# THE NEW ASA-NBER SURVEY OF FORECASTS BY ECONOMIC STATISTICIANS

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Economic forecasts from competent sources are newsworthy events. Men involved in research and planning for government and business use them to check on their own projections and to gauge the general climate of expectations; investors speculate about their probable impact upon industry, trade, and finance; and many just take notice of how the "experts" assess the economy's prospects. But this attention, although nowadays widespread, is typically short-lived. Few bother to keep track of what was predicted and when, how it was done, or how the forecasts turned out. No comprehensive record of forecasts existed until the National Bureau of Economic Research, a few years ago, began compiling and analyzing such data for short-term aggregative predictions. While it is certainly desirable that forecasters maintain and study their own records, this is not enough. To provide the corrective information and discipline that are needed, forecast evaluation must be conducted on a much broader, more objective and systematic basis. Reliable information about the limitations of forecasts can be built up in this way, and a basis for improvement in methodology provided.

### *Genesis of the New Survey*

The Business and Economic Statistics Section of the American Statistical Association has a broad membership base, including many economists and statisticians whose work in government, business, academic institutions, labor unions, trade associations, and research organizations involves professional forecasting. The B & E Section has long been engaged in producing annual surveys of general economic forecasts by its members. Last year, at the request of ASA, the National Bureau of Economic Research assisted in redesigning and tabulating their annual business outlook questionnaire. The 1968 questionnaire, circulated in July, provided more information on the composition of the sample, the assumptions of the forecasters, and the probabilities they attach to different expected outcomes.

In his Presidential address at the 1968 Annual Meeting of ASA in Pittsburgh, Geoffrey H. Moore suggested that the B & E business outlook survey be established on a regular quarterly basis. He indicated that the National Bureau of Economic Research would help to design the new survey with a view to providing a continuing record for scientific study as well as current use. A special committee, appointed by Robert Ferber, Chairman of the B & E Section, and headed by Douglas Greenwald, considered this proposal and recommended its adoption.[1] This committee also worked out the main budgetary, scheduling, and operational aspects of the new survey. Subsequently, the terms of the arrangement were approved by both ASA and NBER, in time to complete the first quarterly survey early in December. The ASA has agreed to carry out the surveys for a period long enough to assure accumulation of useful experience and evidence. The National Bureau has assumed responsibility for the tabulation of forecasts, computation of error

[1] The committee members were: Douglas Greenwald, McGraw-Hill Co., Chairman; Robert Eggert, RCA Corporation; Gary Fromm, Brookings Institution; James Knowles, Joint Economic Committee, U.S. Congress; Robert McLaughlin, Scovill Manufacturing Co.; Charles Reeder, E. I. du Pont de Nemours & Co.; and Morris Cohen, Long Island University, ex officio member.

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statistics and other measures, and research in evaluating the results and their analytical implications. At the NBER Mrs. Charlotte Boschan and I will share these responsibilities.

### *Major Characteristics*

Each of the quarterly surveys will cover the current quarter and four quarters ahead, except that the August survey, geared to the annual meeting, will include six quarters so that the annual figures for the next year may be computed.

The questionnaires are scheduled to be mailed at times when regular forecasters generally review and update their predictions: in late January, after the release of the President's Economic Report and the Budget Message; in late April, after the release of the OBE-SEC and McGraw-Hill surveys of investment anticipations; in late July, after the annual GNP revision and budget review; and in late November, after the McGraw-Hill fall survey is released and the most active forecasting season is under way. The July and November schedules will be coordinated with the August and December ASA meetings.

To enhance the continuity of the forecasts and ease the burden of reporting, and to secure the highest possible quality of forecasts, participation in the quarterly surveys is limited to those who prepare quarterly forecasts of GNP and other key economic indicators on a regular basis. Individuals' forecasts will be kept strictly confidential and used only in statistical tabulations that will not reveal the identity of the forecaster. However, the annual award for forecasting accuracy, based on forecasts prepared at the time of the ASA meetings, will be continued.

The new survey will cover ten important economic time series (listed in Table 1, lines 1, 2, and 4-11). In addition, predictions of GNP in constant dollars (Table 1, line 3) can be derived from the forecasts of GNP in current dollars and the implicit price deflator.

The new survey should result in a record suitable for the evaluation of different forecasting assumptions and new approaches, for studies of probabilistic forecasts, for analyzing the varying degrees of consensus among forecasters, and so on.

### *First Results from the December 1968 Survey*

An analysis of the accuracy of the new survey must, of course, await the appearance of the corresponding data on realizations. In the meantime, however, it is interesting to examine the returns from the December survey, in which more than 80 forecasters participated.

