

# FORECASTS 1983

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The longest recession since World War II will have ended by the time you read this article, according to a group of economic forecasters. While record-breaking prosperity may not be right around the corner, the forecasters do expect moderate real economic growth in 1983 led by strong consumer spending and a rebound in residential construction.

It should be noted, however, that forecasters also expected moderate real economic growth for 1982 at this time last year.

This article contains highlights of a recent survey of economic forecasts. First, the pattern of forecasts for 1983 is discussed, with details presented in Tables I and II. (Considerably more information is available in this Bank's "Business Forecasts 1983," which is a compilation of forecasts with names and details of the various estimates.) Next is a discussion of last year's predictions. An analysis of forecasts over the last twelve years concludes the article.

Table I  
RESULTS FOR 1982 AND TYPICAL FORECAST FOR 1983

	Unit or Base	Preliminary 1982*	Forecast 1983**	Percentage Change	
				Preliminary 1982/1981	Forecast 1983/1982
Gross national product .....	\$ billions	3,057.5	3,293	4.1	7.7
Personal consumption expenditures .....	\$ billions	1,972.0	2,136	7.0	8.3
Durables .....	\$ billions	242.7	269	3.5	10.7
Nondurables .....	\$ billions	762.7	808	3.8	6.0
Services .....	\$ billions	966.6	1,061	10.6	9.8
Gross private domestic investment .....	\$ billions	421.9	463	-10.5	9.6
Fixed investment:					
Nonresidential .....	\$ billions	347.5	338	0.4	-2.6
Residential .....	\$ billions	95.8	120	-8.7	25.8
Change in business inventories .....	\$ billions	-21.4	6	-	-
Net exports .....	\$ billions	16.5	-0.5	-	-
Government purchases .....	\$ billions	647.1	695	8.4	7.4
Federal .....	\$ billions	257.3	283	12.4	10.0
State and local .....	\$ billions	389.8	413	5.9	6.0
Gross national product (1972 dollars) .....	\$ billions	1,475.5	1,512	-1.8	2.5
Private housing starts .....	thousands	1,060.6	1,431	-2.2	34.9
Domestic automobile sales .....	\$ millions	5.7	6.8	-8.1	19.4
Rate of unemployment .....	percent	9.7	10.1	-	-
Industrial production index .....	1967 = 100	138.6	141.9	-8.2	2.4
Consumer price index .....	1967 = 100	289.1	303.8	6.1	5.1
Producer price index .....	1967 = 100	280.6	293.5	4.0	4.6
GNP implicit price deflator .....	1972 = 100	207.2	217.8	6.0	5.1

\* Data available as of January 1983.

\*\* These data are constructed using preliminary 1982 data and the median annual percentage change forecast for each category, incorporating 31 forecasts.

## Forecasts for 1983

Real GNP is projected to increase by 3.9 percent over the year (unless otherwise noted, growth-rates are from the fourth quarter of 1982 to the fourth quarter of 1983 as shown in Table II). That real growth would represent a considerable improvement over the last three years: real GNP declined 0.7 percent in 1980, grew only 0.7 percent in 1981 and fell 1.2 percent in 1982. Even if the predicted growth were to occur, however, at the end of 1983 the economy would still be well below its historical potential. For example, unemployment would be 9.7 percent of the labor force compared with 6.0 percent in late 1979. Likewise, housing starts, at 1.6 million

units, would be well below the 2 million units started in 1978. And the industrial production index would still be 5 percent below its level in early 1979.

The household sector is expected to provide the strongest growth in spending in 1983. Consumer spending for durable goods is expected to rise by 14 percent, while private housing starts are expected to increase by 334,000 units. Business nonresidential fixed investment, however, is expected to show little real growth.

No dramatic change in the inflation picture is expected. The consumer price index, for example, is projected to grow by 5.3 percent in 1983, compared to 4.5 percent in 1982.

