When the Big Wheel Turns

Projected Impacts of a Recession on Los Angeles Workers

December 2001

Daniel Flaming
Mark Drayse

Gerald Sumner
Statistical Consultant

Economic Roundtable
A Nonprofit, Public Policy Research Organization
315 West Ninth Street, Suite 1209, Los Angeles, California 90015
www.economicrt.org

Copyright © 2001 by the Economic Roundtable
All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage or retrieval system, without permission in writing from the publisher.

This report has been prepared by the Economic Roundtable, which assumes all responsibility for its contents.

This complete report can be downloaded from the Economic Roundtable web site:
www.economicrt.org

Table of Contents

EXECUTIVE SUMMARY 1
Findings 1
Policy Recommendations 2

INTRODUCTION 3

INDUSTRY DISTRIBUTION OF POTENTIAL LAYOFFS 4
Correlation with the Business Cycle 4
Correlation of Change in the Business Cycle and Change in Employment 5
Projected Distribution of Job Losses Attributable to a Recession 7
Low-wage Workers 10

INDUSTRIES AT RISK 11

INCREASE IN UNEMPLOYMENT 13
Unemployment Rate among Low-wage Workers 13
Discouraged Workers 14

DECLINE IN EARNINGS 16

TOOLS FOR HELPING WORKERS 18

NOTES 30

List of Tables and Figures

TABLES

1 Timing of the Association between Level of Employment and Total Personal Income 6
2 Industries Projected to have the Greatest Rate of Job Loss or the Greatest Number of Jobs Lost in a Recession 9
3 Industries Employing the Most Low-wage Workers 11
4 City of Los Angeles Industries Potentially at Risk from Recession-linked Industrial Restructuring 12

5 Changes in Los Angeles County Official Civilian Labor Force Statistics from 1997 to 2001 15
6 Change in Earnings from 1997 to 1999 in Los Angeles County 16
7 Average Annual Earnings of Employed Welfare Workers by Year of First Gain Job 17
8 Information for Managing Labor Force Impacts of a Recession 19
9 Business Cycle Effects on Industry Employment and Estimated Distribution of Impacts in a Recession 21

FIGURES

1 Total Personal Income and Employment 5
2 Annual Change in Personal Income and Employment 6
3 Thirty Industries Projected to Have the Largest Share of Recession-caused Layoffs 8
4 Projected Distribution of Recession-Caused Job Losses by Industry Sector ... 10
5 Unemployment Rate for Different Segments of the Labor Force 14
6 Average Annual Wages of Employed Persons 17
7 Earnings of Employed Welfare Workers who were in the Labor Market 2+ Years as a Percent of Average Wages for all Los Angeles County Workers 1991-1999 18

When the Big Wheel Turns

Projected Impacts of a Recession on Los Angeles Workers

Executive Summary

Summary of Findings

This report uses information from the five most recent years when the Los Angeles economy contracted as well as information about the overall sensitivity of each industry to the business cycle over the past 23 years to produce a list of "likely suspects" for layoffs in the current downturn. We explore the question of "where?" rather than the question of "how much?" to provide fine-grain industry information about workers and employers that face the greatest risk of impacts from the current downturn.

1. Over half of Los Angeles County's labor force works in industries that are highly synchronous with the business cycle, with employment changes likely to occur in the same year as business cycle changes. More than one-quarter of the effects of a recession are likely to occur in a secondary wave of lagged employment impacts that occur subsequent to the overall business cycle.
2. In addition to job losses the past two recessions have also seen job growth in some Los Angeles industries. The ratio of job loss to job growth in the downturns was roughly three to one.
3. By far the largest job losses are projected to occur in the "help supply services" (temp agency) industry, which is expected to account for 15 percent of all layoffs. Nine percent of all low-wage workers are employed in this industry.
4. Twenty-two industries with total employment of 54,400 workers in the City of Los Angeles may be at-risk as the current slowdown increases the likelihood of further industrial restructuring. Overall, these industries pay above-average wages - $3,730 a month in 1999 compared to $3,012 for all jobs in the city.
5. There is a distinct geographic component to the industries that are at risk of setbacks. Most are manufacturing and wholesale industries with significant concentrations of employment in North San Fernando Valley and some additional concentrations in South San Fernando Valley and Central Los Angeles.
6. A seemingly moderate increase of 1 percentage point in the rate of unemployment, which would increase it to the 1997 rate of 6.8 percent, can represent hundreds of thousands unemployed workers – comprised of some officially counted job seekers and many "invisible" uncounted discouraged workers who are left out of labor force statistics.
7. The unemployment rate for welfare-to-work participants is roughly five times higher than the rate for the overall labor market, reflecting much bigger swings in employment than in the overall labor market. A positive outcome of this disparity was that when the overall unemployment rate declined by 1 percentage point

between 1997 and 1999, the rate for welfare-to-work participants dropped by 7 percentage points. The potential downside is that as unemployment increases there is likely to be disproportionately large upswing among low-wage workers.

8. Over the most recent three-year period for which we have data, 1997 to 1999, the average annual wage for a job in Los Angeles County increased by 4 percent. During this same period of time the average annual earnings of welfare-to-work participants who had been in the labor market for at least two years and who were employed during the year increased by a remarkable 38 percent. In 1999, the average earnings of these welfare-to-work participants grew to 29 percent of average wages in the labor market, a gain of 6 percentage points in a single year.
9. Most of this economic progress is attributable to increased labor market demand for entry-level workers, rather than a fundamental change in these workers' competitive standing in the labor market.
10. The recent economic progress made by low-wage workers in the Los Angeles region has been greatly facilitated by recent economic growth and consequently it is vulnerable to being reversed by a recession.

Summary of Policy Recommendations

1. Initiate preemptive outreach activities to: (a) obtain identifying and contact information for at-risk workers, (b) provide workers in vulnerable industries with access to training programs that will help them move laterally to related jobs in other industries, (c) provide workers with information about potential career mobility paths, (d) make business assistance resources available to impacted employers.
2. Use this period of job scarcity to support more extended and intensive job training programs that qualify workers for occupations that pay sustaining wages. Career planning activities should make use of extensive information that is now available about the occupations that employ workers in each area of the city, the wages they pay, and whether they are growing or declining.
3. The number of laid-off low-wage workers will be highly disproportionate to their presence in the labor market. It is particularly important to identify at-risk workers in this population as early as possible and to use this interval of unemployment for skill development that will change their competitive standing in the labor market.
4. Monitor the 23 industries (see Table 2) that are projected to have the have the highest layoff rates and the most laid off workers, accounting for an estimated 55 percent of recession-caused job losses, identify workers in advance of layoffs, and provide workers with appropriate employment services.
5. Reach out to employers in the 22 at-risk industries (see Table 4) that have experienced both long-term and near-term employment decline to determine how the city can assist in improving the business environment for them. Particular attention should be paid to the large concentration of these industries in the San Fernando Valley.

Introduction

The word *economic* was originally a Greek term relating to managing household resources to meet a family's needs. The word was absorbed into the English language and continued to have this meaning through the 1700s. It was used, for example, in referring to a woman's "wisdom economic" in managing the practical affairs of her household. Seen in this sense, Los Angeles is a community of people, together earning their livelihoods and working to fulfill the practical needs of their families. In a recession the threads of interconnection in this shared economic enterprise become frayed. The most concrete characteristic of a recession is that demand disappears for some of the commodities produced by workers and unwanted unemployment is imposed on a segment of the labor force. This paper examines the places where a recession is likely to cause displacement and disconnection in Los Angeles' economic fabric.

A decline in regional employment appears to have begun in June 2001,[1] and it is likely to be more precipitous and protracted than it otherwise would have been as a consequence of reduced consumer confidence following the September eleventh terrorist attacks. This paper explores likely impacts of a recession on Los Angeles industries, including:

- Industry distribution of potential layoffs
- Declining industries that may suffer long-term damage from the downturn

We then look at the effects of industry downturns on workers, including increases in the rate of unemployment and decreases in earnings.

Additional secondary impacts resulting from reduced employment and worker earnings during the course of a recession, although not examined in this paper, are likely to include:

- Higher rate of poverty
- Growing welfare caseload
- Increased number of precariously housed and homeless persons
- Increased dependency on public transportation
- Increased dependency on public health services
- Reduced public sector tax revenue

Understanding how a recession will affect the Los Angeles region and its workers can help us develop priorities for public sector programs to help workers remain gainfully employed. Additionally, Los Angeles underwent remarkable demographic transformations during the 1990s; with over one million immigrants arriving from abroad to replace a similar number of residents who left the region. These changes in the labor force aggravated existing problems of labor market polarization and lack of access to sustaining employment. It is important to understand the potential

impacts of a recession on the progress of low-wage workers in becoming self-sufficient.

Industry Distribution of Potential Layoffs

Information about the effect of the business cycle on industry employment in Los Angeles provides a basis for anticipating which industries have the potential to layoff the most workers during a recession. This information can be used to identify and monitor industries where workers may have the greatest likelihood of being laid off. We recommend using this information to:

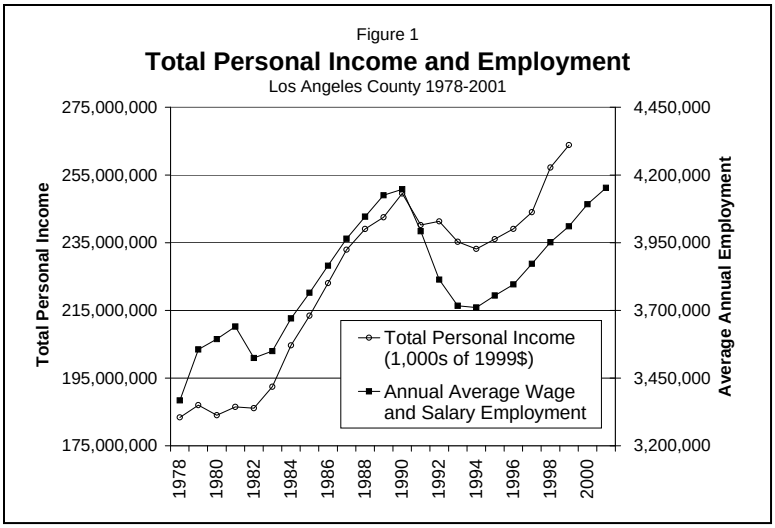
- Identify workers who are at risk of layoffs.
- Provide workers in vulnerable industries with access to training programs that will help them move laterally to related jobs in other industries.
- Provide workers with information about potential career mobility paths to lower risk industries.
- Make business assistance resources available to impacted employers.

This analysis uses very fine-grain (4-digit SIC) industry data from 1978 through 1999 to extract as much historic information as possible about how each industry has responded to the past two recessions as well as its overall sensitivity to the business cycle. The use of highly specific data for a large number of industries increases the risk of inaccurate projections, but it also provides a level of detail that is operationally useful for public programs that assist laid-off workers and distressed businesses. It should be noted that employment trends in many industries do not run in a consistent parallel course with the overall economy, but are influence by eclectic factors. Users of this data should be alert to instances in which specific industries may be affected by circumstances that were not typical of the past two recessions. This might, for example, include such things as differences in the availability of public funds for health care or the drop in tourism following the September eleventh attacks.

