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A Review of Some Economic Forecasts  
for 1955 and 1956

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## A Review of Some Economic Forecasts for 1955 and 1956\*

The year draws to a close, and the season of economic forecasting has arrived. As business prospects for 1958 are discussed, the voice of the economist is heard throughout the land. While many members of the economics profession are currently peering into the future, I should like to follow the less risky pursuit of investigating economic forecasts for years in the recent past. I trust, however, that this aim is not entirely out of tune with the times. For, as the economic forecasters introduce their 1958 models, it seems highly appropriate to appraise the quality of their output in previous years. In this paper, I shall discuss the predictive accuracy of some quantitative short-term forecasts of GNP and its components. The evidence is drawn from a very small sample and is confined to two recent years, 1955 and 1956, both of which were characterized by expanding business activity.

### The Purposes of a Post-Mortem

Before turning to this limited body of evidence, I should like to express my conviction that a careful review of past endeavors in aggregative economic forecasting can serve a number of significant purposes. For one thing, methodological discussions regarding the progress of aggregative economics may be illuminated by an appraisal of forecasting performance. After a generation of intensive theoretical and empirical exploration concerning the short-run determinants of national income,

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there is good reason to inquire whether these endeavors have provided the profession with tools of value in prediction. At the end of World War II, most forecasters of post-war economic activity failed utterly to foresee the inflationary prospects of the late forties. Their bearish predictions have been thoroughly analyzed\* and

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\* See Lawrence R. Klein, "A Post-Mortem on Transition Predictions of National Product," Journal of Political Economy, LIV (August 1946), 289-308; and Michael Sapir, "Review of Economic Forecasts for the Transition Period," Studies in Income and Wealth, XI, pp. 275-351.

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have stood for a decade as the basis for a tentatively adverse verdict on the predictive value of aggregative economic analysis. In the light of more recent experience, it may well be asked whether this verdict should be reversed or re-affirmed. Obviously, the post-war period has presented to the economic forecaster no challenge equal in magnitude to the shift from war to peace in 1945. Nevertheless, only in a gross caricature could the last decade be depicted as a period of unvarying and steady expansion in economic activity. The rate of growth of national product has varied widely from year to year. Reversals in the direction of change in quarterly GNP have occurred in four of the years from 1947 to 1956. And in every year, one or more of the important components of GNP has shown marked deviations from a smooth rising trend-line. The skill of the forecaster has been continuously tested. How he has fared on these tests surely provides some indication of how well he would perform in response to more dramatic challenges. Furthermore, it should be emphasized that the prediction of turning-points or of major disruptions in the trend of activity is not the sole objective of aggregative forecasting. Even in relatively quiet times, business and government decision-makers can benefit from accurate forecasts.

An appraisal of forecasting performance can also aid business and government policy by indicating the reliability which should be attached to economic forecasts. The optimal uses of forecasting as a guide to decision-making normally depends on the degree of confidence placed in the forecast by its users. For example, a firm could accept the forecast of a minor recession as a virtual certainty for the coming year; alternatively, it might employ the same forecast as its best estimate and yet regard the prediction merely as the average of three equiprobable outcomes, involving a major recession, a minor one, or no change in business. Depending on the firm's attitude towards risk and on the relative costs of excessive and deficient productive capacity, the optimal level of investment by the firm might differ markedly in the two cases. At the extreme, Friedman and, more recently, Theil have shown analytically that the government may be well-advised not to alter public policy on the basis of forecasts which are very unreliable.\* The confidence warranted by current predictions depends

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\* Milton Friedman, Essays in Positive Economics (Chicago, 1953), pp. 117-32; Henri Theil, "Forecasting in its Relation to Government Policy-Making," unpublished paper presented at the Universities-National Bureau Conference on the Quality and Economic Significance of Anticipations Data (November 1957), pp. 12-25.

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on the degree of success obtained in previous forecasts. In this connection, an evaluation of degree of success requires consideration of the areas of success or failure. A highly accurate projection of the GNP total which displayed large offsetting errors in individual components would be far less likely to inspire confidence than a forecast which was accurate in detail as well as in its total.

