

Special Topic: Regional Forecasting (3)

A check-up.

Forecasting models, like automobiles, require periodic check-ups for optimal performance.

This is our third reported evaluation of the prediction errors asso-

ciated with the Puget Sound Economic Forecasting Model. It entails measuring one-year-ahead and two-year-ahead forecasting errors for the six end-of-year predictions produced since publication of our first newsletter. In November 1997, for example, we forecast 3.6 percent employment growth for 1998 and 2.6 percent for 1999. Based on government figures through June 1999, the actual growth rates are 4.0 percent and 2.0 percent, respectively. This results in a one-year-ahead error of -0.4 (=3.6-4.0) percent and a two-year-ahead error of 0.6 (=2.6-2.0) percent.

The average *absolute* error for the six one-year-ahead employment forecasts is 0.7 (= [0.4+0.3+1.5+1.5+0.4+0.3]/6) percent. Considering the range of the employment growth rate since 1990 (0.6 percent to 5.2 percent), this error is acceptable. As expected, the one-year-ahead average error is larger for personal income (1.3 percent) and housing permits (5.1 percent) and smaller for the consumer price index (0.4 percent) and population (0.2 percent). Contrary to our expectations, the two-year-ahead average error is smaller than the one-year-ahead average error in three of the five cases (personal income, the consumer price index, and housing permits).

Except in the case of personal income, the errors are random (some positive and some negative). Due to the unanticipated growth of Microsoft wages, we have consistently under-predicted the change in income. Perhaps we might be forgiven in this instance, since much of the wage gain has come from exercised stock options. Forecasting stock option income is tantamount to predicting the price of Microsoft stock.

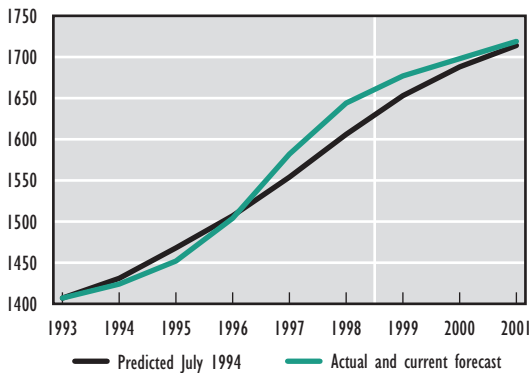
Five years ago, we published

our first ten-year outlook. As evident in the chart, the employment projection remains on track. The prediction error in 1999 is -1.4 percent. Since employment increased 17.8 percent over the five-year period, this is not a large error. And, as the projections beyond 1999 show, the long-run prediction error is likely to decline. The 1999 prediction error was larger for personal income (-4.3 percent, thanks to Microsoft) and smaller for the consumer price index (0.2 percent) and population (0.4 percent).

Not surprisingly, the employment prediction errors that occurred along the way stemmed from inaccurate forecasts of Boeing. In 1995, when we over-predicted Boeing jobs by 8,900, we over-predicted regional employment by 16,400. In 1998, an under-prediction of the Boeing work force (-11,500) contributed to an under-prediction of regional employment (-38,100).

In general, the model has performed well, producing reasonably accurate forecasts. Of course, luck has also played a role.

Predicted and Actual Puget Sound Employment
Thousands



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Forecasting Errors

Percent

Date of Forecast	9/93	11/94	11/95	11/96	11/97	11/98	Average Error
One-year-ahead errors							
Employment (0.6-5.2)	-0.4	0.3	-1.5	-1.5	-0.4	0.3	0.7
Personal income* (3.8-9.4)	-0.8	-0.3	-1.7	-2.5	-1.7	-0.6	1.3
Consumer price index (2.8-5.8)	-1.0	0.0	-0.5	-0.6	-0.2	-0.4	0.4
Housing permits (-45.6-23.9)	-4.4	2.7	-10.7	-4.1	-6.9	1.8	5.1
Population (1.1-2.3)	0.1	-0.3	0.1	0.2	0.3	0.3	0.2
Two-year-ahead errors							
Employment	0.4	-0.7	-1.2	-1.0	0.6	NA	0.8
Personal income*	-1.1	-0.6	-2.0	-1.7	-0.5	NA	1.2
Consumer price index	-0.2	0.2	0.2	0.2	0.2	NA	0.2
Housing permits	0.7	-1.3	-6.7	-8.3	-2.1	NA	3.8
Population	-0.5	0.0	-0.2	0.2	0.4	NA	0.3

Note: Numbers in parentheses show the range of growth rates since 1990.

*Current dollars.