According to the group median forecasts, listed in Table 1, GNP in current dollars is expected to increase from 860 to 917 billions between 1968 and 1969, a rise of $57 billion or 6.6 per cent (see Table 2 for the projected percentage changes). A slowdown in the rate of growth is expected in the first half of 1969, with an acceleration in the second half. However, about half of the rise in GNP will be due to price increases. This means a continuing inflation at an annual rate of 3.3 per cent, which is significantly lower than the 4 per cent rate of 1968.

The rise of total national output (GNP in constant dollars) implied by the forecasts is about 3 per cent between 1968 and 1969, which also is lower than the 5 per cent increase last year. Since the price level is expected to rise steadily during the year, the growth in real GNP, too, should decline in the first half and pick up in the second half of 1969.

The industrial production index, which measures the output of factories, mines, and public utilities, is expected to rise by about 2.4 per cent, and all of this growth is ascribed to the second half of 1969. Consistent with these expectations the unemployment rate is forecast to increase to 4 per cent in the first half, then to remain unchanged or slightly lower in the second half of the year.

The forecasts anticipate moderately lower corporate after-tax profits in the first and second quarter of 1969, and a pick-up later. Business inventories would continue to increase but at appreciably lower rates (particularly in the first six months) than those recently recorded. Early and transient slowdowns are also projected in housing starts and consumer expenditures for durable goods. A continuing rise in plant and equipment outlays is expected, amounting to about 4 per cent for 1969 as a whole.

The chances of a general economic recession,

## TABLE 1
### Projections of GNP and Other Economic Indicators, 1968–69

| Indicator | Number of Forecasters | 1968 Q1 | 1968 Q2 | 1968 Q3 | 1968 Q4 | 1969 Q1 | 1969 Q2 | 1969 Q3 | 1969 Q4 | Annual 1968 | Annual 1969 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | | | | Forecast (median) | | | | | |
| 1. Gross national product ($ bil.) | 84 | 831 | 853 | 871 | 885 | 896 | 908 | 924 | 940 | 860 | 917 |
| 2. GNP implicit price deflator (1958:100) | 81 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 122 | 126 |
| 3. GNP in constant dollars (bil. 1958 $) | — | 693 | 703 | 712 | 720[a] | 723[a] | 726[a] | 733[a] | 740[a] | 705[a] | 728[a] |
| 4. Industrial production (1958–59:100) | 81 | 162 | 164 | 165 | 166 | 166 | 166 | 168 | 170 | 164 | 168 |
| 5. Unemployment rate (per cent) | 78 | 3.6 | 3.5 | 3.6 | 3.6 | 3.8 | 4.0 | 4.0 | 3.9 | 3.6 | 3.9 |
| 6. Corporate profits after taxes ($ bil.) | 72 | 49.1 | 50.7 | 51.0 | 51.1 | 50.4 | 50.5 | 51.8 | 52.7 | 50.5 | 51.6 |
| 7. Plant and equipment expenditures, OBE-SEC ($ bil.) | 72 | 64.9 | 62.8 | 64.9 | 65.5 | 66.0 | 67.0 | 67.7 | 68.1 | 64.5 | 67.5 |
| 8. Private nonfarm housing starts (ann. rate, mil.) | 79 | 1.47 | 1.42 | 1.52 | 1.52 | 1.55 | 1.60 | 1.64 | 1.69 | 1.48 | 1.62 |
| 9. Change in bus. inventories, GNP accounts ($ bil.) | 80 | 2.1 | 10.8 | 7.5 | 6.0 | 5.0 | 5.2 | 5.7 | 6.4 | 6.6 | 5.8 |
| 10. Consumer expenditures for durable goods ($ bil.) | 81 | 79.0 | 81.0 | 85.1 | 85.7 | 85.6 | 86.0 | 87.1 | 88.6 | 82.7 | 87.0 |
| 11. National defense purchases, GNP accounts ($ bil.) | 84 | 76.8 | 79.0 | 79.6 | 80.0 | 80.4 | 80.5 | 80.9 | 81.0 | 78.8 | 80.8 |

[a] Line 1 divided by line 2, times 100.

Source: American Statistical Association and National Bureau of Economic Research, Business Outlook Survey, December 1968.

