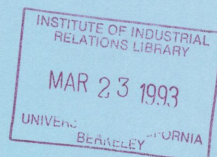


WORKING PAPER SERIES - 236

EMPLOYMENT FORECASTING  
AND EMPLOYER HIRING SURVEY DATA:  
Evaluation of the Manpower, Inc. Index

By

Daniel J.B. Mitchell and David Hensley



Daniel J.B. Mitchell  
Professor  
Anderson Graduate School of Management  
University of California, Los Angeles  
Los Angeles, California 90024-1481

Telephone: 310/825-1504

David Hensley  
Director  
UCLA Business Forecasting Project  
50 Dodd Hall  
University of California, Los Angeles  
Los Angeles, California 90024-1463

Telephone: 310/825-1623

DRAFT: December 1992

INSTITUTE OF INDUSTRIAL RELATIONS

UNIVERSITY OF CALIFORNIA

LOS ANGELES

**EMPLOYMENT FORECASTING AND EMPLOYER HIRING SURVEY DATA:**

**Evaluation of the Manpower, Inc. Index**

**Daniel J.B. Mitchell**  
Professor  
Anderson Graduate School  
of Management  
U.C.L.A.  
405 Hilgard Avenue  
Los Angeles, Calif. 90024-1481  
(310) 825-1504

**David Hensley**  
Director  
UCLA Business Forecasting  
Project  
U.C.L.A.  
50 Dodd Hall  
Los Angeles, Calif. 90024-1463  
(310) 825-1623

December 1992

Since the 1960s, the use of large-scale, computer-based econometric modeling has become a standard approach to business forecasting. Most forecasters apply judgment to their predictions; they do not mechanically apply their models. So forecasters may well be considering information sources not formally incorporated into their models, as well as the possibility that the model does not properly interpret the information on which it is based. Nonetheless, the model-plus-judgment forecasting approach has long been challenged, or at least asked to prove its effectiveness, relative to other approaches.

At the end of the 1970s, McNees (1979) found that forecasters generally outperformed naive projections but that in absolute terms, forecasting errors could be quite high. He concluded that there were still opportunities to improve forecast accuracy. A more recent review (Zarnowitz & Braun, 1992) concluded that while forecasters still generally outperformed naive models (and even more sophisticated approaches such as vector autoregression), overall it could not be said that forecasting accuracy had improved relative to the 1970s. Moreover, the margin of better performance of forecasters versus naive models is not large.

Typically, these evaluative reviews have considered forecasts of such macro variables as real GNP, price inflation, and unemployment, the last being the main labor-market indicator that has been evaluated. Other labor-market indicators, notably employment, have not been used in studies of forecasting accuracy. While the unemployment rate is a traditionally-watched index of great political significance, labor-market analysts know that it is subject in the short run to both demand and supply influences. Job creation and job destruction can influence the unemployment rate, but so can changes in the propensity to participate in the labor force. Often, those analysts whose concern is the labor market really are more interested in employment than unemployment. Yet employment forecasting accuracy typically has not been evaluated in the literature.

For certain variables, such as consumer spending, alternative sources of forecasting information are available, namely survey data. Consumer confidence and reported consumer buying intentions are available to be used as forecasting tools. But research in the consumer area has not suggested that the survey approach to consumption outperforms alternative modeling on an ongoing basis. (Leeper, 1992) In the labor market, surveys of annual employer wage-change intentions also do not appear to contain much information beyond awareness of general economic conditions that could be obtained elsewhere. (Mitchell, 1989) However, each survey source needs to be considered on a case-by-case basis. Some may contain useful information; others may be largely redundant when combined with generally-available macro variables.

In what follows, an examination is presented of a survey of employment-change intentions, gathered from employers by Manpower, Inc., a firm noted mainly for its temporary help supply services. Obviously, as a producer of such services, the demand for which should reflect overall labor demand, Manpower has a strong interest in the state of the job market. The evidence below suggests that the Manpower survey of employer intentions does contain information beyond what can be learned by the usual macro modeling and forecasting techniques. On the other hand, the information gathered by Manpower does not seem especially useful in forecasting the state of the product market; its value (perhaps not surprisingly) is primarily in the labor market, the market in which the Manpower survey is gathered.<sup>1</sup>

## I. The Manpower Survey

The Manpower survey had its origins in the early 1960s. However, in the mid 1970s, an effort was made to improve sampling with the assistance of the University of Michigan's Survey Research Center. In its present form, the survey involves telephone questioning of over 15,000 employers in over 475 areas of the country. Manpower representatives around the nation are asked, on a quarterly basis, to telephone "top personnel people" of "large"

employers, both private and public. The word "large" is used to discourage the telephoning of mom-and-pop operations; in fact, the surveyed employers include small- and medium-sized organizations.

An attempt is made to reach the same people at the same employers in each successive survey. However, as people and firms turn over (or refuse to cooperate), the Manpower interviewers are instructed to substitute other employers. Once contact is made, the respondent is asked whether - in the next quarter - the number of employees in the organization is expected to change relative to the current quarter at the location being telephoned.<sup>2</sup> Respondents' answers are characterized as "increase," "decrease," "no change," or "don't know".<sup>3</sup> Interviewers also report the industry classification of the employer in ten categories: mining, construction, durables manufacturing, nondurables manufacturing, transportation and public utilities, wholesale and retail trade, finance-insurance-real estate, education - public and private, services, and public administration (local, state, and federal excluding education). To assist the interviewers in classifying respondents, a one-page set of examples for each category is provided to them.