Table II  
TYPICAL QUARTERLY CHANGES FORECAST FOR 1983

	Preliminary Result for 1982 (Fourth Quarter 1981 to Fourth Quarter 1982) <sup>a</sup>	Forecast 1983*				Change from Fourth Quarter 1982 to Fourth Quarter 1983 <sup>a, d</sup>
		I	II	III	IV	
Gross national product .....	3.3	8.2	9.2	10.1	10.7	9.5
Personal consumption expenditures ....	8.0	8.4	8.8	8.8	9.4	8.9
Durables .....	9.6	13.6	14.6	15.3	12.3	13.9
Nondurables .....	4.3	6.2	7.5	6.1	6.2	6.5
Services .....	10.6	9.3	9.4	10.1	10.0	9.7
Gross private domestic investment ....	-15.1	16.6	17.8	19.3	18.8	18.1
Fixed investment:						
Nonresidential .....	-4.2	-4.4	3.3	8.6	10.0	4.2
Residential .....	4.5	43.9	31.6	33.9	28.8	34.4
Change in business inventories <sup>b</sup> ....	-21.4	-1.5	4.4	9.6	12.8	6.3
Net exports <sup>b</sup> .....	17.3	-5.5	-7.4	-9.0	-10.1	-8.0
Government purchases .....	7.9	5.8	5.9	7.4	8.4	6.9
Federal .....	6.4	6.2	4.8	8.6	14.0	8.3
State and local .....	6.1	5.4	6.0	6.7	5.2	5.8
Gross national product (1972 dollars) ....	-1.2	3.1	3.4	4.4	4.7	3.9
Corporate profits after taxes .....	-	3.7	17.2	19.9	22.8	15.7
Private housing starts .....	44.6	21.1	33.2	28.8	14.7	24.2
Domestic automobile sales .....	17.6	19.4	31.1	22.1	22.2	23.6
Rate of unemployment <sup>c</sup> .....	2.4	10.6	10.4	10.0	9.7	-1.0
Industrial production index .....	-7.7	5.4	7.6	8.2	7.6	7.2
Consumer price index .....	4.5	5.0	5.4	5.4	5.4	5.3
Producer price index .....	3.6	4.5	4.7	4.9	5.7	4.9
GNP implicit price deflator .....	4.6	5.5	5.1	5.3	5.6	5.4

\* Percentage changes at annual rates unless otherwise noted. Median quarterly percentage change for each category, incorporating 20 forecasts. Due in part to the smaller sample size in this table, these data are not strictly comparable to the median percentage changes forecast for the year 1983 in the preceding table.

<sup>b</sup>Percentage change, except cumulative change in the levels of inventories and exports, and change in the quarterly average unemployment rate.

<sup>c</sup>Billions of dollars at annual rates.

<sup>d</sup>Percent.

<sup>e</sup>Average computed from quarterly figures.

## Last Year's Forecasting Performance

In many ways the 1983 forecast described above resembles the median forecast for 1982 described in "Forecasts 1982." Both projected a consumer-led recovery with moderate real GNP growth. The 1983 forecast for 3.9 percent growth in real GNP is not far from the 2.8 percent projected for 1982. Actually, real GNP in 1982 declined by 1.2 percent as the recession lingered much longer than anticipated.

Another point of similarity is that both the 1983 and the 1982 forecasts projected little change in the inflation rate. In 1983, the inflation rate (estimated by the producer price index) is predicted to rise by 1.3 percentage points, while last year it was predicted to rise by 0.5 percentage points. The rate actually declined in 1982 by 3.6 percentage points. As was noted in this article last year, forecasters typically underpredict changes in inflation rates. Most often, formal econometric models rely heavily on past inflation rates to predict future inflation (see, for example, Eckstein [1982] for an explanation of the reasoning behind such an approach). As a result, even when monetary policy changes as dramatically as it did in 1981 (when shift-adjusted M1 grew by 2.3 percent, down sharply from 6.6 percent growth in 1980) many forecasters will predict little change in near-term inflation rates.

The 1982 forecasts can also be compared with forecasts in recent years. As Table III indicates,

the 1982 forecast errors were above average for real output growth, inflation, and the interest rate on Treasury bills. After such a difficult year to predict, one might wonder how much confidence should be placed in forecasts for 1983. To determine that, a more detailed analysis of past forecasts is presented below.

## An Analysis of Past Forecasts

The purpose of this section is to study the record of median forecasts in an attempt to gauge the reliability of future forecasts.<sup>1</sup> In order to do that, simple statistical analysis is used. The price of that simplicity is the adoption of stringent assumptions.<sup>2</sup> If

<sup>1</sup>At this point it is useful to examine the comparability of the median with individual forecasts. Over the 1971-82 period there were three individual forecasters for whom this Bank published real GNP and inflation projections for each year. Their average errors were 1.5, 1.8, and 2.3 percent for inflation, versus 1.7 percent for the median forecast. For real GNP, their average errors were 1.2, 1.2, and 1.4 percent, versus 1.7 percent for the median. Thus while it is hard to draw firm conclusions based on three observations, it appears that the median forecast had about average accuracy in predicting inflation but below-average accuracy in predicting real GNP.

<sup>2</sup>It is assumed that when a forecast is prepared, the median forecast error for each year is an independent, normally distributed random variable with a zero mean and fixed variance that remains unchanged over time. In addition, it is assumed that the small sample sizes (twelve forecasts for GNP and inflation, and nine interest-rate forecasts) are large enough to provide useful information.