Correlation with the Business Cycle

We estimated the relationship between employment in 243 industries and the county business cycle by examining the historic association between industry employment and total personal income (reflecting the overall strength of the economy[2]) in Los Angeles County from 1978 to 1999. A time series for these two trends in the county is shown in Figure 1. There is a strong relationship between these trends; the total *level* of personal income in the county appears to explain 90 percent of the overall *level* of employment.[3]

Figure 1



The industries that are most sensitive to an economic downturn are those supplying goods or services that consumers are most likely to defer using when they have less income. The first column of data in Table 9 (at the end of this paper) shows correlation values for the association between the level of employment in an industry and total personal income in the county (a value of 1.0 indicates perfect correlation; negative values indicate a difference in timing rather than impact).[4] Looking at these values we see that consumers are less likely to go to a car wash, have bodywork done on their car, hire a gardener, go to a doctor, go on vacation trips, take their pet to the veterinarian, or buy jewelry during a recession. Nearly 60 percent of the region's employment is in industries with cyclical correlation values of 0.70 or higher, indicating a strong association between changes in the business cycle and in employment. This includes much of the retail and service sectors.

Non-cyclical industries typically provide basic necessities for daily life or businesses, such as grocery and drug stores, stationary and office supplies. This also includes sources of basic information, such as newspaper job listings, and skill development from community colleges.

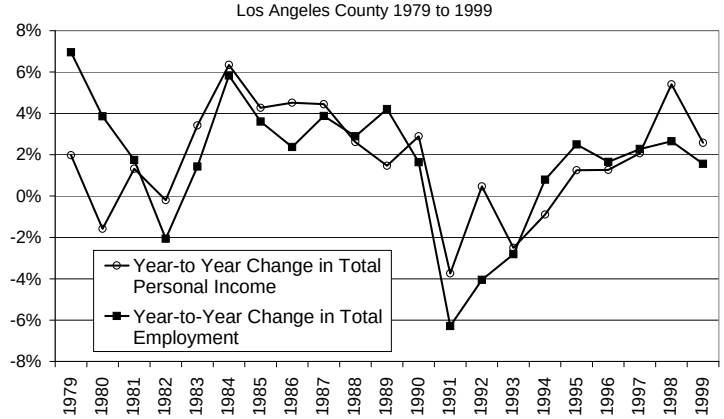
Only a small number of industries are counter-cyclical to business cycles. They include industries in which job loss foretells a recession. For example, department stores and apparel manufacturers tend to lose jobs before the rest of the economy enters a recession. This category also includes industries such as telephone communications in which decline in employment occurs long after it has begun in other industries.

Correlation of Change in the Business Cycle and Change in Employment

In the previous section we looked at the relationship between the level of personal income in the county and the level of employment in industries. To understand the effects of a recession on employment we need to understand the relationship between *change* in the level of total personal income and *change* in the level of employment. This relationship can be seen in Figure 2, which shows year-to-year

change in employment and total personal income in the county from 1979 to 1999. *Changes* in total personal income appear to explain 44 percent of *changes* in total employment.[5] This association is weaker than the association between the levels of personal income and employment, but still quite significant.

Figure 2
Annual Change in Personal Income and Employment
Los Angeles County 1979 to 1999



The most important information from this step in the analysis was to determine the timing of changes in industry employment relative to the business cycle. Using data showing year-to-year change in employment in each industry from 1979 to 1999 as well as change in total personal income we determined whether the strongest relationship between these two trends was obtained by linking change in personal income with change in employment in the preceding year, the same year, or the following year.[6] We found that a majority of industries have employment changes that are most strongly associated with changes in the business cycle that occur during the same year. These linkages are summarized below in Table 1 and shown for each industry in the second column of data in Table 9. It is noteworthy that more than one-quarter of the effects of a recession are likely to occur in a secondary wave of delayed impacts.

Table 1
Timing of the Association Between Level of Employment and Total Personal Income
Lag Relationship between Changes in Employment and Total Personal Income:
1 Year Before, No Lag, or 1 Year After - Los Angeles County 1979-1999

Lag Relationship Producing Highest Correlation between Employment and the Business Cycle	Total Employment	Percent of Employment	Number of Industries
Employment Changes Precede the Business Cycle	541,643	16%	57
Employment Changes Concurrent with the Business Cycle	1,842,782	56%	123
Employment Changes Follow the Business Cycle	923,387	28%	63
Total for 243 Industries	3,307,812	100%	243

Projected Distribution of Job Losses Attributable to a Recession

Three elements of the historic information used in this paper are useful for projecting the distribution of layoffs among industries in a recession:

1. The number of workers laid off by each industry in previous recessions.

2. The extent to which changes in the business cycle explain changes in industry employment.
3. The number of workers in each industry.

We combined these three factors to project the distribution among industries of total layoffs caused by a recession.[7] This projection focuses on the relative share of total layoffs that are likely to come from each industry, rather than the actual number of layoffs, since at this time we do not know how many layoffs will actually occur.

To produce this projection we combined the average percent of jobs lost in each industry in the five years in which there was an overall decline in personal income in the county (1980, 1982, 1991, 1993, and 1994) with the percent of job change in the industry that is attributable to the business cycle. This gives us a percent value showing the annual job change in downturns that is explained by change in the business cycle. This is shown in the fifth column of data in Table 9.[8] The sixth column of data shows the average annual number of jobs projected to be lost or gained during a downturn. This projected job change was calculated by multiplying the percent annual job change in previous downturns that was explained by the business cycle by the county's employment in the industry in 1999.

Comparing the job changes projected for an economic downturn by this model with actual job losses in each industry in the past two recessions (shown in the third and fourth data columns in Table 9) we see that this model understates the actual impacts of a recession. When we apply the average annual rate of job change attributable to the business cycle in the 5 years the economy contracted to 1999 industry employment levels we get 36,400 jobs lost and 12,800 jobs gained, for a net loss of 23,600 jobs. This is a very low projection of probable job losses. The value of this conservative approach is that it minimizes the "noise" in employment data, for example the one-time effects of defense cutbacks and an over-built commercial real estate market on the 1990 recession, to isolate the hierarch of effects that an economic contraction is likely to have on industry employment.

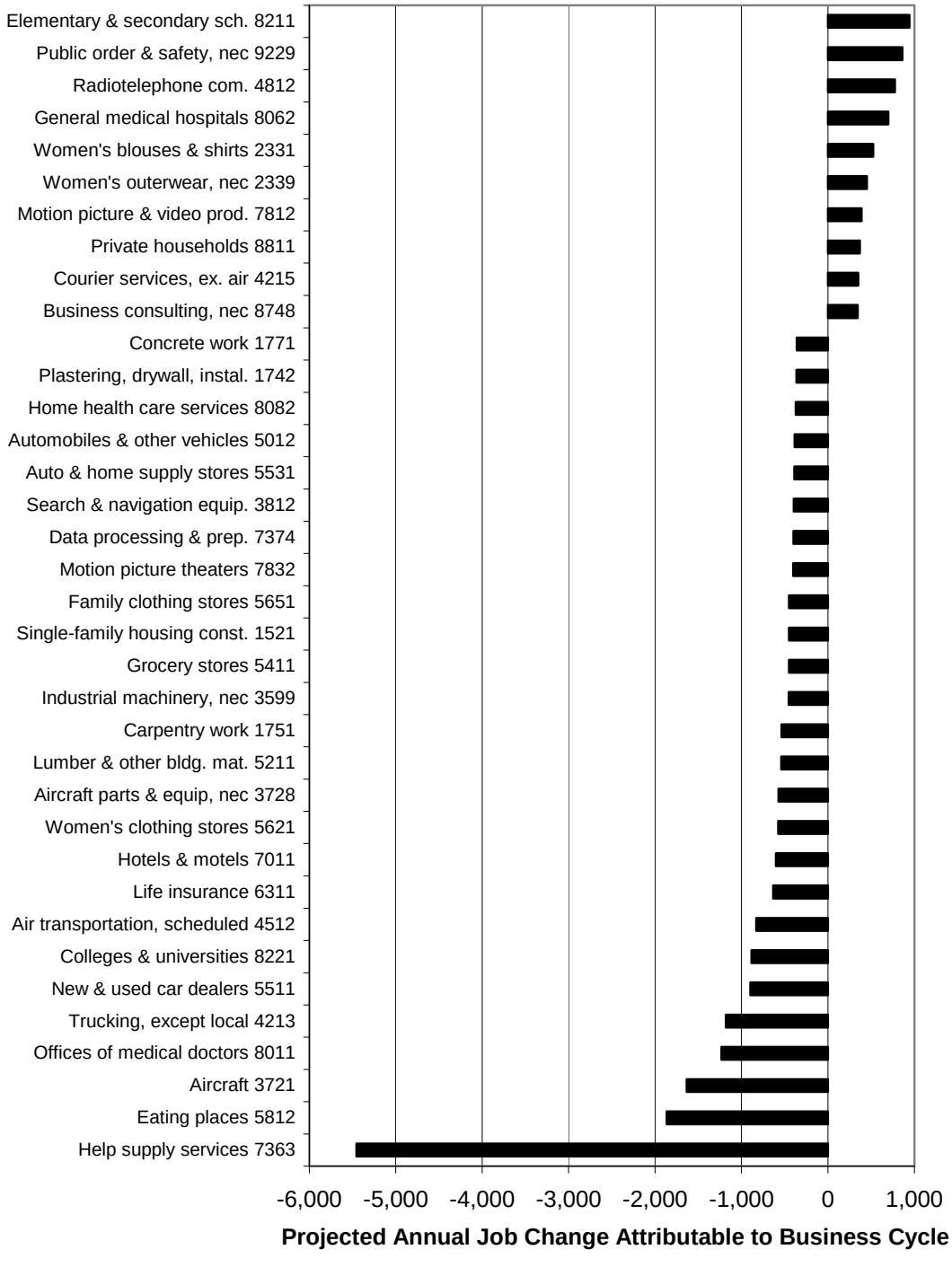
This model enables us to produce a ranking of industries at risk of laying off the most workers in a recession. Such a ranking is more useful than the actual amount of job change projected by the model. These projections of recession-caused job losses are shown in Table 9 at a very detailed industry level (4-digit SIC) to enable employment and business assistance programs to identify specific industries that should be monitored for impacts in the current downturn.

The 33 industries projected to have the most job change in a recession are shown in Figure 3. The 26 industries in Figure 3 that are projected to lose jobs account for 61 percent of all layoffs projected for the 243 industries in Table 9. By far the largest job losses are projected in help supply services, followed by restaurants.