Apart from industry classification, Manpower breaks down responses into four regions: Northeast, South, Midwest, and West, utilizing the same definition of these regions as is used by the U.S. Bureau of the Census. Interviewers do not attempt to provide any type of correction for the strong seasonality of hiring patterns. Indeed, the raw data collected show the substantial "sawtooth" seasonal pattern associated with unadjusted employment. But recently, Manpower has begun to seasonally adjust its published data for user convenience. For purposes of this examination, however, all employment data presented below have been seasonally adjusted by the authors unless otherwise noted.<sup>4</sup>

## II. An Initial Look at the Manpower Survey

Manpower publishes an overall summary index defined as the difference

between the percentage of employers who indicate they plan to increase employment and the percentage indicating they plan to decrease employment. That is, if 17% of employers report expected employment increases and 15% report expected decreases, the index will stand at +2. (The percentages reporting no planned change or "don't know" are not included directly in the index). Also available separately are the percent indicating an increase and the percent indicating a decrease. Note that there are no published surveys of how many employers are actually increasing or decreasing employment in a given quarter. Hence, the survey cannot be checked for accuracy in its own metric based on outside information. (Manpower does not go back and ask the employers one quarter later whether they actually followed their own projections).

However, the national Manpower forecast index on a seasonally-adjusted basis (MFUSADJ) - increase minus decrease - can be compared with annualized seasonally-adjusted quarterly percent changes in the total number of people employed as reported in the U.S. Bureau of Labor Statistics' establishment survey of payroll employment (PEMUSA). Figure 1 shows the Manpower forecast index plotted against the percent change in payroll employment. Quarters indicated on Figure 1 for each observation refer to the period being forecast by employers responding to the Manpower survey.

As can be seen from the figure, the two series generally move together. However, the extent of independent information contained in the Manpower forecast index cannot be readily determined from such graphical analysis. That is, it cannot be known whether a forecaster could predict the change in payroll employment just as well using standard macro-oriented forecasting techniques.

Figure 2 shows the components of the Manpower forecast index, percent of employers increasing employment (IUSADJ) and percent decreasing employment (DUSADJ) plotted against one another. Both have a mirror-image quality, as might be anticipated. This quality suggests that it may not make much

difference which series is used as a forecasting tool or whether the "official" Manpower forecast index - which combines both with equal weighting - is used.

On the other hand, as Figure 3 illustrates, the seasonally-adjusted regional elements of the Manpower forecast index - MFNEADJ for the northeast, MFSOADJ for the south, MFMWADJ for the midwest, and MFWEADJ for the west - while tracing the same general pattern, do show geographic variation. The midwest, for example, drops most dramatically during the recession(s) of the early 1980s whereas the northeast has this dubious honor during the recession of the early 1990s. Thus, there seems to be independent information in the survey by region. Although not shown, the same pattern of independence is evident from the regional classifications used by Manpower.

### III. Independent Information in the Manpower Survey

To determine the degree to which there is information of use to forecasters in the Manpower survey, it is necessary to make a comparison of alternative forecasts. One way of forecasting employment change would be to rely simply on the survey results. But another approach would be the standard macro forecast (model plus judgment). Does the Manpower survey information add anything to the standard forecasting approach?

Unfortunately, the widely-used compendiums of standard forecasts - the Eggert newsletter summary and the summaries issued by the National Bureau of Economic Research - do not indicate the predictions of reporting forecasting organizations for employment change. Rather, they have compiled information only on consensus forecasts of other variables such as real GNP. Hence, even though forecasting accuracy seems to improve if many forecasts are averaged (Zarnowitz, 1985), it is not possible to construct such an historical time series for employment change. For that reason, the employment forecasts of the UCLA Business Forecast Project are used as the comparison.

#### i. The UCLA Business Forecast

The UCLA Business Forecast Project began in the early 1950s with purely judgmental forecasting. In the late 1960s, it began to use a combination of econometric modeling and judgment, the standard modern approach. The Project won the Sterling National Bank's Annual Economic Forecasting Award in 1989 for forecasting accuracy.

Unfortunately, even the UCLA data do not perfectly match the payroll job orientation of the Manpower survey. Until mid 1991, the UCLA Business Forecast Project predicted employment as it is reported by the household survey - a series which is based on individuals and differs in concept from the establishment survey.<sup>5</sup> While the two series - establishment and household - generally move together, significant differences can emerge between them in the short run.<sup>6</sup> Despite this potential divergence, there is no readily-available alternative to the use of UCLA's household employment-change prediction.

It must be stressed in addition, predicting employment change (either household or payroll) has not been a primary focus of the UCLA Business Forecast Project on a national level. Much more attention has been centered on other measures of economic activity. In that regard, however, UCLA is probably typical of other forecasting services.