Information on the areas of success and failure in past forecasts can also be valuable as a guide to research activities in aggregative economics. Presumably, substantial efforts should be devoted to further exploration of those sectors of the

economy which are sources of important unanticipated changes in national product. It must, of course, be recognized that some large problem areas (e.g., variables which are labelled exogenous) may not yield their mysteries even to intensive research; and, on the other hand, some small gaps in knowledge may be profitably closed with relatively minor expenditure of effort. Nonetheless, the presumption remains that the marginal productivity of research activity is likely to be high in areas that are sources of substantial error.

A review of economic forecasts can also offer evidence on the efficacy of alternative forecasting methods through comparison of the degree of success obtained by various techniques. However, this objective can be pursued extensively only if the methods underlying the forecasts are specified in detail, as they are in the case of econometric models. Where great reliance is placed on the informed judgment or ad hoc reasoning of the forecaster, differences in accuracy can be related to specific differences in techniques only to a limited extent.

The discussion above has suggested a number of broad objectives in economic research which may be furthered by a continuing review of economic forecasts. The empirical material below is presented as a very modest contribution to the pursuit of these objectives.

#### The Nature of the Forecasts

The forecasts under review have a number of common characteristics. None of them is derived from an articulated formal model. In all cases, the informed judgment of the forecaster plays a large role in the selection and weighting of evidence concerning future trends. However, quantitative techniques are widely employed to extrapolate certain key ratios among variables; in some instances, regression relationships are also utilized. The predictive techniques thus fit into the category of "looser frameworks of a quasi-mathematical character," to use Fellner's phrase.\*

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\* William Fellner, Trends and Cycles in Economic Activity (New York, 1956), pp. 328-39.

The forecasts concentrate on the expenditures (or product) side of GNP, building up the total by components and specifying the predicted levels of the individual components in the national product account. Although the essential characteristics of the expenditure approach to forecasting have been amply outlined in the literature,\* a

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\* See, e.g., Ibid; Robert M. Biggs, National-Income Analysis and Forecasting (New York, 1956), Chapter 11; V. Lewis Bassie, "Recent Developments in Forecasting," Studies in Income and Wealth, XVII; Elmer C. Bratt, Business Cycles and Forecasting (Homewood, Ill., 1953). For two case studies, see the chapters by Kenneth D. Ross and Donald J. Watson in Business Forecasting in Practice, edited by A.G. Abramson and R.H. Mack (New York, 1956).

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brief review may be in order. Typically, government expenditure is treated as exogenously determined in current dollars. Budgetary information and informal statements of public officials are employed as a basis for projections of the government sector; in the case of state and local spending, considerable attention is also paid to trend-patterns. Fixed investment expenditure is related by categories to pre-determined flow and stock variables. The degree of utilization of the existing stock of capital, the state of financial markets, and current levels of profits and corporate liquidity may be considered as determinants of investment in the coming year. Furthermore, data on new orders and contract awards may be given weight; and anticipations data are frequently weighted heavily. Consumer expenditure and inventory investment are usually treated as endogenous variables. They are thus projected at levels consistent with the disposable income and sales levels that are implied by the predicted magnitudes of government and fixed investment expenditure. There are particularly large differences among forecasters in the extent to which consumption and inventory investment are believed to be affected by concurrent developments within the forecast period.

Evidence is also sought on the autonomous strength of demand for inventories and for consumer goods. In the case of inventories, this evidence may consist of survey data regarding planned additions to stocks and data on financial variables, particularly those reflecting the availability and cost of bank loans. The demand for consumer durable goods often receives special attention with resulting emphasis on installment credit conditions and on survey data reflecting household intentions and attitudes concerning purchases of durables.

The quantitative results of these forecasting techniques were made available to me by economists employed in six financial, industrial, and publishing firms in New York City. The forecasts were prepared by professional economists whose principal responsibility lay in the analysis of aggregate economic activity. The predictions made by industrial and financial firms were designed for internal use as a guide to management policy. The forecasts were the product of serious, independent and substantial efforts.