## TABLE 2
### Projected Percentage Changes in GNP and Other Economic Indicators, 1968–69

| Indicator | Number of Forecasters | Q2 68 to Q3 69 Actual | Q3 68 to Q4 68 | Q4 68 to Q1 69 | Q1 69 to Q2 69 | Q2 69 to Q3 69 | Q3 69 to Q4 69 | Q4 68 to Q4 69 | 1968 to 1969 |
|---|---|---|---|---|---|---|---|---|---|
| | | | Forecast | | | | | | |
| 1. Gross national product ($ bil.) | 84 | +2.1 | +1.6 | +1.2 | +1.3 | +1.9 | +1.7 | +6.2 | +6.6 |
| 2. GNP implicit price deflator (1958:100) | 81 | +0.8 | +0.8 | +0.8 | +0.8 | +0.8 | +0.8 | +3.3 | +3.3 |
| 3. GNP in constant dollars (bil. 1958 $)[a] | — | +1.3 | +1.1 | +0.4 | +0.4 | +1.0 | +1.0 | +2.8 | +3.3 |
| 4. Industrial production (1957–59:100) | 81 | +0.6 | +0.6 | 0 | 0 | +1.2 | +1.2 | +2.4 | +2.4 |
| 5. Unemployment rate (per cent)[b] | 78 | +0.1 | 0 | +0.2 | +0.2 | 0 | −0.1 | +0.3 | +0.3 |
| 6. Corporate profits after taxes ($ bil.) | 72 | +0.6 | +0.2 | −1.4 | +0.2 | +2.6 | +1.7 | +3.1 | +2.2 |
| 7. Plant and equipment expenditures, OBE-SEC ($ bil.) | 72 | +3.3 | +0.9 | +0.8 | +1.5 | +1.0 | +0.6 | +4.0 | +4.1 |
| 8. Private nonfarm housing starts (ann. rate, mil.) | 79 | +7.0 | 0 | +2.0 | +3.2 | +2.5 | +3.0 | +11.2 | +9.5 |
| 9. Change in bus. inventories, GNP accounts ($ bil.)[c] | 80 | −3.3 | −1.5 | −1.0 | +0.2 | +0.5 | +0.7 | +0.4 | −0.8 |
| 10. Consumer expenditures for durable goods ($ bil.) | 81 | +5.1 | +0.7 | −0.1 | +0.5 | +1.3 | +1.7 | +3.4 | +5.2 |
| 11. National defense purchases, GNP accounts ($ bil.) | 84 | +0.8 | +0.5 | +0.5 | +0.1 | +0.5 | +0.1 | +1.2 | +2.5 |

[a] See Table 1.

[b] Change in rate, in percentage points.

[c] Change in billions of dollars.

Source: Computed from Table 1.

i.e., of a decline in GNP in constant dollars, are very small in 1969, according to the 84 economic statisticians in the sample (Table 3). The median probabilities are 11 and 13 (out of 100) in the first two quarters of the year, and they fall to 5 and 3 in the last two quarters. The corresponding mean probabilities are higher, ranging from 8 to 20 chances in 100 (these distributions show strong positive skewness).

These results suggest general consistency in the time patterns of forecasts for the different variables. Furthermore, the annual forecasts for GNP and prices probably come close to what would appear to be the "standard" forecasts at this time. This should be so because these are averages for a relatively large and broadly based group of professional forecasters.[2]

[2]The composition of the group in terms of "primary affiliation" was as follows: 33, manufacturing; 18, commercial banking and other financial institutions; 10, consulting or research; 7, government; 6, academic; and 10, trade association, labor union, or other (for a total of 84 forecasters). The forecasters were located in 19 states across the nation, but with a heavy concentration in New York, as might be expected.

There are always some "outliers" in a group of this size and diversity. These produce the appearance of substantial dispersion among the forecasts when a measure such as the range of forecasts is used (Table 4). However, the extreme classes are very thinly populated, with the bulk of the forecasts falling close to the average. These distributions are more compact for the nearest than for the more distant future: all measures of dispersion systematically increase with the span of the forecasts, being smallest for the Q4 1968 and largest of the Q4 1969 predictions (Table 4, lines 7-9). No pronounced asymmetries are apparent in the distributions (e.g., note the closeness of the medians and means on lines 3 and 4).

Since the predictive value of the presently available information decreases, and uncertainty increases, the more distant the predictive target, the dispersion of the probabilistic forecasts of any individual is likely to rise with the span of forecast. Table 4 indicates the dispersion of point forecasts among individuals, which is not directly related to the degree of uncertainty in the way the dispersion of the