Despite these drawbacks, Figure 4 compares movements of the one-quarter ahead predictions of the UCLA Business Forecast Project for household employment and the Manpower survey index. That there is a correlation between the two is quite evident, raising the possibility that the Manpower survey index might turn out to be redundant, given the macro information contained in the UCLA model-plus-judgment approach (or vice versa). A similar relationship (not shown) can be found between the UCLA forecast and the increase or decrease components of the Manpower survey.<sup>7</sup>

#### ii. Results with the Overall Household and Establishment Surveys



Table 1 contains a series of regressions in which the UCLA forecast is used to predict actual quarterly percent changes in employment from the household survey along with components of the Manpower survey. In all cases, an autoregressive correction has been made. Note that given the tendency for employment expansions and contractions to come in sequences, a simple autoregressive model (with no additional variables) will do fairly well in absolute terms in predicting quarterly employment change.<sup>8</sup>

As can be seen from Table 1, the Manpower survey, with the exception of the decrease component taken alone, seems to add to forecasting accuracy and to contain information beyond that reflected in the UCLA forecast when both sources are included in the same equation. Generally, it appears that the power of the Manpower survey is coming from the increase component. But also noteworthy is the fact that neither forecast, taken alone, is able to rise to statistical significance in the face of an autoregressive correction. That is, a simple autoregressive model is able to capture the quarterly movements of household employment. Absent such a correction, *t* values rise to seemingly-significant levels, as often happens in the presence of autocorrelation.<sup>9</sup>

In effect, the results suggest that both forecasts have statistical power in predicting the employment-change residual from the household survey residual only after controlling for the information embodied in the other source. Thus, whatever information is collected from employers - by itself - is unable to rise to statistical significance after autoregressive correction. But the error left over after information from employers (via Manpower) is included can be predicted using the kinds of macro data and modeling contained in the UCLA Forecast. The results indicate that employers have knowledge of their own micro-level circumstances, but are unable to predict those macro influences that will additionally determine their actual employment changes. Similarly, after correcting for macro influences, the residual error term can be reduced significantly by the kind of employer-based information contained

in the Manpower survey.

It is important to note, however, that the results shown are sensitive to the period selected and the precise specification. There are subperiods in which either or both UCLA and Manpower will slide toward or away from statistical insignificance. Although it is not possible to obtain consensus forecasts for employment change from sources such as the Eggert newsletter, it is possible to obtain consensus forecasts for percent change in real GNP beginning in 1979. In some cases, these will outperform UCLA (either employment or real GNP change) in regressions with the Manpower survey index.<sup>10</sup>

As noted above, the UCLA Forecast did not attempt to predict employment from the establishment series during the period covered; only the household series was predicted. Thus, if the UCLA forecast for household employment is used to predict establishment employment change, it might be expected that the contribution of the UCLA forecast would decline relative to the Manpower survey. On the UCLA side, the "wrong" series is being used for predictive purposes. Moreover, the Manpower survey is closer in concept to the establishment data which come exclusively from employers and do not contain components relating to self-employment and family employment.

Table 2 confirms the expectation of falling significance of the UCLA forecast. The UCLA forecast of household employment change drops below significance in all of the regressions for establishment employment, save one.<sup>11</sup> In the case of the establishment employment regressions, the intercorrelation of the increase and decrease components of the Manpower survey and the UCLA forecast are sufficient to prevent any of the independent variables from showing significance, despite their collective contribution, when all three are entered into the regression.

### iii. Industry and Regional Employment-Change Results

Unlike the Manpower survey, UCLA does not attempt to forecast at the

regional level (except for California). Until the mid 1980s, it also did not forecast at the industry level. However, since regional and industrial employment changes are affected by general macro-level trends, the UCLA forecast for national employment change can be put into regressions containing the Manpower survey index. The question is then whether the regionally-based employment information gathered by Manpower adds statistical value to regional predictions which might naively be made exclusively from national information. Table 3 provides a summary of both those results and the others already discussed.

At the regional level, both the UCLA and Manpower forecasts contribute explanatory power except in the west where UCLA drops out. The results suggest that both the surrounding macro environment and employer intentions play a role in determining employment change. Again, it is important to underline that the UCLA variable is a prediction for the entire U.S. economy, not just the western region, while the Manpower survey refers only to the west. It is quite possible that a regional forecasting model would perform better than the naive predictions from a national-level forecast.

Table 3 shows the industry breakdown used by Manpower. In regressions containing both the UCLA national forecast and the Manpower industry-level employment forecasts, Manpower was a significant predictor in 7 out of 10 sectors. The UCLA macro (all-industry) forecast appears as significant in only two. Survey information from employers, as opposed to a general macro prediction for the overall economy, is a more powerful predictor of industry-level trends.