The forecasts were prepared within a few months on either side of the onset of the year they cover. In a few instances, the same firm contributed two forecasts for a single year, one prepared late in the preceding year and one early in the predicted year. Consequently, eight forecasts for 1956 and six for 1955 are included. Nine of the fourteen forecasts were completed prior to the beginning of the predicted calendar year. Many of the predictions were presented on a quarterly basis, but I have treated all as annual forecasts in order to maintain comparability. National product components were usually predicted in current dollars with some indication of expected price movements included in the forecast. To obtain consistency, I have handled all as current dollar projections. In order to do so, I have had to take some minor liberties with two forecasts which were presented in constant dollars and which did not contain a complete specification of assumed price trends.

In making their predictions, the forecasters specified quantitatively their beliefs concerning the GNP account for the year immediately preceding the predicted year. Invariably, the assumed levels differ in some degree from the most recent official estimates as shown in the July, 1957 issue of Survey of Current Business. In part, these discrepancies occur because most of the forecasts were made before year-end or else just after the turn of the year prior to the release of any official estimates for the fourth quarter. However, of far greater quantitative importance in accounting for the differences is the fact that the initial official estimates of nation product are tentative and subject to later revisions. For both 1954 and 1955, subsequent revisions have raised the initial GNP figures by about one per cent. All forecasting techniques -- however naive or sophisticated -- are hampered by imperfect knowledge of the benchmark period preceding the forecast. It is desirable to isolate this source of error in an appraisal of the quality of forecasts. One can abstract from the benchmark inaccuracies by interpreting each prediction as the expected change from the level assumed for the benchmark year by the forecaster and then by comparing the predicted changes with actual changes as measured by the latest official estimates for both the predicted and benchmark years. This device has been adopted elsewhere in the appraisal of forecasts\* and

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\* Klein and Goldberger, An Econometric Model of the United States, 1929-1952 (Amsterdam; Holland, 1955), p. IX; Theil, op. cit., p. 6; Joint Economic Committee, "Report on the January 1956 Economic Report of the President," p. 101.

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will be employed below. The technique cannot guarantee that the indicated performance of the forecasts is unaffected by the benchmark inaccuracies, but the remaining effects



are probably quantitatively insignificant.\* However, if policy decisions depend on

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\* Several business economists who discussed the benchmark problem with me agreed that their predicted changes were quite insensitive to differences in assumed benchmark levels over the relevant range: when Commerce revises estimates for the benchmark period, the forecasters adjust their predicted levels by equal amounts, as a first approximation, thus maintaining the same predicted changes. Predictions of inventory investment were noted as a possible exception, but, it was felt, not usually a significant one. In the case of forecasts derived from econometric models, the precise effect of inaccuracies in the assumed levels of lagged variables can be determined. To the best of my knowledge, however, such calculations have never been performed.

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expected levels of national product, the benchmark inaccuracies need not be costless to the users of the forecasts.

#### Forecasts for 1955

At last, I turn to the data. The relevant information for 1955 is presented in Table I. Actual change in column 1 is the difference between 1955 and 1954 levels, as shown in the most recent (July 1957) Commerce estimates. For each item, the arithmetic mean of the predicted change in the six forecasts for 1955 is recorded in column 2. As indicated above, predicted change for 1955 in each case is the difference between the level predicted for 1955 and the level assumed by the forecaster for 1954.\* The range of predicted changes in the six

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\* In a few instances, I interpolated predicted changes for sub-components of investment or government spending when forecasts did not categorize these components in exactly the manner shown in the Table. The effect of the interpolation on the results was negligible.

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forecasts is shown in columns 3 and 4. Since high and low values are selected for each separate item, these columns will not sum to totals. The deviations, or forecast errors, tabulated in columns 5, 6, and 7 are the differences between