Figure 3

Industries Projected to have the Greatest Job Change Attributable to the Business Cycle During Downturn

Change rate from 1980, 1982, 1991, 1993 and 1994 applied to 1999 employment



It is noteworthy that some industries, including public safety and hospitals, are projected to grow. Of the 243 industries analyzed in this paper, an economic downturn is projected to be associated with job losses in 160 industries, no change in 2 industries, and job gains in 81 industries. Taking into account the size and rate of change in industries, the ratio of jobs lost to jobs gained is projected to be 3 to 1.

Table 2
Industries Projected to have the Greatest Rate of Job Loss or the Greatest Total Number of Job Lost in a Recession

SIC	Title	Percent of Industry Jobs Projected to be Lost Annually During Downturn	Annual Job Loss Projected During Downturn
1751	Carpentry work	-12.4%	-538
1771	Concrete work	-7.2%	-361
3721	Aircraft	-4.1%	-1,633
3728	Aircraft parts & equip., nec	-3.4%	-572
4213	Trucking, except local	-8.0%	-1,180
4512	Air transportation, scheduled	-3.0%	-830
5012	Automobiles & other vehicles	-7.2%	-385
5112	Stationery & office supplies	-6.4%	-238
5211	Lumber & other building mat.	-4.2%	-540
5331	Variety stores	-5.3%	-198
5511	New & used car dealers	-2.7%	-898
5621	Women's clothing stores	-5.8%	-577
5812	Eating places	-0.8%	-1,866
6311	Life insurance	-8.8%	-634
6371	Pension, health, & wel. funds	-5.0%	-165
6552	Subdividers & developers,	-5.9%	-153
7011	Hotels & motels	-1.5%	-601
7322	Adjustment & collection srvs.	-5.0%	-149
7363	Help supply services	-4.9%	-5,454
7374	Data processing &	-6.1%	-398
7832	Motion picture theaters	-5.8%	-401
8011	Offices of medical doctors	-2.0%	-1,232
8221	Colleges & universities	-1.2%	-885

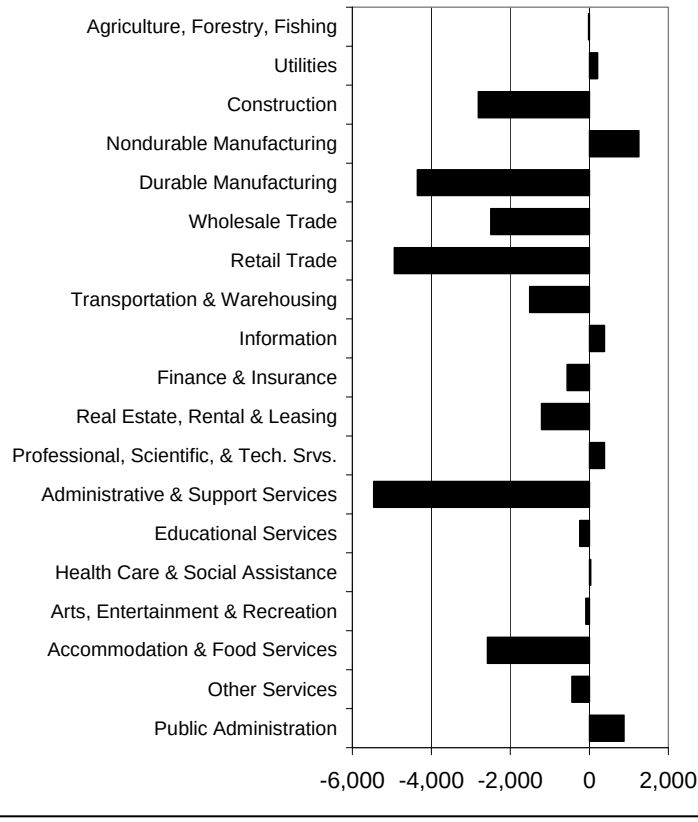
The rate of job loss in an industry is as important for employment and business assistance programs as the total number of jobs lost. The rate identifies the severity of unemployment impacts, whereas the number identifies the scope of potential job losses in industries. Industries with the greatest potential job losses based on both measures are shown in Table 2. These industries are projected to account for 55 percent of recession-caused layoffs. This is a useful list of industries likely to be most impacted by a recession.

The projected distribution of job losses for all of the 243 industries in Table 9 are rolled up by North American Industry Classification System (NAICS) industry sector in Figure 4. Three sectors are projected to account for over half of job losses attributable to the business cycle, with the greatest number projected in administrative and support services, followed by retail trade and durable manufacturing. Low-wage workers are concentrated in the first two of these sectors. These estimates are useful for anticipating the sectors where the most workers will be laid off. Industries with high rates of job loss are likely to offer very poor employment prospects, whereas industries with below-average rates of job loss, or even some growth, may have some new positions or need new hires to replace workers who retire or leave the labor force for other reasons.

Low-Wage Workers

Since low-wage workers are a major component of the unemployed population it is useful to identify the industries in which they are concentrated. Fourteen industries, listed in Table 3, employ nearly half of all low-wage workers (as represented by welfare-to-work participants). The largest of these is elementary and secondary schools, followed in rank order by help supply services, eating places, and private households. These four industries account for 28 percent of all low-wage employment.

Figure 4
Projected Annual Employment Change during Downturn Attributable to Business Cycle
Change rate from 1980, 1982, 1991, 1993, and 1994 applied to 1999 employment



Low-wage workers are shown in Table 3 to be highly concentrated in help supply services (temp agencies). This industry also shows up in Figure 3 as having the greatest projected number of layoffs. Based on the model presented in this paper for projecting job change caused by an economic downturn, this industry is projected to account for 15 percent of all projected layoffs. The high concentration of low-wage workers in this industry makes it particularly important that public employment services be fully accessible to and known by these workers.

Three operationally relevant points emerge from this discussion of the industries in which the business cycle has the greatest employment effects. First, the 23 industries listed in Table 2 are likely to represent the areas of greatest need for assisting workers who may be laid off as the result of a recession. Second, employment and training programs should assign high priority to making contact with employers in these industries, identifying workers in advance of layoffs, and providing workers with appropriate skill development and employment services. Third, the industry in which there is the greatest concentration of low-wage workers

is primary and secondary schools. This is not surprising given that this is the largest 4-digit SIC employer in the City of Los Angeles. It is important to protect this workforce; reductions in school personnel would run counter to efforts to improve the quality of public education.

Table 3
Industries Employing the Most Low-Wage Workers

SIC	Title	Percent of Low-wage Employment
8211	Elementary & secondary schools	9.4%
7363	Help supply services	8.6%
5812	Eating places	5.8%
8811	Private households	4.2%
5311	Department stores	3.2%
2339	Women's outerwear, nec	2.7%
7381	Detective & armored car services	2.0%
7389	Business services, nec	1.9%
5411	Grocery stores	1.7%
8051	Skilled nursing care facilities	1.7%
7361	Employment agencies	1.6%
8011	Offices & clinics of medical doctors	1.6%
9131	Executive & legislative combined	1.4%
8062	General medical & surgical hospitals	1.3%
	Subtotal	*47.2%*

Industries At Risk

Twenty-two industries with total employment of 54,400 workers in the City of Los Angeles may be at risk as the current slowdown increases the likelihood of another cycle of industrial restructuring. These industries are listed in Table 4. All of the industries have experienced long-term, countywide employment decline or stagnation from 1978 through 1998 as well as near-term employment decline in the City of Los Angles from 1997 to 1999. Half of these industries are in the manufacturing sector, with the balance in the transportation, wholesale, financial, scientific, and services sectors. Most of these industries pay above-average wages and many provide middle class jobs for workers with average levels of education.

The recovery phase of recessions is typically accompanied by an economic shakeout as businesses seek to compete against redefined industry benchmarks for efficiency, cost containment, scale of operations, supply chain linkages, and product innovation. For businesses that have been struggling to survive, this repositioning may take the form of merging with other firms, consolidating facilities, moving to a new location, or liquidating assets. What emerges from this process is a redefined industrial structure in the regional economy. Many of the casualties of industrial restructuring in Los Angeles over the past two decades have been durable manufacturing industries that provided sustaining employment and middle class incomes for average members of the workforce. The average monthly wage in 1999 for industries listed in Table 9 was $3,730 – nearly a quarter more than the average wage of $3,012 for all jobs in the City of Los Angeles.

Table 4

City of Los Angeles Industries Potentially at Risk from Recession-Linked Industrial Restructuring

							City Planning Area Concentrations						
SIC	Industry Title	County of Los Angeles Employ-ment Change 1978-1998	City of Los Angeles Employ-ment Change 1997-1999	Correla-tion of Employ-ment Change with Business Cycle 1978-1999	City of Los Angeles Average Monthly Pay in 1999	City of Los Angeles 1999 Employ-ment	Central Los Angeles	West Los Angeles	So. San Fernando Valley	East Los Angeles	South Los Angeles	Harbor Area	No. San Fernando Valley
Nondurable Manufacturing													
2082	Malt beverages	-1%	-8%	-0.65	$5,519	1,142							97%
2759	Commercial printing, nec	-2%	-8%	-0.81	$3,174	2,269	28%						
3089	Plastics products, nec	-1%	-2%	-0.47	$2,375	2,038							54%
Durable Manufacturing													
3432	Plumbing fixture fittings & trim	-1%	-18%	-0.07	$3,314	906							75%
3479	Metal coating & allied srvs.	-1%	-4%	-0.35	$2,183	989							52%
3599	Industrial machinery, nec	-2%	-2%	-0.68	$3,020	2,548							55%
3652	Prerecorded records & tapes	-2%	-7%	-0.72	$7,091	1,060	65%						
3672	Printed circuit boards	-2%	-12%	-0.42	$2,315	1,258							74%
3679	Electronic components, nec	-1%	-14%	0.10	$2,667	1,566							62%
3714	Motor vehicle parts & access.	0%	-34%	-0.13	$2,658	1,353			72%				
3812	Search & navigation equip.	-4%	-14%	-0.54	$5,749	4,169			71%				18%
Transportation and Warehousing													
4215	Courier services, exc. by air	0%	-4%	-0.34	$1,308	4,108	28%	13%		43%			
Wholesale Trade													
5013	Motor vehicle supplies & parts	-1%	-14%	-0.89	$2,394	2,891			23%				40%
5065	Electronic parts & equipment	-1%	-7%	-0.12	$4,757	3,115	18%		31%				35%
5087	Service establishment equip.	-1%	-19%	-0.21	$3,078	1,034							49%
5088	Transp. equipment & supplies	-2%	-10%	-0.64	$4,752	1,076							51%
Finance and Insurance													
6022	State commercial banks	-1%	-32%	-0.32	$4,170	5,682	81%						
6036	Savings institutions, exc. fed.	-1%	-34%	0.02	$2,894	1,693							56%
6331	Fire, marine, & casualty ins.	-1%	-3%	-0.46	$4,662	6,886	45%		41%				
Other Services													
7538	General auto repair shops	0%	-15%	0.38	$2,083	3,050	30%		26%				
Professional, Scientific and Technical Services													
8711	Engineering services	0%	-6%	0.30	$4,791	4,000	48%	18%	23%				
8731	Commercial physical research	-1%	-7%	0.04	$5,025	1,590		34%					34%

The three industry sectors with the most workers at-risk are:

- Finance and insurance with three at-risk industries employing 21 percent of workers in the sector.
- Durable manufacturing with six at-risk industries employing 18 percent of workers in the sector.
- Wholesale trade with four at-risk industries employing 10 percent of workers in the sector.