#### iv. Predicting Real GNP Change

It should not be surprising that an employer survey might contribute explanatory power to a prediction of employment change. But it might be the case that the employer predictions also contain general information about economic activity in the product markets affecting the employing

organizations. As it turns out, however, when UCLA is on its own turf, that of predicting real GNP change, there is no significant additional contribution of the Manpower survey. Table 3 contains regressions underlying this conclusion.<sup>12</sup>

Employers - in summary - appear to know about their own immediate (micro) situations regarding labor input; they do not know enough about macro influences to outperform a forecast oriented toward macro prediction of output.<sup>13</sup>

#### v. Increase or Decrease?

Table 4 summarizes the results of regressions containing the Manpower survey data with the increase and decrease components entered as independent variables. Despite the correlation between the two, the regression coefficients were able to attribute significance to one or the other components. However, although the increase component emerged as the significant variable in more equations, it is apparent from Table 4 that both components contribute explanatory power. As a practical matter, it would be difficult to state with assurance that one component was better than the other. Manpower's index technique - taking increase minus decrease - although it arbitrarily assigns equal weights to the two components, is a reasonable summarizer of the information being gathered in the survey.

#### IV. Forward Prediction

What would the Manpower survey information have added to employment predictions beyond the end point of the regressions presented (1991-II)? Unfortunately, there are two limitations in examining this question. First, the UCLA Business Forecast switched after 1991-III to predicting the establishment employment series rather than the household. This shift creates a potential structural break in the regressions.

Second, there was a marked deterioration in establishment series data

quality which seemed to accompany the economic slump of the early 1990s. In several large states such as California, the annual benchmarking of the establishment series produced a dramatic downward revision in employment counts for reasons which are not well understood. (U.S. Bureau of Labor Statistics, 1992) Thus, forecasters - such as UCLA - were forced to base their estimates on flawed employment information. There is no way of knowing whether the structural shift which affected the establishment series might also have affected the accuracy of the Manpower survey data.

Despite these uncertainties, it is worth looking at the results of post-sample prediction. Figure 5 shows a comparison the error made by the UCLA forecast in predicting employment change (UCLAERR) vs. the residual computed from the equation estimated over 1977.3 to 1991.2 contain the UCLA forecast, the Manpower forecast, and an autoregressive correction (RESID).<sup>14</sup> As can be seen from the figure, the equation residual fits better than the unadjusted UCLA forecast (it stays closer to the zero axis) during the five immediate post-sample quarters. The mean absolute error, mean error, and root mean square errors for the former are .6, -2.0, and .8 and for the latter (respectively) 1.0, 3.0, and 1.1.

While the post-sample period is short, and there are various data problems associated with it, the reduction in error associated with adding the Manpower index to the conventional macro forecast suggests the value of the Manpower survey data. The economic slump of the 1990s has featured various unusual labor-market features. Analysts can point to the so-called "white-collar recession" (job losses among occupational groups that were relatively untouched in previous recessions) and greater reliance on permanent rather than temporary layoffs, for example. Nonetheless, the Manpower survey index continued to contain useful information on employment trends.

## V. Conclusions

Is the Manpower survey of employment-change intentions are useful

forecasting tool? If the goal is to forecast employment change, the answer is "yes". The survey information generally adds to, and sometimes outperforms, employment-change predictions made using the standard macro-model-plus-judgment technique typically used by forecasters. If the goal is forecasting the product market, i.e., change in real GNP or GDP, employer-based information seems not to be especially useful. However, the Manpower survey - which is aimed at uncovering labor-market information - can hardly be criticized for failure to predict the product market.

**Table 1: Regressions Explaining Annualized Percent Change in Household Employment: 1977-III to 1991-II**

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-.31 (-.38)	-3.30 (-1.74)	2.49 (1.43)	-5.56 (-1.26)	1.35 (2.73) ***	.32 (.29)
UCLAPEMA	.36 (2.01) **	.39 (2.26) **	.28 (1.39)	.42 (2.33) **	.25 (1.34)	-
MFUSADJ	.11 (1.90) *	-	-	-	-	.09 (1.30)
IUSADJ	-	.18 (2.33) **	-	.23 (2.04) **	-	-
DUSADJ	-	-	-.11 (-.73)	.11 (.55)	-	-
AR(1)	.22 (1.37)	.19 (1.21)	.41 (2.65) ***	.19 (1.17)	.50 (3.99) ***	.47 (2.93) ***
Adjusted R-Squared	.40	.41	.38	.41	.39	.39
Standard Error	1.63	1.61	1.65	1.62	1.64	1.64
Durbin-Watson	1.93	1.92	1.97	1.92	1.98	1.94

UCLAPEMA = Forecast of UCLA Business Forecast for percent change in household employment one quarter ahead.

MFUSADJ = Manpower, Inc. survey index (increase - decrease) one quarter ahead.

IUSADJ = Increase component of Manpower, Inc. survey.

DUSADJ = Decrease component of Manpower, Inc. survey.

AR(1) = Cochrane-Orcutt first-order autoregressive correction.

\* = significant at 10% level; \*\* = significant at 5% level;

\*\*\* = significant at 1% level.

Note: Figures in parentheses are t-statistics.