Table I

Predicted and Actual Changes in National Product for 1955  
(in Billions of Dollars)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Actual Change	Predicted Change			Deviation			Deviations Based on Fourth Quarter Naive Model
		Mean	High	Low	Mean	Low	High	
Gross National Product	+30.5	+14.5	+20.4	+10.5	+16.0	+10.1	+20.0	+25.7
Personal Consumption Expenditure	+17.9	+ 7.5	+11.7	+ 5.5	+10.4	+ 6.2	+12.4	+14.2
Gross Private Domestic Investment	+12.2	+ 6.7	+ 9.1	+ 4.1	+ 5.5	+ 3.1	+ 8.1	+ 8.8
Residential Construction	+ 3.1	+ 2.0	+ 2.9	+ 1.3	+ 1.1	+ .2	+ 1.8	+ 1.6
Other Construction	+ 1.8	+ .1	+ .5	- .2	+ 1.7	+ 1.3	+ 2.0	+ 1.8
Producers' Durable Equipment	+ 1.2	- .1	+ 1.2	- 1.6	+ 1.3	.0	+ 2.8	+ 1.7
Change in Business Inventories	+ 6.1	+ 4.8	+ 6.0	+ 4.2	+ 1.3	+ .1	+ 1.9	+ 3.7
Net Foreign Investment	.0	+ .8	+ 1.6	+ .2	- .8	- 1.6	- .2	- 1.2
Government Purchases of Goods and Services	+ .4	- .5	+ .8	- 2.6	+ .9	- .4	+ 3.0	+ 3.8
Federal	- 2.1	- 2.6	- 1.5	- 4.6	+ .5	- .6	+ 2.5	+ 2.0
State and Local	+ 2.6	+ 2.1	+ 2.6	+ 1.3	+ .5	.0	+ 1.3	+ 1.9

In columns 1, 2, 5, and 8, detail need not add to total because of rounding.

actual change and predicted change; column 5 is column 1 minus column 2, etc. For comparison with the performance of the six forecasts, column 8 presents the deviations based on a naive model which "predicted" 1955 levels as equal to those of the fourth quarter of 1954 as initially reported by Commerce in February 1955. The actual changes in column 1 may be interpreted as the deviations involved in an alternative naive model which projected all components for 1955 at their levels for the full year 1954.

The most striking characteristic of the table is the predominance of positive predicted changes and positive deviations.\* The forecasters unanimously envisaged a general

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\* Since positive deviations prevail, the "high" predicted change is the most accurate forecast for each component except net foreign investment and federal spending.

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expansion of economic activity in 1955. The upswing which actually occurred exceeded the expectations of all. Of the 30.5 billion dollar rise in GNP, about four billions are attributable to higher prices in 1955. Since few of the forecasters anticipated any increase in prices, the underestimates in the implied forecasts of real GNP would be a trifle smaller.

The mean underestimate of 16 billion current dollars in GNP, and even the smallest underestimate of GNP, are substantial. Nevertheless, the record is on the whole quite impressive. As of the end of 1954, the national product accounts showed a decline of 14 billions in GNP (at annual rates) from the second quarter of 1953 to the first quarter of 1954; the total then remained remarkably stable over the next two quarters. A mechanical extrapolation of recent trends up to the fourth quarter of 1954 could not have led to a prediction of expanding activity for 1955. The fourth quarter of 1954 did produce an improvement of business conditions, but it was only around year-end that this upturn became evident from weekly and monthly economic series. By this time, four of the six forecasts had been completed. Surprisingly, the changes predicted in the two later forecasts do not differ in any systematic way from the predictions that were made earlier.\*\*

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\*\* One exception should be noted. The later forecasts both show larger, and hence more accurate, predicted changes for residential construction. Housing was far below normal in late 1954.

The examination of individual components yields interesting results. The decline in federal spending and rise in state and local spending were both well forecast, in general. Since there was somewhat of a downward bias in forecasts for both components, the mean predicted change for total government was in the wrong direction and below the mark by nearly one billion dollars. Still, government expenditures account for only a small portion of the total underestimate in GNP in all but one case: the error in the lowest forecast of government was substantial, amounting to three billion dollars.

The forecasters unanimously anticipated a small rise in net foreign investment which failed to materialize. For producers' durables and other (i.e., non-residential) construction, the mean of the forecasts displays no particular superiority over either the full-year or fourth-quarter naive model. On the other hand, for the remaining two components of gross private domestic investment, i.e., residential construction and inventory investment, the forecasts were consistently and decisively better than the two naive models, although the predictions were uniformly too low. The superiority is particularly evident for inventories, where all of the economists predicted accurately that the inventory liquidation of 1954 would be reversed in 1955. The inventory forecasts improved upon the full-year naive model by four to six billion dollars and on the fourth-quarter model by two to four billions. The moderate positive residuals in the inventory predictions are in part attributable to underestimates of final sales of goods in 1955. In fact, if sales had been accurately projected, some of the inventory forecasts would probably have been a bit too high.