Within the City of Los Angeles there is a distinct geographic component to the industries at risk of further setbacks in a new cycle of industrial restructuring. Most are manufacturing and wholesale industries with significant concentrations of employment in the North San Fernando Valley and some additional concentrations in the South San Fernando Valley and Central Los Angeles. Central Los Angeles also has concentrations of two finance and insurance industries that have been in decline. And West Los Angeles has concentrations of two Professional, Scientific and Technical Services industries that have experienced attrition.

Most of the industries listed in Table 4 have weak counter-cyclical linkages with changes in the regional business cycle. This suggests that many of them have experienced stress from forces not associated with regional recessions. City business assistance and economic development staff should reach out to employers in these industries to determine how the city can assist in improving the business environment for them.

Increase in Unemployment

Unemployment Rate Among Lower-Wage Earners

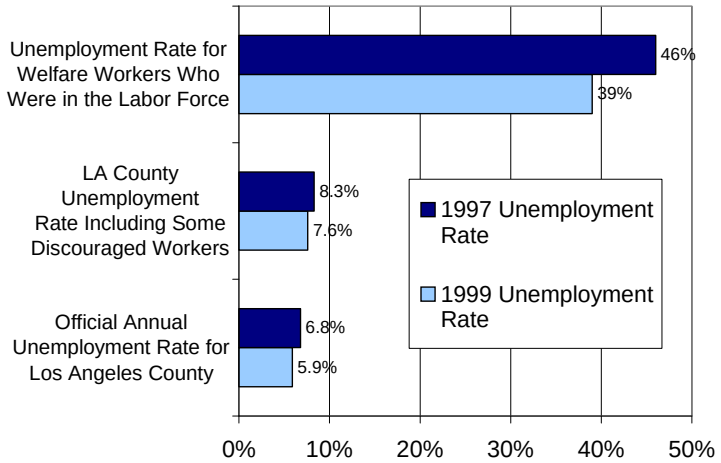
By looking at the workforce impacts of a comparatively mild recession in which unemployment increases to the level it was at in 1997 we see how a shrinking labor market affects different groups of workers. This hypothetical return to the 1997 level of unemployment is roughly comparable to the projections in the UCLA Anderson forecast released in September 2001,[9] and serves to demonstrate the uneven distribution of unemployment in the labor force.

The unemployment rate for Los Angeles County in September 2001was 5.8 percent and close to the annual average of 5.9 percent for 1999 (the most recent year for which we have unemployment rates for low-wage workers, as represented by welfare-to-work participants). An increase of one percentage point in the unemployment rate, as projected by the recent UCLA forecast, would raise this rate to 6.8 percent, the same as it was in 1997.

Figure 5

Unemployment Rate for Different Segments of the Labor Force

1997 and 1999 Unemployment Rates for Los Angeles County



The unemployment rates for three different segments of the county labor market and the extent of their decline from 1997 to 1999 are shown graphically in Figure 5.[10] The three unemployment rates are:

- The unemployment rate for welfare-to-work participants who had found employment after enrollment in this program and established themselves as part of the labor force.
- An adjusted official unemployment rate that includes some discouraged workers by using the statewide labor force participation rate to adjust the size of the county's labor force upward (this creates a roughly fair comparison between the overall unemployment rate and the rate calculated for welfare workers).
- The officially reported unemployment rate.

The decline in unemployment from 1997 to 1999 was roughly proportionate for all three groups, but because the unemployment rate for welfare-to-work participants was more than five times higher than the rate for the overall labor market, the improvement in their employment level was much greater. Their unemployment rate dropped by 7 percentage points. Workers throughout the labor market will be affected by a recession, with a disproportionately large share of the burden relative to their numbers in the labor market falling on low-wage workers. It is entirely plausible that a return to the economic conditions of 1997 would mean a 7-percentage point increase in the unemployment rate among low-wage workers.

Discouraged Workers

One of the uncertainties in trying to determine the rate of unemployment is the extent to which futile experiences searching for jobs have caused active job seekers to become discouraged workers who are invisible in labor market statistics. Discouraged workers (i.e., persons who are not employed or actively seeking

employment) are not counted either as part of the labor force or part of the unemployed. A profile of the county labor market in 1997 and September 2001 based on official employment data is shown in Table 5. The data suggests the presence of a large number of discouraged workers in 1997.

Table 5
Changes in Los Angeles County Official Civilian Labor Force Statistics from 1997 to 2001

	Labor Force	Employment	Unemployment	Unemployment Rate
September 2001	4,887,600	4,604,000	283,600	5.8%
Annual Average 1997	4,491,900	4,184,800	307,100	6.8%
2001 minus 1997	395,700	419,200	-23,500	-1.0%

Officially, the unemployment rate was 1 percentage point higher in 1997 than in September 2001, there were 23,500 more unemployed workers, and there were 419,200 fewer employed workers. The additional 23,500 unemployed workers in 1997 amounted to less than 6 percent of the 419,200 fewer employed workers in 1997 compared to September 2001. This points first and foremost to the likely presence of hundreds of thousands of uncounted discouraged workers in 1997 (secondarily, a minor portion of this anomaly may be explained by growth in the overall labor force since 1997). The important point to take away from this discussion is that a seemingly moderate rate of unemployment, such as the 6.8 percent rate in 1997, can represent a great many unemployed workers – both counted and uncounted.

The prospect of a shrinking labor market and a growing number of frequently invisible unemployed workers has at least two implications for public employment programs:

1. In order for training and re-employment programs to reach workers it is important to identify them before they lose their jobs. After they are unemployed the combination of lack of information about them and confidentiality rules that restrict access to what little information is available makes it impossible to find many of these workers or to make services available to them. Outreach programs can help alleviate this problem by working with employers to obtain identifying and contact information about at-risk workers at their work sites before they become unemployed.

2. Given the reality that there are fewer jobs than workers in a recession, employment programs should increase their emphasis on skill development and human capital investments and decrease their emphasis on job search activities that may prove futile or produce only short-lived benefits. This period in which there is a moratorium on job availability for many workers

can be used to strengthen the skill base, productive capabilities and future competitiveness of workers who do not have immediately favorable prospects for re-employment.

Decline in Earnings

In addition to outright unemployment, sectors of the labor market where there is the greatest surplus of workers are likely to see:

- Increases in involuntary part-time employment.
- Increased competition among workers for scarce jobs that may lead to wage reductions in some sectors.

Both of these outcomes result in lower earnings. Reductions in earnings mean greater austerity for workers and their families as well as reduced consumer demand and buying power in the region.

The workforce as a whole as well as low-wage workers have achieved increases in earnings since 1994, when the Los Angeles region began emerging from the 1990 recession. A time series of average annual wages is shown in Figure 6.

Over the most recent three-year period for which we have data, 1997 to 1999, the average annual wage for a job in Los Angeles County increased by 4 percent. During this same period of time the average annual earnings of welfare-to-work participants who had been in the labor market for at least two years and who were employed during the year increased by a remarkable 38 percent (Table 6 and bottom graph line in Figure 6).[11]

Table 6
Change in Earnings from 1997 to 1999 in Los Angeles County

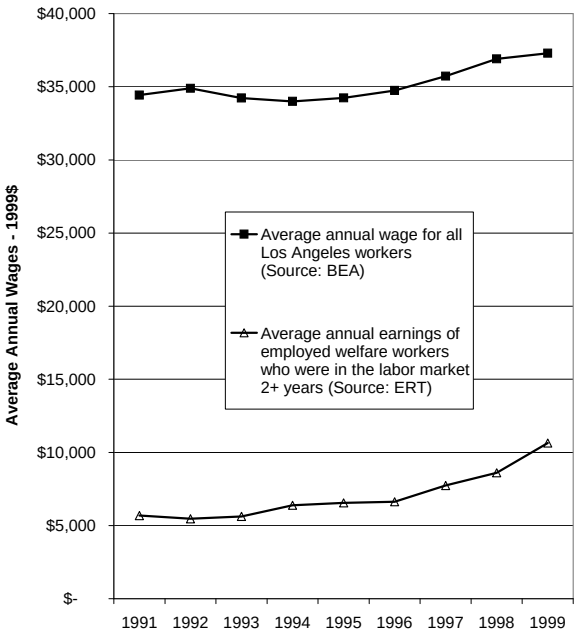
Year	Average annual earnings of employed welfare workers in the labor market 2+ years (ERT)	Average annual wage for all Los Angeles workers (Source: BEA)
1997	$7,740	$35,729
1999	$10,644	$37,299
Change from 1997 - 1999	38%	4%

Earnings of this group of welfare-to-work participants as a percent of overall average wages in the labor market are shown in Figure 7. In the most recent year for which we have data, 1999, average earnings of these welfare-to-work participants grew to 29 percent of average wages in the labor market, a gain of 6 percentage points in a single year. Even after this progress, however, only one-third of these low-wage workers had earnings above the poverty threshold for a family of three in 1999.[12]

Figure 6

Average Annual Wages of Employed Persons

All wage and salary workers in LA County and employed welfare workers who were in the labor market 2+ years - Earnings in 1999$



It appears that much of this economic progress is attributable to increased labor market demand for entry-level workers, rather than a fundamental change in these workers' competitive standing in the labor market. This conclusion is supported by at least two sources of information. First, based on a review of earnings histories for 91,090 welfare-to-work participants who had earnings over the past decade we see that by the end of their second year in the labor market workers typically catch up with the earnings of other welfare-to-work participants who had entered the labor market in previous years (see Table 7). There is little evidence of continued economic progress based on tenure in the labor market. Among workers who had been in the labor market two or more years, earnings for the entire population tended to rise and fall together with few additional pay gains accounted for solely by length of labor force participation.

Second, numerous independent analyses of recent labor market outcomes have concluded that differences in skill levels are the most important factor in explaining differences in income.[13] Unfortunately, there has been relatively little emphasis on building the employment skills of welfare-to-work participants, so this is unlikely to be a major factor in explaining their economic gains.