**Table 2: Regressions Explaining Annualized Percent Change in Establishment (Payroll) Employment: 1977-III to 1991-III**

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-1.47 (-1.61)	-6.55 (-3.39) ***	4.75 (3.07) ***	-.68 (-.16)	1.46 (1.65) *	-.38 (-.34)
UCLAPEMA	.26 (1.61)	.36 (2.25) **	.02 (.16)	.22 (1.31)	.16 (1.04)	-
MFUSADJ	.21 (3.51) ***	-	-	-	-	.16 (2.13) **
IUSADJ	-	.33 (4.15) ***	-	.19 (1.59)	-	-
DUSADJ	-	-	-.30 (-2.36) **	-.23 (-1.36)	-	-
AR(1)	.34 (1.70) *	.28 (1.57)	.71 (6.54) ***	.40 (1.89) *	.78 (8.94) ***	.64 (3.95) ***
Adjusted R-Squared	.67	.66	.68	.67	.65	.67
Standard Error	1.36	1.39	1.35	1.37	1.42	1.36
Durbin-Watson	1.94	1.93	1.94	1.96	1.88	1.94

UCLAPEMA = Forecast of UCLA Business Forecast for percent change in household employment one quarter ahead.

MFUSADJ = Manpower, Inc. survey index (increase - decrease) one quarter ahead.

IUSADJ = Increase component of Manpower, Inc. survey.

DUSADJ = Decrease component of Manpower, Inc. survey.

AR(1) = Cochrane-Orcutt first-order autoregressive correction.

\* = significant at 10% level; \*\* = significant at 5% level;

\*\*\* = significant at 1% level.

Note: Figures in parentheses are t-statistics.



**Table 3: Summary of Regression Results for Equations Using UCLA Business Forecast and Manpower Survey Index**

Predicted	UCLA: National Hshld.	Manpower: Increase minus Decrease	Auto- regressive Coefficient	Dummies Used?	Reasons for Dummy Use
Annual % change:					
U.S.-Estab.	0	***	*	no	
U.S.-Hshld.	**	*	0	no	
Real GNP 1982%	**(a)	0	0	no	
Establish- ment Data:					
Northeast	**	***	**	no	
South	*	***	0	no	
Midwest	***	***	0	no	
West	0	*	***	no	
Mining	0	**	***	yes(b)	coal strikes
Construction	**	***	0	no	
Durables	0	**	**	no	
Nondurables	0	0	***	no	
Transport & Utilities	0	***	0	yes(c)	phone strike
Wholesale & Retail	0	0	***	no	
Finance, insurance, real estate	0	0	***	no	
Service except education	***	***	0	no	
Education	0	***	0	no	
Govt. except education	0	***	0	yes(d)	Census hiring

0 = not significant; \* = significant at 10% level; \*\* = significant at 5% level; \*\*\* = significant at 1% level.

(a) The UCLA variable in this case is the prediction for quarterly real GNP change.

(b) Dummies for 1978.1, 1978.2, 1981.2, and 1981.3.

(c) Dummies for 1983.3 and 1983.4.

(d) Dummy = 1 in 1980.2 and 1990.2; -1 in 1980.3 and 1990.3.

Note: Significance levels refer to coefficients of the UCLA Business Forecast for employment, the Manpower survey index (increase - decrease), and a Cochrane-Orcutt autoregressive coefficient. All regressions run over the period 1977.3 to 1992.2.

**Table 4: Summary of Regression Results for Equations Using UCLA Business Forecast and Manpower Increase and Decrease Components**

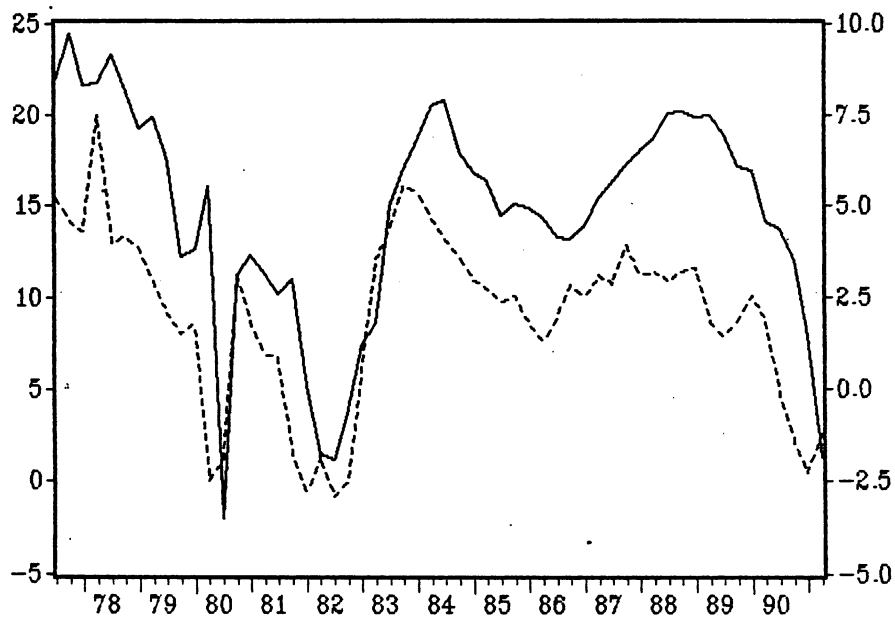
Predicted	UCLA: National Hshld.	Manpower Increase	Manpower Decrease	Auto- regressive Coefficient	Dummies Used
Annual % change:					
U.S.-Estab.	0	0	0	*	no
U.S.-Hshld.	**	**	0	0	no
Real GNP 1982\$	*(a)	0	0	0	no
Establish- ment data:					
Northeast	**	0	**	*	no
South	*	***	0	0	no
Midwest	***	0	**	0	no
West	0	0	0	***	no
Mining	0	*	0	***	yes(a)
Construction	**	**	0	0	no
Durables	0	0	**	***	no
Nondurables	0	0	0	***	no
Transport & Utilities	0	***	0	0	yes(a)
Wholesale & Retail	0	0	0	***	no
Finance, insurance, real estate	0	0	0	***	no
Service except education	***	***	0	0	no
Education	0	0	***	0	no
Govt. except education	0	***	0	*	yes(a)

0 = not significant; \* = significant at 10% level; \*\* = significant at 5% level; \*\*\* = significant at 1% level.

