANCE, INSUR. AND REAL ESTATE EMPLOYMENT</b>										
FINANCE, INSUR. AND REAL ESTATE EMPLOYMENT	1243.9	1242.3	1245	1247.2	1247.9	1259	1259.4	1262.8	0.13	-0.32
<b>GOVERNMENT EMPLOYMENT, THOUSANDS</b>										
FEDERAL GOVERNMENT	609.9	611.5	614.1	610.7	614.5	618.8	632.6	655.8	-0.26	-0.75
STATE AND LOCAL	2899.9	2883.8	2888.9	2863.2	2851	2842.2	2832.3	2781.7	0.56	1.71

Data are weighted aggregates of available 12th District data constructed by FRBSF staff from public and industry sources.

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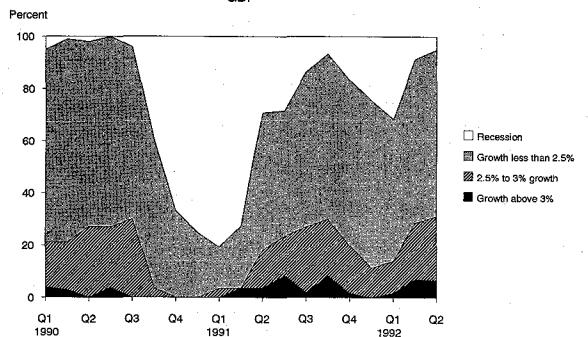
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# San Francisco Bank of Federal Reserve Research Department

**PERSONAL INCOME  
ANNUALIZED PERCENT GROWTH RATES**

	91Q4	91Q3	91Q2	91Q1	90Q4	ANNUAL GROWTH		
						1991	1990	1989
ALASKA	7.8	4.9	-1.6	6.8	6.2	4.4	6.6	10.5
ARIZONA	3.0	-0.3	5.1	5.5	3.4	3.3	6.1	5.7
CALIFORNIA	0.9	2.6	4.6	-1.5	4.4	1.6	7.5	7.1
HAWAII	5.2	5.3	3.3	5.0	8.9	4.7	11.0	11.1
IDAHO	14.4	3.4	9.3	-8.4	14.9	4.3	8.4	10.2
NEVADA	5.8	4.9	4.8	3.9	3.9	4.9	9.7	13.0
OREGON	5.2	5.5	4.5	1.6	5.6	4.2	7.0	9.8
UTAH	5.0	5.8	5.9	5.0	6.2	5.4	8.5	7.5
WASHINGTON	6.7	5.4	4.9	3.5	8.4	5.1	8.6	10.4
12TH DISTRICT	2.5	3.1	4.6	0.0	5.2	2.6	7.7	7.8
U.S.	3.8	2.9	4.3	0.4	3.6	2.8	6.1	6.9

**Twelfth District Business Sentiment\*  
GDP**



\* Expectations for GDP growth during the next four quarters based on a survey of approximately 75 business leaders in the 12th Federal Reserve District.

**NON-AGRICULTURAL EMPLOYMENT  
ANNUALIZED PERCENT GROWTH RATE**

	92Q1	91Q4	91Q3	91Q2	91Q1	ANNUAL GROWTH		
						1992*	1991	1990
ALASKA	3.4	7.3	0.6	-1.8	2.3	3.4	2.1	5.2
ARIZONA	0.6	-0.2	2.8	-0.1	0.0	0.6	0.6	1.6
CALIFORNIA	-0.5	-3.4	-1.1	-0.8	-6.5	-0.5	2.9	0.4
HAWAII	1.3	1.4	2.6	-0.6	0.7	1.3	1.0	3.9
IDAHO	5.8	5.9	3.1	2.2	3.7	5.8	3.8	4.6
NEVADA	4.2	4.2	2.2	0.7	-1.0	4.2	1.5	5.3
OREGON	3.3	1.5	1.2	-0.5	-2.4	3.3	-0.1	2.5
UTAH	3.0	2.0	3.4	0.9	2.7	3.0	2.3	4.4
WASHINGTON	1.8	2.9	1.6	1.1	-1.5	1.8	1.0	3.3
12TH DISTRICT	0.6	-1.3	0.1	-0.4	-4.2	0.6	1.4	1.4
U.S.	-0.3	-0.1	0.5	-1.2	-2.3	-0.3	-0.8	0.7

\* Year-to-date

**UNEMPLOYMENT RATES  
AVERAGE QUARTERLY DATA**

	92Q1	91Q4	91Q3	91Q2	91Q1	ANNUAL AVG.		
						1992*	1991	1990
ALASKA	9.1	9.8	8.8	8.0	7.7	9.1	8.6	7.0
ARIZONA	8.7	7.3	5.6	4.9	4.8	8.7	5.7	5.3
CALIFORNIA	8.4	7.6	7.5	7.8	7.4	8.4	7.6	5.6
HAWAII	3.5	3.0	2.7	2.5	2.5	3.5	2.7	2.8
IDAHO	6.4	6.2	5.6	6.3	6.4	6.4	6.1	5.9
NEVADA	6.6	5.7	6.7	5.9	5.6	6.6	5.7	5.0
OREGON	8.1	6.5	5.9	5.8	5.8	8.1	6.0	5.5
UTAH	4.7	5.2	5.3	4.6	4.3	4.7	4.6	4.3
WASHINGTON	7.3	6.8	6.3	6.3	5.9	7.3	6.3	4.9
12TH DISTRICT	8.0	7.2	6.9	6.9	6.6	8.0	6.9	5.4
U.S.	7.2	7.0	6.8	6.8	6.5	7.2	6.7	5.5

\* Year-to-date