Table 7

Average Annual Earnings of 91,090 Welfare Workers by Year of First Welfare-to-Work (GAIN) Job

Average Annual Earnings of Employed Persons (1999$)

Earnings in Second and Subsequent Years after GAIN Shown in Bold Italic

Year of First GAIN Job	1990	1991	1992	1993	1994	1995	1996	1997	1998
1990	$3,586	***$5,679***	***$5,257***	***$5,198***	***$5,705***	***$6,228***	***$6,629***	***$7,427***	***$8,234***
1991	$1,828	$3,805	***$5,597***	***$5,563***	***$5,800***	***$6,412***	***$6,883***	***$7,622***	***$8,775***
1992	$2,068	$1,432	$3,664	***$6,113***	***$6,518***	***$7,378***	***$7,863***	***$8,943***	***$10,427***
1993	$3,229	$2,500	$1,709	$3,747	***$7,115***	***$7,637***	***$8,441***	***$9,560***	***$10,866***
1994	$3,942	$2,814	$2,093	$1,483	$3,599	***$6,199***	***$6,872***	***$8,224***	***$9,474***
1995	$4,270	$3,371	$2,481	$2,006	$1,731	$3,602	***$5,836***	***$7,191***	***$8,383***
1996	$4,912	$4,323	$3,614	$3,013	$2,849	$2,536	$4,384	***$7,478***	***$8,525***
1997	$4,238	$3,777	$3,316	$2,889	$2,670	$2,618	$2,527	$5,273	***$7,979***

This suggests that the recent economic progress made by low-wage workers in the Los Angeles region is vulnerable to being undercut in a recession. This reality

supports the argument for using this interval of slack labor market demand to focus employment and training programs on long-term skill development rather that on efforts for immediate re-employment.

Figure 7
Earnings of Employed Welfare Workers who were in the Labor Market 2+ Years as a Percent of Average Wages for all Los Angeles County Workers 1991-1999

The Los Angeles region has undergone remarkable economic and demographic changes in the past decade and emerged with a strong and growing economy. Much of this resilience is attributable to the drive and initiative of immigrants to the region, who also make up a disproportionately large share of the workers whose jobs are at risk in this downturn. In the long-term there is every reason to believe that the energy and productivity of the region's workforce in combination with effective use of public resources for assisting the workforce will support a successful recovery and continued growth of the economy.

Tools for Helping Workers

There are at least two challenges in helping workers who lose their jobs in the current economic downturn. The first is to know where to look for the impacts – which industries in which communities are most likely to layoff workers? The second is to provide effective help for workers who lose their jobs – how and where can workers find sustaining employment?

This paper provides a starting point for dealing with the first challenge by identifying industries with the greatest potential for layoffs based on their outcomes in the past two recessions as well as their general sensitivity to the business cycle. It is important to note that patterns of employment change in each of five years since 1978 when the economy has contracted have included some industry-specific and time-specific variations from long-term trends. This again will inevitably be the case in the current downturn. The historical information used in this report provides a list of "likely suspects" for layoffs in the current downturn based on the patterns of change that were consistently present in past downturns.

Table 8

Information for Managing Labor Force Impacts of a Recession

Questions	Tools	Applications
LOS ANGELES COUNTY INDUSTRY EMPLOYMENT TIME SERIES		
Which industries are likely to lose the most jobs as a result of a recession?	Data for 1981 and 1990 recessions; correlation of industry employment with Los Angeles business cycle	Identify the likely industry location and timing of recession-driven job losses
Which industries have the most volatile employment conditions?	Residual coefficients of variation for Los Angeles industries	Flag industries with the least stable employment conditions.
What are the long-term employment trends for specific industries in Los Angeles County?	Detailed 23-year industry employment time series for Los Angeles County	Assess long-term employment prospects in industries producing near-term layoffs.
CITY OF LOS ANGELES EMPLOYER DATABASE		
How many employers in different industries and size groups are present in each area of the city?	Geocoded database of all employers in the City of Los Angeles	Identify industries in each community that have significant risks of layoffs and monitor the status of their workforce
CITY OF LOS ANGELES OCCUPATIONAL DATA		
What is the occupational composition of industries that are likely to produce the most layoffs?	Industry-occupation matrix for Los Angeles	Identify the likely occupations in which there are likely to be the most laid off workers
How many workers are employed in occupations that are likely to experience high layoffs in each area of Los Angeles?	Planning area occupational tables	Identify occupations in each community that have significant risks of layoffs and develop training and reemployment plans
What are the potential absorption industries for workers in different occupations?	Industry-occupation matrix for Los Angeles	Match industries with stable employment conditions with laid off workers in occupations used in those industries
WELFARE-TO-WORK DATA		
Which industries employ the greatest number of low-wage workers in different communities?	Industry distribution table for low-wage workers	Identify major employers of low-wage workers and inform workers of available employment services
*O*NET OCCUPATIONAL CODING*		
What are the alternative occupations that use the skills of a laid off worker?	O*NET job family matrix	Map career transition paths using transferable job skills
What skills need to be learned to move from one occupation to another?	O*NET skill and knowledge ratings for occupations	Identify training that is needed to qualify for a new occupation
Which occupations make use of a specific set of skills?	O*NET skill search protocol	Identify occupations for which a worker is qualified
What are the specific tasks and work environments associated with different occupations?	O*NET work activity, work context, and occupational task tables	Identify occupations that are compatible with a worker's capabilities and limitations

The second challenge of helping workers who lose their jobs is the most difficult, and in this regard Los Angeles is fortunate to have better information about its economy than any other major city we know of in the United States. Most of the information summarized in Table 8 can be downloaded from the Economic Roundtable website, providing an effective array of tools for reducing the level of uncertainty and risk in employment programs.[14] These information resources are described below.

Historic Industry Information

Long-term industry trends can be used as they have been in this paper to assess the likely labor force outcomes in an industry during a downturn as well as to assess an industry's prospects for rebounding after the general recovery begins.

Inventory of Employers

Employer directories can be used to identify specific work sites of employers in industries that are having, or are likely to have, the most layoffs. This information can be used to target preemptive outreach activities to contact workers before they are laid off so that identifying information can be obtained for future recruitment efforts and also to inform them about available services.

Occupational Profile of Workforce

Industry-occupation matrices are available for the Unites States and the City of Los Angeles. These can be used to determine the occupational composition of industries that are laying off workers. Occupational profiles are available for each City of Los Angeles planning area as well as for the county as a whole. These can be used to identify the size (and in the city the geographic concentrations) of occupations experiencing high layoffs.

Outcome Data for Low-wage Workers

Information about the geographic and industry concentrations of low-wage workers can be used to guide outreach efforts to help workers who are most vulnerable during a downturn.

Occupational Characteristics and Linkages

Occupational coding information embedded in the O*NET classification system can be used to identify career transition paths that utilize workers' existing skills as well as to identify the additional skills they must acquire to qualify for new occupations.

Table 9, which follows, provides detailed industry information about employment size, historic outcomes, and estimated distribution of layoffs in a recession.

Table 9

Business Cycle Effects on Industry Employment and Estimated Distribution of Impacts in a Recession