Both the largest gains relative to the naive models and the largest quantitative underestimates of expansion are found in personal consumption expenditure, the largest component of GNP. Since consumption is treated as an endogenous variable, one would like to divide the consumption error into an autonomous and an induced portion. The autonomous portion reflects the error in the relationship between consumption and GNP:

it measures the difference between the actual change in consumer spending and the rise that would have been predicted by the forecasters if they had had perfect foreknowledge of total GNP for 1955.\* The remainder of the consumption error could be

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\* This error might be further separated into two parts: the error in the predicted relationship of consumption to disposable income and the error in the relationship of disposable income to GNP.

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considered induced. It would measure the implicit multiplier effects on consumption attributable to deviations from the predicted values of other components or to the autonomous error in consumption. The determination of the autonomous error, in effect, requires knowledge of how consumption would have been predicted on the assumption of a 30.5 billion dollar rise in GNP for 1955. Since the predictions were not based on a formal framework, I do not have such precise knowledge. However, a few relatively crude calculations are enlightening. The predicted changes in consumption were just about half the predicted change in GNP, ranging from 43 to 58%. For the mean of the forecasts, the ratio of predicted change in consumption to that in GNP is 52%.

By extrapolation of the 52% mean predicted marginal ratio over the 30.5 billion actual change in GNP, the calculated rise in consumption amounts to 15.8 billions as compared with the actual consumption increase of 17.9 billions. The implied mean autonomous error in consumption is just above two billions. Other calculations on the individual forecasts based on more detailed consideration of the underlying reasoning suggest the same general conclusion. There was a distinct autonomous error in predictions of consumption: the decline in the saving-income ratio and the accompanying great strength of demand for consumer durables were typically not foreseen. The consumer sector did not contribute to the success of the forecasts in anticipating expansion.

Nevertheless, by any reasonable calculation, the bulk of the 10.4 billion mean underestimate of the rise in consumer spending must be ascribed to induced effects, and the autonomous error in consumption must be set at a level far below the 5.5 billion mean error in the forecast of gross private domestic investment. More of the underestimate of consumption is attributable to the inaccuracy in projecting investment than to failure in assessing the behavior of the consumer sector.

Thus, the proposition emerges that the principal reasons for the accurate predictions of expanding activity in 1955 and for the uniform underestimates of the magnitude of expansion lie in the investment sector. Inventory investment is the hero and fixed investment must stand as the principal villain. The major expansionary influence identified by the forecasters was the projected switch from inventory decumulation in 1954 to a moderate build-up of stocks in 1955. The significant rise in non-residential construction and producers' durables was not foreseen by the forecasters as a group. The mean prediction of zero change for these items was three billions too low. According to the calculations above, an induced consumption error of roughly equal magnitude should also be attributed to the underestimate of producers' capital outlays. The performance of the forecasts for residential construction was more satisfactory: while that component did contribute to the underestimate of expansion, it also contributed substantially to the bullish tone of the forecasts.

Thus, as a group, the forecasters deserve a very high grade for their 1955 inventory predictions, a relatively high grade for residential construction, and only average marks -- in comparison with the naive models -- for producers' capital outlays and for the relationship between consumer demand and GNP. I shall conclude the review of the 1955 forecast by suggesting some reasons for the differing degrees of predictive success in these various areas.

A number of lines of reasoning led to the accurate view that inventory liquidation had terminated.\* Inventory-sales ratios received careful consideration. While

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\* The discussion below is based on written analyses of economic prospects for 1955 which were prepared during late 1954 or early 1955. Each of the six quantitative forecasts was accompanied by a discussion of the evidence supporting the predictions. I am also drawing on material contained in a number of other forecasts for 1955, which were not presented in quantitative detail but which reached qualitative conclusions similar to those in the six forecasts reviewed above.