**TABLE 3**

**Estimated Probability of Decline in GNP in Constant Dollars**

| | Q4 1968 to Q1 1969 | Q1 1969 to Q2 1969 | Q2 1969 to Q3 1969 | Q3 1969 to Q4 1969 |
|---|---|---|---|---|
| | Number of Forecasters | | | |
| Estimated probability (chances in 100) | | | | |
| Less than 1 | 21 | 14 | 26 | 34 |
| 1–10 | 20 | 24 | 34 | 30 |
| 11–20 | 21 | 18 | 12 | 13 |
| 21–30 | 7 | 15 | 7 | 4 |
| 31–40 | 5 | 5 | 0 | 2 |
| 41–50 | 5 | 5 | 2 | 0 |
| 51 and over | 5 | 3 | 3 | 1 |
| Total number of forecasters | 84 | 84 | 84 | 84 |
| Median probability (chances in 100) | 11 | 13 | 5 | 3 |
| Mean probability (chances in 100) | 18 | 20 | 12 | 8 |

Source: American Statistical Association and National Bureau of Economic Research, Business Outlook Survey, December 1968.

probability distribution of an individual's forecasts is. Nevertheless, it is a plausible hypothesis that the greater dispersion of the longer forecasts, illustrated in Table 4, reflects the same basic phenomenon of uncertainty increasing with the forecast span. Further evidence of the greater ignorance associated with the more distant future is found in the systematically larger errors of the longer forecasts.[3]

Some direct information on the probability distribution of an individual's forecast was obtained in the survey. Table 5 records the mean of the probability distributions reported by each individual regarding his forecast of the 1968-69 percentage change in (a) GNP in current dollars and (b) the implicit price deflator. Wider dispersion in the distribution for GNP than for the price level is evident, as well as the higher level of expected change in GNP. The means of these two distributions agree well with the averages in Table 1.

### *Assumptions and Methods*

Most of the participants in the survey assumed that the 10 per cent surtax adopted in 1968 would continue after June 1969 for the rest of the year, but some expected that it would be lowered, particularly for individuals (Table 6). Monetary policies of moderate restraint were assumed by most, but a sizable minority foresaw a tendency toward greater ease. Continuation of the Vietnam war was anticipated, but mostly at lower levels of hostilities. However, very few forecasters expected reductions in either the defense posture or total government spending.

Over 80 per cent of the participants report using an informal GNP model, and about 70 per cent report using leading indicators and anticipation surveys (Table 7). In addition to these three principal methods of forecasting, a considerable number of survey members made use of their own or others' econometric models.

### *Comparison with the Previous Survey*

In the July 1968 B & E survey, about 260 responses were received, approximately one-fourth of which came from forecasters who identified themselves as "professional" rather than "occasional." In terms of median forecasts, the differences between the two subgroups were small. However, a number of the occasional forecasters submitted extreme and (at least at the lower end of the scale) rather unreasonable predictions, so that the ranges of forecasts in the total July set were much larger than the comparable figures for the December set. But the dispersion measures for the profes-

[3]Victor Zarnowitz, *An Appraisal of Short-Term Economic Forecasts*, Occasional Paper 104, National Bureau of Economic Research, New York, 1967, Chapter 5.

**TABLE 4**

**Distribution of Forecasts of GNP, 1968–69**
**(billion dollars)**

| | Q4 1968 | Q1 1969 | Q2 1969 | Q3 1969 | Q4 1969 |
|---|---|---|---|---|---|
| 1. Highest | 895 | 914 | 937 | 960 | 985 |
| 2. Third quartile | 888 | 900 | 915 | 930 | 949 |
| 3. Median | 885 | 896 | 908 | 924 | 940 |
| 4. Mean | 884.7 | 896.4 | 908.6 | 923.6 | 939.7 |
| 5. First quartile | 882 | 892 | 902 | 918 | 933 |
| 6. Lowest | 873 | 875 | 880 | 875 | 880 |
| 7. Interquartile range | 6 | 8 | 13 | 12 | 16 |
| 8. Total range | 22 | 39 | 57 | 85 | 105 |
| 9. Standard deviation | 3.5 | 6.3 | 8.8 | 12.1 | 16.4 |

Note: The total number of forecasters is 84.

Source: American Statistical Association and National Bureau of Economic Research, Business Outlook Survey, December 1968.

sionals' subset of the July forecasts are similar to the measures for the December survey, when predictions for approximately equal time-spans are compared.

Underestimation of increases in GNP is common in economists' forecasts.[4] The median forecast of the July survey understated by about 2 per cent the subsequently reported value of GNP in the third quarter of 1968. Attempts to correct such errors imply upward revisions of the forecasts. The accompanying tabulation shows the extent of such revisions in the median GNP forecasts of the B & E surveys (the July figures refer to the subset of 67 professional forecasters).

[4]See V. Zarnowitz, *op. cit.*, Chapter 4.