(a) See footnotes on Table 3.

Note: Significance levels refer to coefficients of the UCLA Business Forecast for employment, the increase component of the Manpower survey, the decrease component of the Manpower survey, and a Cochrane-Orcutt autoregressive coefficient. All regressions run over the period 1977.3 to 1992.2.

Figure 1: Manpower Forecast Index versus Annualized  
Percent Change in Establishment Employment



— MFUSADJ    ---- PEMUSA

Figure 2: Increase and Decrease Components of the Manpower Index

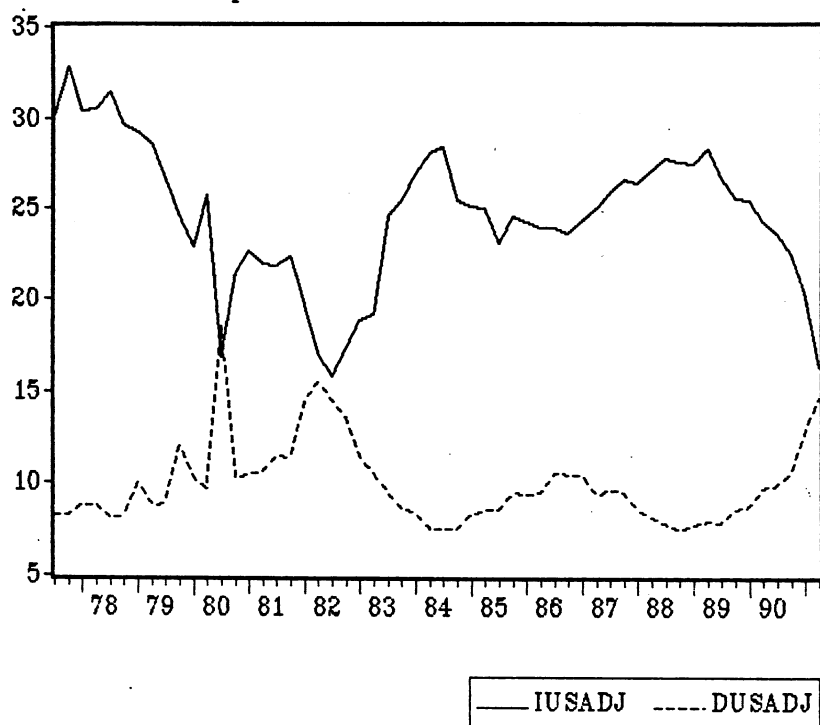


Figure 3: Manpower Indexes for Northeast, South,  
Midwest, and West

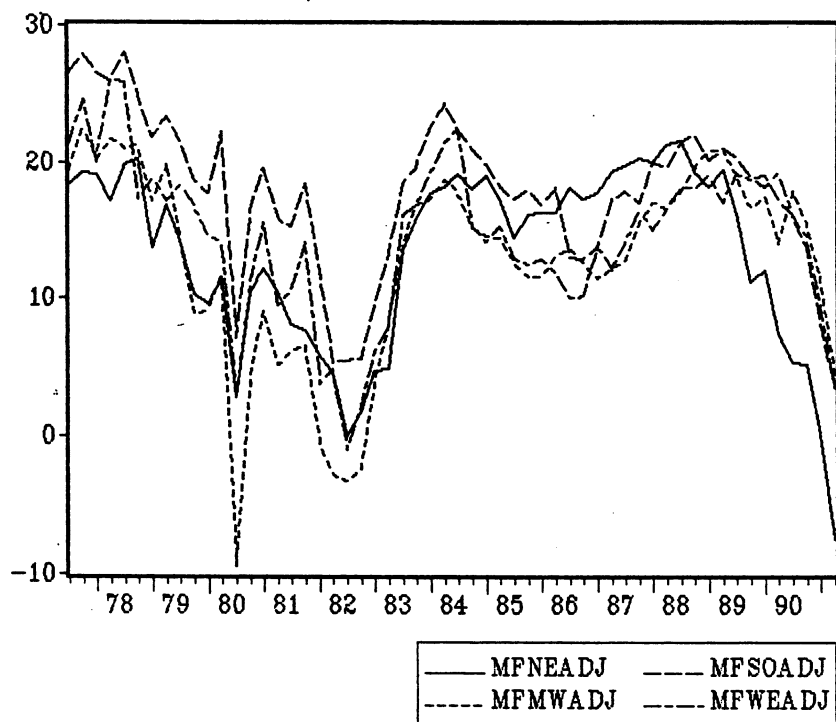


Figure 4: UCLA Forecast for Annualized Percent Change in Household Employment vs. Manpower Index