Projections Based on Los Angeles County Annual 4-Digit SIC Employment 1978-1999

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
Agriculture, Forestry, Fishing										
0742	Veterinary services, specialties	0.96	3	-1%	-6%	0%	15	4,149	1,406	0.1%
0782	Lawn & garden services	0.98	2	-7%	-15%	0%	-35	9,591	3,766	0.2%
Utilities										
4923	Gas Transmission & Distribution	-0.26	2	-1%	-17%	0%	-4	5,037	1,614	0.0%
4939	Combination utilities, nec	0.29	1	-4%	-23%	0%	38	8,399	6,936	0.0%
4941	Water supply	0.91	3	-1%	1%	0%	9	3,742	1,249	0.0%
4952	Sewerage systems	0.84	1	-6%	-3%	5%	193	3,647	1,188	0.0%
4953	Refuse systems	0.94	2	-2%	-10%	-1%	-28	5,245	1,197	0.0%
Construction										
1521	Single-family housing const.	0.64	2	-35%	-47%	-3%	-450	17,664	5,715	0.3%
1542	Nonresidential construction, nec	0.36	1	-27%	-36%	0%	7	9,586	2,488	0.1%
1611	Highway & street construction	-0.71	1	-7%	-21%	0%	0	4,347	1,437	0.0%
1629	Heavy construction, nec	-0.03	1	-36%	-14%	0%	12	2,973	493	0.0%
1711	Plumbing, heating, air conditioning	-0.23	2	-15%	-35%	-2%	-282	15,446	4,205	0.2%
1721	Painting & paper hanging	0.69	2	-23%	-43%	-3%	-156	5,064	1,887	0.1%
1731	Electrical work	0.74	2	-6%	-25%	0%	-66	17,292	5,220	0.2%
1742	Plastering, drywall, installation	0.49	2	-22%	-55%	-4%	-364	9,601	2,344	0.1%
1743	Terrazzo, tile, marble, mosaic work	0.66	2	-26%	-56%	-5%	-106	2,115	1,325	0.0%
1751	Carpentry work	0.65	2	-28%	-57%	-12%	-538	4,326	1,602	0.1%
1752	Floor laying	0.85	2	-15%	-22%	-2%	-51	3,043	1,119	0.0%
1761	Roofing, siding, & sheet metal work	0.51	2	-25%	-31%	-5%	-271	5,446	1,769	0.1%
1771	Concrete work	0.16	2	-23%	-45%	-7%	-361	5,010	1,231	0.1%
1799	Special trade contractors, nec	0.64	2	-16%	-40%	-2%	-187	8,308	1,671	0.1%
Nondurable Manufacturing										
2051	Bread, cake, & related products	-0.55	3	-3%	-31%	-3%	-193	7,169	2,456	0.1%
2064	Candy & other confectionary prod.	0.55	2	-12%	-21%	-1%	-22	1,916	1,036	0.0%
2082	Malt Beverages	-0.65	2	-15%	-21%	0%	6	1,941	1,142	0.0%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
2099	Food preparations, nec	0.51	2	-14%	-32%	0%	-9	5,809	1,183	0.1%
2261	Finishing plants, cotton	0.70	3	-26%	203%	8%	254	3,307	1,878	0.0%
2329	Men's & boys' clothing, nec	-0.04	2	-35%	-15%	0%	3	2,089	1,525	0.1%
2331	Women's blouses & shirts	0.33	3	-3%	26%	11%	525	4,577	2,799	0.1%
2335	Women's, juniors' dresses	-0.94	3	-4%	-46%	-1%	-54	7,957	4,800	0.2%
2339	Women's outerwear, nec	0.94	3	-7%	-8%	1%	449	61,492	31,276	2.7%
2361	Girls', children's' outerwear	0.78	2	-1%	-9%	1%	7	1,118	878	0.1%
2369	Girls' & children's outerwear, nec	0.65	3	-16%	20%	12%	242	2,039	1,490	0.1%
2392	House furnishings, nec	-0.11	1	-3%	-30%	-1%	-35	3,347	1,132	0.1%
2396	Automotive & apparel trimmings	0.91	3	-16%	-23%	1%	32	5,069	2,152	0.1%
2752	Commercial printing, lithograph	0.62	3	-2%	-20%	0%	-25	14,278	4,868	0.2%
2759	Commercial printing, nec	-0.81	3	-18%	-25%	-2%	-127	6,381	2,269	0.1%
2834	Pharmaceutical preparations	-0.57	3	-17%	-22%	5%	175	3,735	1,578	0.1%
2836	Biological prod., except diagnostic	0.52	1	-43%	-54%	1%	10	1,437	1,348	0.0%
2844	Toilet preparations	-0.55	1	-23%	-17%	1%	38	5,078	2,402	0.1%
3089	Plastics products, nec	-0.47	2	-9%	-15%	0%	-21	11,806	2,038	0.2%
Durable Manufacturing										
2499	Wood products, nec	-0.50	1	-33%	-52%	-4%	-99	2,635	1,822	0.1%
2511	Wood household furniture	-0.53	1	-13%	-51%	-4%	-279	6,568	1,407	0.1%
2512	Upholstered household furniture	-0.35	2	-24%	-34%	-4%	-218	5,872	1,844	0.1%
3231	Purchased glass products	0.78	2	-15%	-20%	-3%	-108	3,567	1,505	0.1%
3432	Plumbing fixture fittings/trim	-0.07	2	-7%	-54%	-4%	-79	2,061	906	0.0%
3444	Sheet metal work	-0.75	2	-17%	-40%	-2%	-96	3,878	1,216	0.1%
3471	Plating & polishing	-0.72	2	-10%	-27%	-3%	-201	7,493	2,278	0.2%
3479	Coating/engraving/allied services	-0.35	2	-18%	-30%	-1%	-23	2,480	989	0.0%
3599	Industrial machinery, nec	-0.68	3	-23%	-50%	-4%	-452	12,874	2,548	0.1%
3652	Prerecorded records & tapes	-0.72	3	-28%	-39%	-2%	-61	2,780	1,060	0.0%
3663	Radio & TV broadcasting equip.	-0.48	2	-4%	-48%	-1%	-30	2,460	1,012	0.0%
3672	Printed circuit boards	-0.42	1	-2%	-42%	-1%	-13	2,377	1,258	0.1%
3674	Semiconductors & related devices	0.49	3	-6%	-42%	-1%	-40	5,552	1,674	0.1%
3679	Electronic components, nec	-0.10	2	-2%	-53%	-2%	-74	4,556	1,566	0.1%
3714	Motor vehicle parts & accessories	-0.13	3	-7%	3%	1%	79	9,305	1,353	0.2%
3721	Aircraft	-0.42	2	-8%	-52%	-4%	-1,633	40,317	3,634	0.0%
3728	Aircraft parts & equipment, nec	-0.27	3	-15%	-47%	-3%	-572	16,850	4,690	0.2%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
3812	Search & navigation equipment	-0.54	1	-5%	-48%	-1%	-395	33,314	4,169	0.1%
3842	Surgical appliances & supplies	-0.49	2	-2%	-51%	-1%	-48	3,207	1,197	0.0%
3911	Jewelry, precious metal	0.88	2	-1%	0%	0%	6	3,409	2,415	0.2%
3999	Manufacturing industries, nec	-0.41	1	-5%	-15%	0%	-17	3,623	1,673	0.1%
Wholesale Trade										
5012	Automobiles & other motor vehicles	-0.12	2	-12%	-50%	-7%	-385	5,367	1,770	0.0%
5013	Motor vehicle supplies & parts	-0.89	3	-9%	-7%	0%	15	10,074	2,891	0.2%
5023	Home furnishings	0.32	2	-7%	-29%	-4%	-237	6,258	1,806	0.1%
5044	Office equipment	-0.21	2	-8%	-50%	-2%	-118	5,220	2,091	0.0%
5045	Computers & peripheral equip.	0.64	1	-7%	-27%	-1%	-119	13,936	2,632	0.1%
5047	Medical & hospital equipment	0.96	2	-5%	-19%	-1%	-37	5,181	1,237	0.1%
5063	Electrical apparatus & equip.	0.45	2	-1%	-17%	-1%	-55	7,086	2,005	0.1%
5065	Electronic parts & equipment	-0.12	1	-8%	-40%	-3%	-300	11,781	3,115	0.1%
5072	Hardware	0.15	2	-3%	-28%	-2%	-145	6,475	1,051	0.1%
5084	Industrial machinery & equip.	-0.66	2	-11%	-41%	-2%	-235	10,252	1,130	0.1%
5087	Service establishment equip.	-0.21	1	-1%	-38%	-1%	-38	2,643	1,034	0.1%
5088	Transportation equip. & supplies	-0.64	2	-7%	-26%	-2%	-55	3,130	1,076	0.0%
5092	Toys & hobby goods & supplies	0.67	1	-25%	37%	1%	42	3,684	1,487	0.1%
5093	Scrap & waste materials	0.13	2	-15%	-34%	-1%	-54	5,567	2,280	0.1%
5094	Jewelry & precious stones	0.95	2	-6%	-12%	-1%	-78	5,500	4,100	0.2%
5099	Durable goods, nec	-0.82	1	-20%	-35%	-1%	-66	5,444	1,417	0.1%
5112	Stationery & office supplies	-0.13	2	-1%	-35%	-6%	-238	3,727	1,554	0.2%
5122	Drugs, proprietaries, & sundries	-0.58	1	-6%	-19%	0%	-21	8,669	2,286	0.1%
5131	Piece goods & notions	0.90	3	-7%	0%	0%	29	7,170	3,984	0.1%
5136	Men's & boys' clothing	0.90	1	0%	-8%	1%	24	4,296	1,622	0.1%
5137	Women's & children's clothing	0.94	2	-3%	-2%	0%	-6	11,110	6,474	0.2%
5141	Groceries, general line	-0.08	3	-4%	-13%	-1%	-45	7,552	1,689	0.1%
5146	Fish & sea foods	0.88	2	-9%	2%	1%	20	2,532	1,803	0.0%
5148	Fresh fruits & vegetables	0.88	2	-13%	-1%	-1%	-95	7,426	3,649	0.1%
5149	Groceries & related products, nec	0.85	2	-2%	-25%	0%	1	11,152	4,921	0.2%
5199	Nondurable goods, nec	0.97	2	-1%	-22%	-2%	-300	19,623	6,315	0.4%
Retail Trade										
5211	Lumber & other building materials	0.92	2	-7%	-24%	-4%	-540	12,974	3,721	0.3%
5311	Department stores	-0.81	2	-10%	-17%	-1%	-324	51,070	14,268	3.2%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
5331	Variety stores	-0.66	3	-63%	-60%	-5%	-198	3,759	1,567	0.2%
5399	Misc. general merchandise stores	0.74	2	-11%	-35%	-2%	-104	5,282	1,860	0.4%
5411	Grocery stores	0.43	3	-4%	-13%	-1%	-451	71,346	22,139	1.7%
5461	Retail bakeries	0.65	2	-5%	-28%	-3%	-217	8,219	3,252	0.3%
5499	Miscellaneous food stores	0.48	3	-6%	16%	5%	180	3,352	1,079	0.1%
5511	New & used car dealers	0.65	2	-8%	-21%	-3%	-898	33,469	7,347	0.3%
5531	Auto & home supply stores	0.68	2	-3%	-25%	-4%	-390	10,973	3,370	0.3%
5541	Gasoline service stations	-0.86	1	-10%	-19%	-2%	-174	11,587	3,629	0.5%
5621	Women's clothing stores	-0.66	2	-5%	-45%	-6%	-577	9,871	3,667	0.4%
5651	Family clothing stores	0.95	2	-6%	-31%	-3%	-449	13,708	4,179	0.6%
5661	Shoe stores	-0.31	1	-1%	-36%	-1%	-47	5,597	1,832	0.2%
5699	Misc. apparel & accessory stores	0.88	2	-6%	-23%	-1%	-21	2,939	1,105	0.1%
5712	Furniture stores	-0.38	2	-16%	-26%	-3%	-205	7,730	2,591	0.2%
5719	Misc. home furnishings stores	0.68	2	-1%	-38%	-4%	-154	4,286	1,778	0.1%
5731	Radio, TV, & electronic stores	0.84	1	-10%	-9%	-1%	-89	8,406	2,350	0.1%
5734	Computer & software stores	0.93	2	-9%	-9%	1%	87	6,444	1,940	0.1%
5735	Record & prerecorded tape stores	0.81	2	-15%	-8%	0%	9	4,557	1,131	0.1%
5912	Drug stores & proprietary stores	0.03	3	-8%	-16%	-1%	-236	16,608	5,465	0.5%
5921	Liquor stores	-0.92	1	-22%	-15%	-1%	-28	3,324	1,287	0.1%
5932	Used merchandise stores	0.93	2	-8%	-29%	-3%	-99	3,511	1,230	0.2%
5941	Sporting goods & bicycle shops	0.76	3	-8%	-24%	0%	-28	5,789	1,325	0.1%
5942	Book stores	0.90	3	-12%	-14%	-1%	-30	4,801	1,446	0.1%
5943	Stationery stores	0.89	2	-9%	-22%	0%	-10	6,306	1,579	0.2%
5944	Jewelry stores	-0.47	3	-3%	-40%	-2%	-73	4,199	1,564	0.2%
5947	Gift, novelty, & souvenir shops	0.83	1	-11%	12%	3%	188	6,941	1,833	0.2%
5961	Catalog & mail-order houses	0.72	3	-15%	-15%	0%	-13	5,271	1,654	0.1%
5999	Misc. retail stores, nec	0.95	2	-8%	-21%	0%	-45	10,713	3,816	0.2%
Transportation and Warehousing										
4111	Local & suburban transit	0.30	2	0%	-19%	0%	-4	8,342	4,166	0.2%
4119	Local passenger transport, nec	0.80	1	-2%	-11%	4%	279	7,346	2,063	0.3%
4151	School buses	0.78	3	-45%	-23%	-2%	-94	4,256	1,263	0.7%
4212	Local trucking without storage	0.16	2		-24%	-2%	-270	14,558	2,859	0.2%
4213	Trucking, except local	0.20	2		-53%	-8%	-1,180	14,813	1,158	0.1%
4215	Courier services, except by air	-0.34	2		358%	4%	350	7,792	4,108	0.2%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
4512	Air transportation, scheduled	0.46	3	-10%	-17%	-3%	-830	27,690	23,279	0.2%
4513	Air courier services	0.55	1	-8%	-24%	-1%	-111	17,033	8,599	0.2%
4522	Air transportation, nonscheduled	0.71	3	-11%	9%	5%	95	1,845	1,327	0.0%
4581	Airports, flying fields, & services	0.91	3	-8%	4%	2%	183	10,561	6,522	0.3%
4724	Travel agencies	0.94	3	-3%	-14%	0%	7	7,490	4,055	0.1%
4725	Tour operators	0.08	2	-2%	-26%	0%	-9	2,134	1,354	0.0%
4729	Passenger transport. arngmnt., nec	-0.22	2	-2%	-25%	1%	3	535	1,904	0.0%
4731	Freight transportation arrangement	0.89	2	-3%	0%	0%	69	15,549	4,015	0.2%
Information										
2711	Newspapers	-0.12	2	-2%	-24%	-2%	-193	11,955	7,166	0.1%
2721	Periodicals	0.89	3	-10%	-13%	1%	45	6,255	2,972	0.0%
4812	Radiotelephone communications	0.59	3	-9%	251%	14%	775	5,721	1,132	0.1%
4813	Telephone communications	-0.92	1	-12%	-30%	1%	150	23,072	9,748	0.4%
4832	Radio broadcasting stations	0.89	2	-1%	-31%	-2%	-50	3,230	2,140	0.0%
4833	Television broadcasting stations	0.63	3	-14%	-19%	2%	206	9,591	7,128	0.0%
4841	Cable & other pay TV services	0.94	1	-27%	-8%	2%	130	8,043	3,159	0.1%
7331	Direct mail advertising service	0.40	2	-16%	-36%	0%	-5	3,599	1,062	0.1%
7372	Prepackaged software	0.82	1	-14%	-28%	0%	-10	6,865	1,848	0.0%
7374	Data processing & preparation	0.15	2	-6%	-54%	-6%	-398	6,549	2,095	0.1%
7375	Information retrieval services	0.52	2	-5%	-34%	-1%	-79	8,088	1,579	0.0%
7812	Motion picture & video prod.	0.62	2	-5%	20%	0%	389	83,177	24,131	0.9%
7819	Services allied to motion pictures	0.73	3	-9%	-48%	0%	-252	59,033	8,455	0.3%
7822	Motion picture & tape distribution	0.41	2	-10%	-14%	3%	78	2,837	1,460	0.0%
7832	Motion picture theaters, ex drive-in	0.14	2	-36%	-25%	-6%	-401	6,944	3,895	0.1%
Finance and Insurance										
6021	National commercial banks	-0.83	1	-5%	-24%	1%	254	23,134	2,327	0.3%
6022	State commercial banks	-0.32	3	-5%	-24%	0%	-31	14,255	5,682	0.1%
6035	Federal savings institutions	0.33	2	-2%	-32%	-2%	-180	9,712	3,685	0.1%
6036	Savings institutions, except federal	0.02	1	-3%	-43%	0%	0	5,833	1,693	0.1%
6081	Foreign banks, branches & agents	0.70	1	-12%	46%	8%	88	1,163	1,024	0.0%
6099	Functions related to deposit banking	0.46	3	-15%	-34%	-3%	-93	2,871	1,356	0.2%
6162	Mortgage bankers & correspond.	0.86	2	-5%	-14%	-1%	-58	10,858	3,332	0.1%
6211	Security brokers & dealers	0.28	2	-5%	-18%	0%	58	12,384	6,718	0.0%
6282	Investment advice	0.82	2	-2%	32%	3%	219	6,602	2,790	0.0%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
6311	Life insurance	-0.74	3	-16%	-54%	-9%	-634	7,209	4,507	0.1%
6324	Hospital & medical service plans	0.75	3	-21%	-30%	0%	-25	8,141	4,407	0.2%
6331	Fire, marine, & casualty ins.	-0.46	1	-17%	-20%	2%	215	12,748	6,886	0.1%
6371	Pension, health, & welfare funds	0.72	2	-4%	-72%	-5%	-165	3,289	1,303	0.1%
6411	Insurance agents, brokers, & srv.	0.53	1	-1%	-25%	-1%	-148	25,545	10,358	0.3%
6719	Holding companies, nec	0.82	3	-23%	-37%	-1%	-26	2,320	1,223	0.0%
6732	Educational, religious trusts	0.76	2	-11%	4%	-1%	-40	3,738	1,223	0.0%
Real Estate, Rental and Leasing										
6512	Operators of nonresidential bldgs.	0.70	2	-9%	-23%	-3%	-211	6,605	3,374	0.1%
6513	Operators of apartment buildings	0.28	3	-6%	-16%	-1%	-96	8,864	4,174	0.2%
6531	Real estate agents & managers	0.97	2	-2%	-13%	-1%	-331	30,845	12,674	0.7%
6552	Subdividers & developers, nec	0.10	3	-7%	-69%	-6%	-153	2,591	1,224	0.0%
7359	Equipment rental & leasing, nec	0.90	2	-10%	-27%	-3%	-174	6,284	2,079	0.1%
7514	Passenger car rental	0.60	1	-11%	-27%	-1%	-82	6,204	3,401	0.1%
7841	Video tape rental	0.93	2	-7%	-32%	-4%	-164	4,537	1,491	0.1%
Professional, Scientific, and Technical Services										
7311	Advertising agencies	0.84	2	-3%	-25%	-1%	-106	10,496	4,618	0.1%
7336	Commercial art & graphic design	0.84	1	-2%	-12%	3%	142	4,635	2,168	0.0%
7371	Computer programming services	0.86	2	-11%	3%	1%	85	12,790	3,811	0.1%
7379	Computer related services, nec	0.94	2	-2%	-8%	1%	56	7,555	2,090	0.0%
8111	Legal services	0.88	3	-6%	-19%	1%	256	44,559	30,967	0.4%
8711	Engineering Services	0.30	3	-6%	-25%	-1%	-192	17,837	4,000	0.1%
8712	Architectural services	0.73	2	-8%	-46%	1%	58	6,069	2,496	0.0%
8721	Accounting, auditing, bookkeeping	0.73	1	-4%	-34%	0%	-128	27,896	12,081	0.4%
8731	Commercial physical research	0.04	1	-41%	-28%	0%	-5	6,746	1,590	0.0%
8732	Commercial nonphysical research	0.67	3	-2%	7%	2%	193	10,722	2,353	0.1%
8741	Management services	0.86	2	-1%	-2%	0%	33	14,594	4,504	0.5%
8742	Management consulting services	0.88	2	-2%	-5%	0%	-6	7,430	2,129	0.1%
8743	Public relations services	0.96	2	-1%	-14%	0%	-3	3,069	1,958	0.0%
Administrative and Support Services										
7322	Adjustment & collection services	0.49	3	-33%	-25%	-5%	-149	2,952	1,190	0.1%
7334	Photocopying & duplicating services	0.88	2	-14%	5%	-1%	-24	4,316	1,947	0.1%
7342	Disinfecting & pest control services	0.61	3	-17%	-11%	3%	100	3,677	1,027	0.1%
7349	Building maintenance srvs., nec	0.50	1	-5%	-26%	-1%	-197	24,776	7,209	0.9%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
7361	Employment agencies	0.26	1	-15%	-11%	2%	296	12,684	5,280	1.6%
7363	Help supply services	0.92	2	-23%	-10%	-5%	-5,454	111,664	24,527	8.6%
7381	Detective & armored car services	0.92	2	-1%	-2%	1%	243	38,256	16,377	2.0%
7389	Business services, nec	0.77	2	-11%	-5%	-1%	-278	40,353	14,479	1.9%
Educational Services										
8211	Elementary & secondary schools	0.83	3	-3%	0%	0%	943	232,533	101,913	9.4%
8221	Colleges & universities	0.32	2	-1%	-30%	-1%	-885	73,310	49,248	0.4%
8222	Junior colleges	0.11	3	-33%	-9%	-1%	-278	29,504	6,935	0.7%
8231	Libraries	0.69	2	-2%	-18%	-1%	-62	4,669	1,521	0.0%
8299	Schools & educational services, nec	0.90	2	-4%	-3%	0%	39	10,209	984	0.1%
Health Care and Social Assistance										
8011	Offices & clinics of medical doctors	0.96	2	-1%	-10%	-2%	-1,232	63,043	24,944	1.6%
8021	Offices & clinics of dentists	0.93	2	-3%	3%	1%	150	23,542	7,318	0.6%
8049	Offices of health practitioners, nec	0.81	1	-16%	14%	5%	270	5,678	1,636	0.1%
8051	Skilled nursing care facilities	0.94	1	-5%	4%	1%	217	33,011	14,496	1.7%
8062	General medical hospitals	0.06	2	-2%	-6%	1%	698	124,588	56,091	1.3%
8063	Psychiatric hospitals	-0.46	1	-8%	-47%	-4%	-153	4,368	1,488	0.1%
8069	Specialty hospitals, exc. psychiatric	0.82	3	-9%	-32%	0%	2	4,730	1,358	0.1%
8071	Medical laboratories	0.21	1	-16%	-8%	1%	62	7,788	2,682	0.1%
8082	Home health care services	0.84	1	-17%	-23%	-3%	-372	11,094	3,598	0.5%
8093	Specialty outpatient facilities	0.87	1	-4%	-12%	0%	16	6,400	2,171	0.2%
8099	Health & allied services, nec	0.81	3	-5%	9%	0%	5	1,919	1,174	0.1%
8322	Individual & family services	0.25	2	-10%	-6%	1%	254	29,411	3,977	0.6%
8331	Job training & related services	-0.18	3	-41%	-18%	-3%	-307	8,882	9,896	0.6%
8351	Child day care services	0.70	2	-5%	6%	0%	48	14,141	4,011	0.9%
8361	Residential care	0.89	3	-6%	8%	1%	238	18,607	4,685	1.0%
8399	Social services, nec	0.81	1	-5%	3%	1%	140	14,721	6,624	0.6%
Arts, Entertainment and Recreation										
7922	Theatrical producers & services	0.53	1	-14%	-38%	1%	67	7,584	3,860	0.1%
7929	Entertainers & entertainment groups	0.68	3	-22%	-29%	-1%	-60	6,746	3,564	0.1%
7941	Sports clubs, managers, & prom.	0.32	1	-7%	-58%	-3%	-43	1,600	1,002	0.0%
7991	Physical fitness facilities	0.89	2	-10%	-11%	0%	30	7,288	2,926	0.1%
7997	Membership sports & recreat. clubs	0.74	1	-2%	-12%	1%	51	5,916	2,015	0.1%
7999	Amusement & recreation srv., nec	0.83	2	-6%	7%	0%	-41	21,463	7,351	0.3%