This new experiment in recording and evaluating economic forecasts is off to a promising start. A statistical record of expert opinion on the state of the economy is in the making. The analysis of the survey data, as they accumulate and are compared with actual values, may contribute some answers to the many interesting scientific questions relating to forecast accuracy and methodology.

Members of the Business and Economic Statistics Section of ASA who regularly prepare forecasts and wish to participate in this survey should write to John Lehman at the Washington office of ASA. The results of the successive surveys will be released promptly to the press and sent to all participants.

**TABLE 5**

**Mean Probability Distributions of Changes in GNP and Prices, 1968–69**

| Per Cent Change | Mean Probabilities Attached to Possible Per Cent Changes, 1968 to 1969, in GNP in Current $ | Mean Probabilities Attached to Possible Per Cent Changes, 1968 to 1969, in Implicit Price Deflator |
|---|---|---|
| +10.0 or more | 1.3 | 0.1 |
| +9.0 to +9.9 | 1.8 | 0.1 |
| +8.0 to +8.9 | 7.8 | 0.5 |
| +7.0 to +7.9 | 25.1 | 1.1 |
| +6.0 to +6.9 | 29.6 | 3.8 |
| +5.0 to +5.9 | 17.4 | 6.9 |
| +4.0 to +4.9 | 7.3 | 21.7 |
| +3.0 to +3.9 | 4.1 | 41.6 |
| +2.0 to +2.9 | 2.4 | 15.1 |
| +1.0 to +1.9 | 1.1 | 5.1 |
| 0 to +0.9 | 1.5 | 2.0 |
| −0.1 to −1.0 | 0.3 | 1.5 |
| −1.1 to −2.0 | 0.1 | 0.2 |
| −2.1 to −3.0 | 0.1 | 0.1 |
| −3.1 or less | 0.1 | 0.1 |
| Total | 100.0 | 99.9 |

Note: The total number of forecasters included is 89. Percentages may not total 100 due to rounding.

Source: American Statistical Association and National Bureau of Economic Research, Business Outlook Survey, December 1968.

**TABLE 6**
**Key Assumptions Underlying the Forecasts**

| | Number of Forecasters Specifying |
|---|---|
| Tax policy | |
| Surtax extended | 44 |
| Surtax reduced | 17 |
| Surtax eliminated | 6 |
| Tax rates unchanged | 2 |
| Tax rates reduced | 2 |
| State taxes increased | 1 |
| Monetary policy | |
| Unchanged | 4 |
| Tighter | 32 |
| Easier | 21 |
| Defense posture | |
| Vietnam War: no change | 17 |
| Vietnam War: hostilities reduced | 23 |
| Vietnam War: hostilities increased | 2 |
| Defense posture: no change | 21 |
| Defense posture: reduced | 4 |
| Defense posture: increased | 10 |
| Government spending | |
| Unchanged | 1 |
| Increased | 10 |

Note: Not all forecasters specified the key assumptions underlying their forecasts.

Source: American Statistical Association and the National Bureau of Economic Research, Business Outlook Survey, December 1968.

**TABLE 7**
**Forecasting Methods Used**

| | Number of Forecasters | | Number of Forecasters Using Each Method Who Ranked It | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Using | Not Using | Most Important | Second Most Important | Third Most Important | Fourth Most Important | Fifth Most Important | Least Important |
| Informal GNP model | 69 | 15 | 49 | 13 | 5 | 2 | — | — |
| Lead indicators | 59 | 25 | 13 | 22 | 21 | — | 3 | — |
| Anticipations surveys | 57 | 27 | 2 | 25 | 18 | 10 | 2 | — |
| Econometric model (outside) | 43 | 41 | 12 | 7 | 6 | 17 | 1 | — |
| Econometric model (own) | 17 | 67 | 4 | 3 | 2 | 5 | 2 | 1 |
| Other methods | 12 | 72 | 3 | 4 | 2 | 2 | 1 | — |

Source: American Statistical Association and National Bureau of Economic Research, Business Outlook Survey, December 1968.

| Quarter Forecast | GNP Forecasts (in $ billion) as of July 1968 | December 1968 | Difference December-July |
|---|---|---|---|
| Q1 1968 | 827 (actual[a]) | 831 (actual) | 4 |
| Q2 1968 | 841 (actual[a]) | 853 (actual) | 12 |
| Q3 1968 | 855 | 871 (actual) | 16 |
| Q4 1968 | 866 | 885 | 19 |
| Q1 1969 | 876 | 896 | 20 |
| Q2 1969 | 887 | 908 | 21 |

[a] The first and second quarter 1968 figures printed on the July questionnaire were 827 and 841 billion dollars, respectively. Both proved to be underestimates, especially the latter, and may well have affected the forecasts.