Table III

### THE RECORD OF MEDIAN FORECASTS

	Real GNP (Percent Change)			Inflation Rate (GNP Deflator)			Treasury Bill Rate		
	Actual	Predicted	Error	Actual	Predicted	Error	Actual	Predicted	Error
1971 .....	4.7	3.8	0.9	4.7	3.6	1.1			
1972 .....	7.0	5.6	1.4	4.3	3.2	1.1			
1973 .....	4.3	6.0	1.7	7.0	3.3	3.7			
1974 .....	-2.7	1.2	3.9	10.1	5.5	4.6	7.3	6.0	1.3
1975 .....	2.2	-0.6	2.8	7.7	7.1	0.6	5.7	7.1	1.4
1976 .....	4.4	6.0	1.6	4.7	5.4	0.7	4.7	7.1	2.4
1977 .....	5.8	5.0	0.8	6.1	5.7	0.4	6.1	5.8	0.3
1978 .....	5.3	4.2	1.1	8.5	5.9	2.6	8.7	6.5	2.2
1979 .....	1.7	1.5	0.2	8.1	7.1	1.0	11.8	8.1	3.7
1980 .....	-0.3	-0.8	0.5	9.8	8.2	1.6	13.7	8.6	5.1
1981 .....	0.9	2.4	1.5	8.9	9.1	0.2	11.8	10.8	1.0
1982 (preliminary) .....	-1.2	2.8	4.0	4.5	7.1	2.6	8.0	11.2	3.2
Average error .....			1.7			1.7			2.3

Note: Predictions are from Business Forecasts, published annually by the Federal Reserve Bank of Richmond. The error is the absolute value of the difference between predicted and actual values. Real growth and inflation are from the fourth quarter of the previous year to the fourth quarter of the stated year. The Treasury bill rate is the average value of three-month bills in the fourth quarter.

those assumptions are acceptable, then the following conclusions can be drawn.

First, the forecasts miss a large portion of the variation in future economic conditions. To see this, consider the regressions presented in Table IV of actual outcomes versus predictions for real GNP growth, the inflation rate and the Treasury bill rate. In each case the summary statistic  $R^2$  can be interpreted as the fraction of the variation in actual outcomes that is associated with variation in the forecast. For real GNP, a little more than half of the variation in actual growth was associated with the forecasts. But for inflation the corresponding value was less than one-third, and for the interest rate only one-fourth. That is, the median forecast failed to predict most of the variation in inflation and the interest rate. Thus over the sample period, the majority of the shocks to the economy that moved inflation and interest rates were not predicted. That result, in turn, raises doubts about the reliability of current and future forecasts.

A second conclusion is that forecasters often place an undue weight on recent conditions when predicting future inflation and interest rates. To see this, consider the  $R^2$  statistics from regressions of forecasts for a given year on the previous year's actual outcome (also presented in Table IV). For both inflation and the interest rate it is clear that most of the variation of forecasts was associated with the previous year's experience. Predictions of real GNP, on the other hand, had a relatively small amount of forecast variation associated with recent outcomes.

Another way to illustrate forecast accuracy is to present confidence intervals for the 1983 forecasts based on the regressions mentioned above. If the assumptions given in footnote one are satisfied, then one can compute the distribution of future forecast errors and derive probabilities that forecasts will be within certain limits (often referred to as confidence

intervals).<sup>3</sup> For each variable, a symmetric interval around the median forecast will be presented so that the odds are three to one that the actual outcome is within that interval. (In other words, a 75 percent confidence interval is presented.) The width of that interval illustrates the precision of the forecast.

For real GNP growth, the 75 percent confidence interval is 1.1 to 6.7 percent. The inflation forecast has a confidence interval ranging from 3.0 to 7.8 percent. And the confidence interval for the interest rate is widest of all, 4.9 to 12.4 percent. It should be remembered that actual outcomes will be outside even such wide intervals about one-fourth of the time.

The foregoing analysis indicates that forecasts have been imperfect guides to the future. That is not to say that forecasts are useless. On the contrary, when an individual forecaster constructs a model of economic activity, predictions of numerous variables can be made consistent with each other, which is a valuable achievement. In addition, a nontrivial fraction of future movement can often be predicted, as the median real GNP forecast demonstrates. Nonetheless, considerable uncertainty remains and is illustrated in the wide confidence intervals described above. Whenever economic forecasts play a significant role in decision-making, that uncertainty is ignored at the user's peril.

<sup>3</sup>See Kmenta [1971] for a discussion of forecast errors and confidence intervals.

## References

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Table IV

### REGRESSION SUMMARY

Independent Variable	Dependent Variable	$R^2$
Actual GNP growth	Predicted GNP Growth	.52
Actual inflation	Predicted inflation	.30
Actual Treasury bill rate	Predicted Treasury bill rate	.25
Predicted GNP growth	Actual GNP growth last year	.19
Predicted inflation	Actual inflation last year	.69
Predicted Treasury bill rate	Actual Treasury bill rate last year	.85