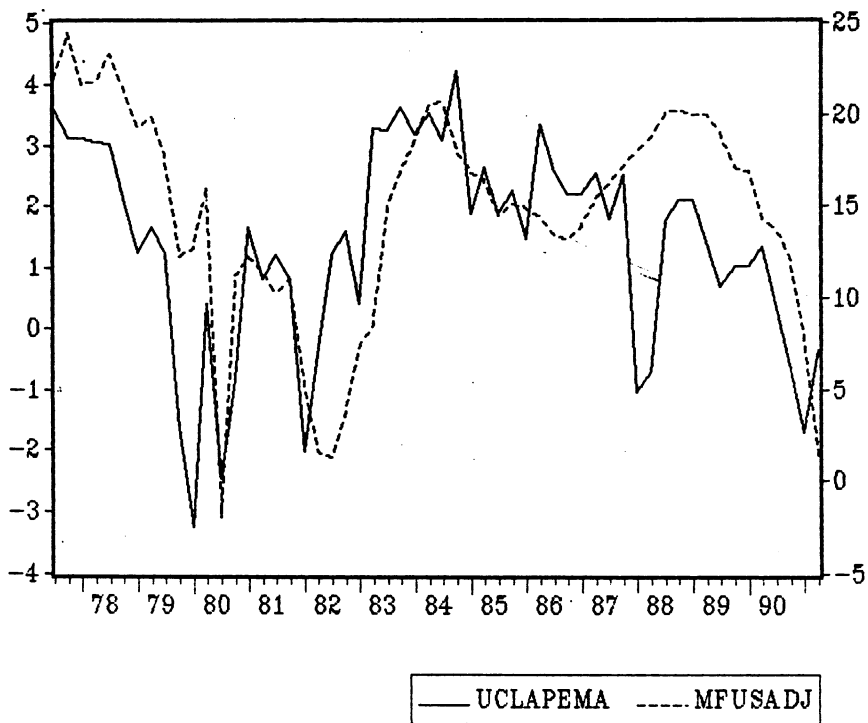
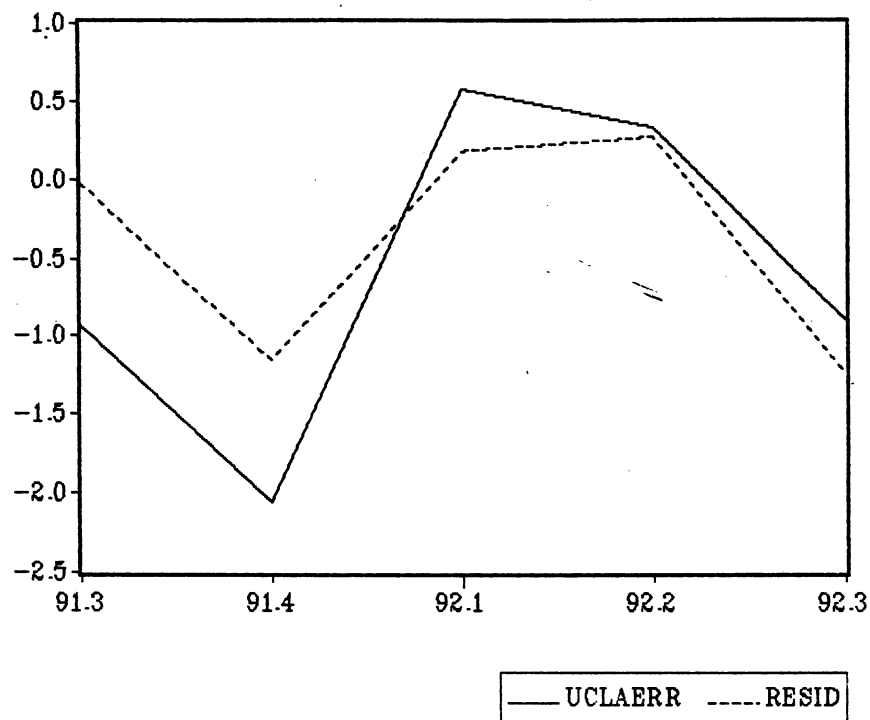


Figure 5: Forecast Error of Payroll Employment Change:  
UCLA Forecast vs. UCLA-Manpower Equation



## Footnotes

1. Other sources of employment intentions are available, such as the Bureau of National Affairs, Inc. (BNA) quarterly survey. However, the BNA survey is based on responses from only a few hundred employers. In this paper, only the Manpower, Inc. survey is examined, since it includes a much larger sample (see below) and has been available over a longer period.

2. Respondents who ask what "location" means are told it means "a plant, office building or complex of buildings" under their jurisdiction. The location question thus prevents respondents from answering about sites not in the local region.

3. For those answering "increase" or "decrease," the interviewer is instructed to ask whether the change will be "substantial," "moderate," or "slight." However, this more-detailed information is not published by Manpower.

4. Use of a common seasonal adjustment procedure prevents any aberrations resulting from different adjustment procedures from affecting the outcomes.