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these ratios had declined in general during the first three quarters of 1954, they remained considerably above their levels of 1952 and early 1953. A few economists saw grounds for moderate optimism in the behavior of the inventory-sales ratio for manufacturing and trade in the aggregate. However, the most significant source of optimism underlying the 1955 forecasts was the changing complexion of inventory disinvestment during the preceding year. The inventory adjustment was apparently precipitated by the cutback in defense programs in mid-1953. Liquidation in late 1953 and early 1954 was concentrated in durable manufacturing industries. After mid-1954, the decline in producers' stocks of durable goods tapered off considerably. During the third quarter, there was an unusually large reduction in auto stocks prior to the introduction of 1955 models. In other areas of durable manufacturing, however, inventories were stable after mid-year. Some forecasters concluded that the adjustment in this sector had been completed despite the rather high stock-sales ratio which prevailed. Inventory disinvestment had spread to non-durable manufacturing and to wholesale and retail trade after mid-year 1954; however, that development was cited by economists as an adjustment to the previous weakness of sales and was not expected to continue. Another kind of disaggregation of recent inventory movements led some analysts to optimistic conclusions. The initial decline in manufacturers' stocks had been characterized by a very pronounced reduction in inventories of purchased

materials; a more moderate disinvestment of goods-in-process followed shortly thereafter. By mid-1954, the liquidation in these groups ended; and stocks of finished goods, which had previously been stable, began to fall. The decline in inventories of finished goods was cited as evidence that the adjustment had entered its last stages: the manufacturers, it was felt, had failed to pare these down earlier because of involuntary accumulation of goods awaiting sale. Now, since purchased materials and goods-in-process had been set into balance with sales and since finished goods were being adjusted, inventory disinvestment was seen nearing an end. Thus, even as stocks in the aggregate continued an unabated decline, the changing composition of liquidated inventories led to optimism. Also buttressing the conclusion were various pieces of survey evidence which suggested that business firms no longer deemed their stocks excessive.

Pre-flow data on housing starts and residential building contract awards convinced the economists that residential construction would remain strong during early 1955. Relaxed money conditions were expected to support housing during this period. Economists differed in extrapolating housing demand into the latter part of 1955; this accounted for much of the variation in the anticipated strength of new housing activity for the full year.

Neither anticipations data nor pre-flow data on new orders provided any indication of the forthcoming rise in plant and equipment outlays. Nor would a study of recent trends up to the beginning of 1955 have led to optimistic conclusions. *Ex post* it seems that outlays for fixed capital in 1955 rose in response to improved sales and earnings experiences; much of the rise appears to have been induced by the concurrent expansion of demand for finished goods. The possibility of an induced element in capital outlays was rarely mentioned in the *ex ante* discussions. Occasionally, expansion was foreseen for this sector and was attributed to the accelerated depreciation provisions of the 1954 tax code or to favorable conditions prevailing in financial markets.



The actual decline in the ratio of personal saving to disposable income during 1955 was associated with a marked increase of expenditures on consumer durables. Ex post, one popular explanation is that the American public fell in love with the 1955 automobile models. This tale of romance hardly supplies an elegant explanation of the strength in consumer demand, but it is consistent with the data: new auto sales can easily account for the low saving ratio, while sales of non-durables and services were not unusually high. In the few instances where a decline in the saving ratio was predicted, the forecasters pointed to the optimistic findings of the Survey Research Center's periodic surveys or argued that relatively low acquisitions of durables in the previous year would make demand in 1955 particularly responsive to the expected rise in disposable incomes.\*

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\* Nobody seemed to expect that the large capital gains associated with the stock market boom would stimulate consumer spending in 1955. And rarely has anyone pointed to this possibility ex post. It is a plausible hypothesis, but it defies empirical verification on the basis of available data.

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#### Forecasts for 1956

Predicted changes and deviations covering the eight forecasts for 1956 are shown in Table II. The results resemble those for 1955 in Table I, since positive predicted changes and positive deviations are again predominant. As in 1955, most components were expected to exceed their levels of the previous year, and most rose to a greater extent than anticipated. In both years, the predicted changes in the GNP total are uniformly more accurate than the full-year naive persistence model. However, there are important differences in the character and accuracy of the forecasts for the two years.