SIC	Title	Correlation of Employment Level and Total Personal Income in LA County 1978-99	Timing of Employment Change in Relation to Business Cycle	Percent Job Change in 1981 Recession	Percent Job Change in 1990 Recession	Percent Annual Job Change in Downturns Explained by Change in Business Cycle	Projected Annual Job Change Attributable to Economic Down-turn (using 1999 employment)	County of Los Angeles Employment in 1999	City of Los Angeles Employment in 1999	Percent of All Low-wage Workers Employed in Industry
8412	Museums & art galleries	0.96	2	-5%	-15%	-3%	-95	3,064	3,550	0.1%
Accommodation and Food Services										
5812	Eating places	0.98	2	-1%	-7%	-1%	-1,866	233,678	75,985	5.8%
5813	Drinking places	-0.66	3	-27%	-10%	-2%	-111	6,395	2,613	0.2%
7011	Hotels & motels	0.90	2	-3%	-25%	-2%	-601	40,040	15,473	1.1%
Other Services										
7212	Garment pressing/laundry agents	0.62	2	-2%	-36%	-4%	-93	2,560	983	0.1%
7213	Linen supply	0.05	3	-30%	-17%	-1%	-34	3,542	1,417	0.1%
7216	Dry cleaning plants, exc rug	0.57	1	-15%	-9%	0%	-12	4,229	1,539	0.1%
7231	Beauty shops	-0.06	2	-5%	-12%	-3%	-329	10,641	3,058	0.8%
7299	Misc. personal services, nec	0.76	3	-11%	-33%	0%	-16	3,439	1,789	0.1%
7384	Photo finishing laboratories	-0.65	1	-11%	-31%	-3%	-91	3,061	1,345	0.1%
7521	Automobile parking	0.95	2	-9%	-4%	1%	80	9,292	4,905	0.3%
7532	Top & body repair & paint shops	0.98	2	-1%	-11%	-2%	-128	8,231	2,862	0.2%
7538	General automotive repair shops	0.38	2	-4%	-24%	-1%	-99	8,264	3,050	0.2%
7542	Car washes	0.98	2	-2%	-13%	-1%	-96	7,309	2,483	0.2%
7549	Auto services, nec	0.83	1	-2%	11%	2%	63	4,029	1,205	0.1%
7699	Repair services, nec	0.60	3	-4%	-19%	-1%	-48	6,812	2,168	0.1%
8611	Business associations	0.27	2	-7%	-33%	-2%	-60	2,799	2,764	0.0%
8631	Labor organizations	-0.56	2	-5%	-13%	0%	-9	4,644	1,055	0.0%
8641	Civic & social associations	0.71	2	-5%	-21%	-1%	-107	10,478	2,526	0.3%
8661	Religious organizations	0.51	3	-15%	-15%	-2%	-89	5,592	4,530	0.3%
8699	Membership organizations, nec	-0.91	1	-23%	-24%	0%	-2	2,613	2,934	0.1%
8748	Business consulting, nec	0.84	1	-1%	27%	4%	343	9,284	3,179	0.2%
8811	Private households	0.89	2	-46%	-2%	1%	371	61,208	6,866	4.2%
8999	Services, nec	0.80	2	-11%	-14%	-3%	-84	2,537	1,185	0.0%
Public Administration										
9131	Executive & legislative combined	0.52	1	-31%	11%	0%	-52	32,905	11,131	1.4%
9229	Public order & safety, nec	0.85	3	-4%	0%	4%	862	23,170	17,191	0.0%
9531	Administration of housing programs	0.57	3	-4%	5%	4%	71	1,899	1,342	0.3%
	All Industries in Table	0.95		-2%	-13%	-1%	-23,571	3,304,839	1,212,231	86%