5. The household survey derives from a cooperative BLS - U.S. Bureau of the Census program originally begun in the 1940s. It differs from the establishment survey because it counts agricultural employees, self-employed individuals, and unpaid family workers and only counts individuals once, no matter how many jobs they hold. It also has a lower age cutoff of 16 years. In contrast, the establishment survey includes only jobs in nonagricultural employment that can be identified from payroll records.

6. Nonetheless, the annualized quarterly percent change in employment as reported in the household and establishment surveys are highly correlated (adjusted R-square = .73) over the period 1977-III to 1991-II.

7. The adjusted R-square between the Manpower index and the UCLA forecast for annualized percent change in household employment over the period 1977-III to 1991-II is .29. For the increase and decrease components of the Manpower survey relative to the UCLA forecast, the adjusted R-squares are, respectively, .23 and .33.

8. During the period 1977-III through 1991-II (the period covered by all the regressions presented) a regression of the annualized percent change in payroll employment against only the autoregressive element (plus a constant) produces an adjusted R-square of .65.

9. The unadjusted regressions for 1977-III to 1991-II are:

1) PEMHCA = .78 + .72 UCLAPEMA (2.58) (5.19)	adjusted R-squared = .32 Standard error = 1.73 Durbin-Watson = 1.51
2) PEMHCA = -1.12 + .20 MFUSADJ (-1.78) (4.97)	adjusted R-squared = .30 Standard error = 1.75 Durbin-Watson = 1.33

where PEMHCA is the quarterly seasonally-adjusted percent change in household employment, UCLAPEMA is the UCLA forecast, and MFUSADJ is the seasonally-adjusted Manpower index. The Durbin-Watson for equation (1) falls just on the lower-bound critical value; for equation (2) it falls below the lower bound. Figures in parentheses are t-statistics.



10. The major error in the UCLA forecast for real GNP (and employment) change came in the two quarters following the 1987 stock market crash. UCLA predicted a recession after the crash; the consensus as represented by Eggert did not. Thus, in subperiods including the immediate post-crash period, Eggert will tend to outperform UCLA in the regressions. It should be noted that there is a high correlation between the UCLA prediction for real GNP change and employment change. (Adjusted R-squared = .81 for the period 1979.1 to 1991.2. It is likely that the other forecasters reporting to Eggert would show the same high correlation, so that the real GNP change forecast can be seen as a proxy for the employment change forecast.

11. As noted earlier in connection with the household regressions, dropping the autoregressive correction will raise the seeming significance of both the UCLA and Manpower forecasts. The uncorrected quarterly regressions over 1977-III to 1991-II are:

1) PEMUSA = .80 + .90 UCLAPEMA (2.50) (6.15)	adjusted R-squared = .40 Standard error = 1.84 Durbin-Watson = 1.03
2) PEMUSA = -2.56 + .31 MFUSADJ (-4.78) (9.32)	adjusted R-squared = .61 Standard error = 1.49 Durbin-Watson = 1.32

where PEMUSA = quarterly seasonally-adjusted percent change in payroll employment, UCLAPEMA = quarterly UCLA forecast of percent change in household employment, and MFUSADJ = Manpower index. Both Durbin-Watsons are below the lower-bound critical value.

12. Real GNP is measured in 1982 dollars. No attempt was made to adjust for changes in the base period used in the national income accounts nor for revisions in data. These omissions should disadvantage the UCLA forecast in its predictive power, since the UCLA forecast was based on the GNP figures actually in use around the time of each forecast quarter. If no correction is made for autocorrelation, the basic results are unchanged: UCLA is significant at the 5% level; Manpower is not significant. Without the correction, the Durbin-Watson does not indicate the presence of autocorrelation.

13. In regressions without the UCLA variable, but with an autoregressive correction, the Manpower index was a barely significant contributor to percent change in real GNP. The predictive power appeared to come mainly from the decrease component.

14. The seasonally-adjusted Manpower index inserted in the equation in the post-sample period is an approximation taken from the graphics contained in the various press releases issued by Manpower, Inc. The regression used is equation (1) of Table 1.

### References

Leeper, Eric M. "Consumer Attitudes: King for a Day," Federal Reserve Bank of Atlanta Economic Review, vol. 77 (July/August 1992), pp. 1-15..

McNees, Stephen S. "The Forecasting Record for the 1970s," New England Economic Review (September/October 1979), pp. 33-53.

Mitchell, Daniel J.B. "Wage Pressures and Labor Shortages: The 1960s and the 1980s," Brookings Papers on Economic Activity (2:1989), pp. 191-231.

U.S. Bureau of Labor Statistics, "Revision of Payroll Survey Employment Estimates to March 1991 Benchmarks," press release data June 3, 1992.

Zarnowitz, Victor. "Rational Expectations and Macroeconomic Forecasts," Journal of Business and Economic Statistics, vol. 3 (October 1985), pp. 293-311.

Zarnowitz, Victor, and Braun, Phillip. Twenty-Two Years of the NBER-ASA Quarterly Economic Outlook Surveys: Aspects and Comparisons of Forecasting Performance, working paper no. 3965, National Bureau of Economic Research, January 1992.