In the first place, the mean predicted change in GNP for 1956 is not much better than the fourth-quarter naive forecast. Five of the eight forecasts were prepared before 1955 ended; still, the forecasters' estimates of fourth-quarter GNP ranged from

Table II

Predicted and Actual Changes in Nation Product for 1956  
(in Billions of Dollars)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Actual Change	Mean	High	Low	Mean	Low	High	Deviations Based on Fourth Quarter Naive Model
Gross National Product	+23.0	+12.4	+18.0	+6.0	+10.6	+5.0	+17.0	+12.9
Personal Consumption Expenditure	+12.7	+ 7.2	+10.0	+5.1	+ 5.5	+2.7	+ 7.6	+7.8
Gross Private Domestic Investment	+ 5.3	+ 2.5	+ 5.4	-1.6	+ 2.8	- .1	+ 6.9	+1.6
Residential Construction	- 1.3	- .7	+ .3	-1.5	- .6	-1.6	+ .2	- .9
Other Construction	+ 1.9	+ 1.1	+ 1.7	+ .5	+ .8	+ .2	+ 1.4	+1.5
Producers' Durable Equipment	+ 4.4	+ 3.0	+ 4.2	+1.2	+ 1.4	+ .2	+ 3.2	+2.7
Change in Business Inventories	+ .3	- 1.0	+ .5	-2.7	+ 1.3	- .2	+ 3.0	-1.8
Net Foreign Investment	+ 1.8	+ .1	+ .6	- .1	+ 1.7	+1.2	+ 1.9	+1.7
Government Purchases of Goods and Services	+ 3.1	+ 2.6	+ 3.7	+ .2	+ .5	- .6	+ 2.9	+1.8
Federal	+ .4	+ .3	+ 1.2	-1.9	+ .1	- .8	+ 2.3	- .1
State and Local	+ 2.7	+ 2.2	+ 2.5	+1.8	+ .5	+ .2	+ .9	+1.8

In columns 1, 2, 5 and 8, detail need not add to  
total because of rounding.

six to twelve billions over the full-year level for 1955. Hence, the mean forecast called for only a minor rise during 1956 over the rate prevailing at the end of 1955. Because GNP had risen rapidly and consistently during 1955, one could have been quite bearish about the prospective trend of activity during 1956 and still have predicted 1956 GNP well above the 1955 total. Only a very sharp decline during the year could have prevented 1956 from being the "best year ever."

In fact, six of the eight forecasts did predict that a downturn in GNP would occur sometime during 1956. This contrasts with the expectations of consistent expansion in the forecasts for 1955. As these facts indicate, there were sharper differences of opinion among the forecasters regarding 1956 than for 1955.

The significance of errors in the prediction of price-movements differed sharply in the two years. Since the implicit price-deflator for GNP rose 3.0%, about twelve billions of the 23 billion dollar increase in GNP from 1955 to 1956 are attributable to higher prices. The mean predicted rise in prices was somewhat less than half as large as the actual increase. This would imply an average underestimate of six to seven billions in the portion of the GNP increase attributable to higher prices. The remainder of the mean forecast error, or about four billions, is caused by an underestimate of constant-dollar GNP for 1956. Thus, the larger share of the mean error in the 1956 forecasts is associated with inaccuracy in the projection of the price level.

When the performance on individual components is considered, Table II indicates that government spending gave the forecasters little difficulty. As anticipated, state and local expenditure followed an upward trend, and federal outlays were stable. The public sector contributed substantially to the total error in GNP in only one forecast, where a marked decline in federal spending was predicted.

On the other hand, the minor and normally docile item of net foreign investment was troublesome in 1956. The substantial rise in foreign demand for American goods was not foreseen and each of the forecasters underestimated the component by about a billion and a half.

For both categories of construction and for producers' durable equipment, the mean predicted changes of the forecasters were considerably better than either naive model. The incipient decline in residential construction was foreseen by the group; data on new housing starts in the second half of 1955, other pre-flow data, and evidence on the increasing tightness of mortgage markets were invoked to support the prediction of a downturn in home-building. The decline during 1956 was greater than the mean predicted change; the number of housing starts actually fell much more sharply than was typically anticipated while value per start rose somewhat more than was expected.