NOTES ON TABLE:

Organization of Table

- 4-digit SIC industries are grouped by North American Industry Classification System (NAICS) sectors.
- The 243 industries in the table represent 82 percent of total county employment. Most employment not shown in the table is in the public sector.

Correlation of Industry Employment Changes with Changes in the Business Cycle

- Total employment in each 4-digit SIC industry from 1978 to 1999 was correlated with total Los Angeles County personal income (representing Los Angeles County business cycle). See note 2 on the following page.
- This value is Pearson's product moment correlation. If it is squared it becomes r-square, indicating (in much the same way as a percent value) the how much of the level of employment is explained by the level of total personal income (reflecting the business cycle) in Los Angeles County.

Timing of Employment Change in Relation to Business Cycle

1. The strongest relationship between year-to-year change in employment in each industry and year-to-year change in total personal income from 1979 to 1999 was obtained by linking change in personal income with change in employment in the preceding year.
2. The strongest relationship between year-to-year change in employment in each industry and year-to-year change in total personal income from 1979 to 1999 was obtained by linking change in personal income with change in employment in the same year.
3. The strongest relationship between year-to-year change in employment in each industry and year-to-year change in total personal income from 1979 to 1999 was obtained by linking change in personal income with change in employment in the following year.

Percent Job Change in 1981 Recession

- The change in industry employment from 1981 to 1982, with the years lagged, unchanged, or advanced based on the timing of employment change in each industry in relation to the business cycle.

Percent Job Change in 1990 Recession

- The change in industry employment from 1990 to 1994, with the years lagged, unchanged, or advanced based on the timing of employment change in each industry in relation to the business cycle.

Annual Job Change in Downturns Explained by Change in Business Cycle

- See note 7 on the following page for an explanation of how this was calculated. This value shows that amount of annual job change in an industry that is projected to occur during an economic downturn as a result of recessionary effects.

County of Los Angeles Employment in 1999

- The employment for each industry is the annual average for 1999. This data is wage and salary employment from the Employment Development Department's ES 202 file.
- Four industries in the table are shown to have larger employment in the city than in the county. This anomaly may be the result of adjustments made in benchmarking the annual data that were not replicated in computations of city data, or may represent a seasonal fluctuation in employment that is captured in the city data (which represents just one quarter) but reduced in producing average annual county data. The four industries are: SIC 4729 passenger transportation arrangements, nec; SIC 8331 job training and related services; SIC 8412 museums and art galleries, SIC 8699 membership organizations, nec.
- Industry data in the table was reviewed to ensure that it does not disclose confidential employer information.

City of Los Angeles Employment in 1999

- The employment for each industry is the average for the second quarter 1999. This data is wage and salary employment from the Employment Development Department's ES 202 file.
- Industry data in the table was reviewed to ensure that it does not disclose confidential employer information.

Percent of All Low-wage Workers Employed in Industry

- The employment distribution of low-wage workers was calculated by averaging the distribution of person quarters of employment of County of Los Angeles welfare-to-work participants from 1995 to 1998 with the person quarters of employment of Housing Authority of the City of Los Angeles residents in 1999.
- Total person quarters of employment of each group in each industry were divided by the following group totals (to produce a percent distribution), and these two percents were then averaged.
  - Person-quarters of employment by Housing Authority in 1999 = 59,773
  - Person-quarters of employment by county welfare-to-work participants 1995-1 to 1998-1 = 620,078
- This procedure was used to combine the more recent employment data for Housing Authority residents with the larger employment base represented by all county welfare-to-work participants.

Notes

[1] Wage and Salary employment for Los Angeles County (i.e., ES-202 data) reported by the California Development Department on October 31, 2001 shows county employment peaking at 4,152,500 in May 2001, and declining in the months since then.

[2] This correlation would more typically look at the association between gross domestic product (GDP) and employment. Since GDP data is not available at the county level we used total personal income as a surrogate measure of the size of the county economy based on our analysis showing that state GPD and total state personal income are highly correlated. At the state level personal income equals 81% of GDP.

[3] The correlation value for these two trends is 0.95; the value of r-square is 0.90.

[4] This value is Pearson's product moment correlation.

[5] The correlation value for these two trends is 0.66; the value of r-square is 0.44.

[6] In tests to determine what, if any, lag relationship showed the strongest association between change in industry employment and change in total county personal income we calculated the r-square value for this relationship with employment preceding by one year, concurrent with, and following by one year. The lag relationship that produced the highest r-square value was used for that industry.

[7] The four steps used to project the distribution of job change among industries in an economic downturn were as follows:

- Step 1 – For each SIC, calculate r-square for %dEi+j and coded dPIi , where dE is change in employment, dPI is change in personal income, i is calendar year, and j = 0, -1, or +1, depending on which lag results in the highest r-square value for the particular SIC.
- Step 2 – Compute avg%dEj =Mean[%dEi+j], where i is restricted to years when dPI is negative.
- Step 3 – Compute 'explained' avg%dEj = SqRt[(avg%dEj -squared)(r-square)], preserving the sign of avg%dEj.
- Step 4 – Project average annual dEj attributable to downturn: = ('explained' avg%dEj)*(E_{1999}).

[8] Seven industries had outliers in the employment change for particular years that were removed when calculating average change in annual employment during downturns for those industries. These outliers appeared to be artifacts of an extended time series that covers a revision of the SIC coding system and occasional recoding of classifications for specific employers, rather than indications of abrupt changes in the level of employment in these industries. The seven industries and the outlier years were: SIC 2261 Finishing plants, cotton, 1992; SIC 4215 Courier services, except by air, 1993; SIC 4812 Radiotelephone communications, 1992; SIC 4939 Combination utilities, nec, 1979; SIC 7812 Motion picture and video production, 1993; SIC 8732 Commercial nonphysical research, 1994; and SIC 8811 Private households, 1980.

[9] The UCLA Anderson forecast released in September 2001 projects that unemployment rates will increase by two percentage points for the nation and one percentage point for the state over the next year. This outcome corresponds roughly with the 1997 unemployment rate for Los Angeles County.

[10] Official annual average unemployment rates for Los Angeles County are from the California Employment Development Department, Labor Market Information Division, "Civilian Labor Force, Employment, and Unemployment – Updated 10/10/2001," March 2000 benchmark. The adjusted unemployment rate including discouraged workers was calculated by adjusting the size of the county's labor force upward by applying the statewide labor force participation rate to the county (this has the effect of including some discouraged workers in the pool of potential workers). The unemployment rate for welfare workers is the average quarterly unemployment rate for those welfare-to-work participants who had found employment after enrollment in this program.

[11] This time series is based on earnings records of nearly 100,000 welfare-to-work participants from 1990 through the first quarter of 1998, and earnings of a 5,700 person sample of this population in 1999.

[12] Economic Roundtable, *Los Angeles Labor Market Action Plan*, 2001, p. 38.

[13] Recent studies that have determined that skill differences are the most important factor for explaining differences in earnings include: Economic Roundtable, *Cage of Poverty,* 2000; Anthony Carnevale and Donna Desrochers, *Getting Down to Business: Matching Welfare Recipients's Skills to Jobs that Train,* 1999, Educational Testing Service, Princeton, NJ; Hans Johnson and Sonya Tafoya, *The Basic Skills of Welfare Recipients: Implications for Welfare Reform,* 1999, Public Policy Institute of California, San Francisco, CA.

[14] The Economic Roundtable web site address is: www.economicrt.org. Other valuable web sites for labor market information include:

- California Employment Development Department, Labor Market Information Division: www.calmis.cahwnet.gov/
- U.S. Department of Labor, Employment Training Administration: www.doleta.gov/almis/

Two items listed in Table 8 cannot be downloaded because they contain confidential data. The first is the 23-year industry employment time series at the 4-digit SIC level. However, an 18-year monthly time series at the 2- and 3-digit SIC level can be downloaded from the Employment Development Department web site. The second item that cannot be downloaded is the geocoded database of all employers in the City of Los Angeles. This data is confidential unless rolled up into industry groups. This rolled up industry data for city-planning areas is available from the Economic Roundtable web site.