Producers' durables and non-residential construction were accurately identified by most of the forecasters as the principal area of strength for 1956. The mean predicted increase for these two items, amounting to four billions, accounts for much of the anticipated rise of GNP and, in particular, explains the mean expectation of a rise over the end-of-1955 level. On the other hand, the two billion dollar mean underestimate of these items is an important source of the mean forecast error in GNP. Anticipations data, pre-flow data, financial considerations and the high level of 1955 profits all pointed to a continued boom in business outlays for plant and equipment. The anticipations surveys were particularly significant. The McGraw-Hill preliminary survey data, released in November, indicated a 13% rise in producers' capital expenditure for 1956; the Commerce-SEC anticipations of March 1956 accurately reported a prospective increase of 22% for the year. The lowest predicted changes were contained in two forecasts made before the McGraw-Hill findings were known; the largest, and thus most accurate, predicted rise was recorded in March, in light of the Commerce-SEC data.

In six of the eight forecasts, a decline in the rate of inventory accumulation was predicted for 1956. Three of the projected declines were very small; the other three were contained in forecasts that were bearish principally for other reasons. While the average forecast error was an underestimate of 1.3 billions, much of the deviation should be considered induced by inaccurate assumptions about other sectors. Unlike 1955, the inventory predictions did not, in general, contribute to forecasting success; on the other hand, only a minor portion of the underestimate in the GNP-total is attributable to this component.

While distinctly more accurate than either naive model, the mean predicted change in consumption was 5.5 billions too low. For the mean of the forecasts, most of this error can be attributed to the five billion dollar underestimate of other components. Because of the error in investment, consumer incomes were understated and, hence, household spending was pegged too low. The ratio of the mean predicted change in consumption to the mean predicted change in GNP was extremely close to the corresponding ratio of actual changes. In this case, however, the analysis of the mean predictions of the group conceals wide differences of opinion in the sample. The two forecasts which were least optimistic about investment demand expected some strength in consumer spending in 1956. Disposable income was expected to rise markedly and the saving ratio was forecast at a low level, as expansion of outlays on services and non-durables was expected to counteract a predicted decline in expenditures for consumer durables. In these two forecasts, the predicted change in consumption was nearly as large as the predicted change in GNP for 1956. In sharp contrast, two forecasts, which were among the most accurate for the investment sector, projected a rather small increase in consumption of about five billions. Here, a marked rise in the saving ratio was expected as a result of weakness in demand for durables and the pressures of consumer installment debt. In these two predictions, the autonomous error in consumption was the largest single source of the underestimate in GNP. In the remaining four forecasts, the predicted relationship of consumption to GNP was quite satisfactory; underestimates in

investment (domestic and foreign) were responsible for most of the error in GNP. Actually, the saving ratio did rise by 1.2% in 1956, as outlays for durables declined. However, the rise in disposable income was particularly large, amounting to 17 billions of the 23 billion increase in GNP. Corporate profits, which had soared in 1955, remained stable in 1956; with undistributed profits and corporate profits taxes approximately unchanged, consumers received the lion's share of the rise in GNP. Hence, despite the rise in the saving-income ratio, expanded consumer outlays in 1956 absorbed nearly three-fifths of the increase in GNP just as they had in 1955.

As a group, the economists predicted accurately that physical output in 1956 would barely surpass the level of the fourth quarter of 1955. However, the majority of the forecasters underestimated the prospective rise in the price level and did not accurately foresee the consistent upward movement of current-dollar GNP during the course of 1956. Thus, on the average, the predicted change in GNP was only slightly better than the fourth-quarter naive model. At the same time, it should be emphasized that the forecasts were consistently and markedly superior to the naive model for the individual components of national product. Most of the forecasters scored successes in their predictions of stability in federal spending, continued expansion in state and local outlays, a downturn in residential construction, and a substantial further rise in plant and equipment expenditure.

The forecasts of business fixed investment were by no means perfect, however. Each of the predicted increases was too small; and, in four forecasts, the error was substantial, exceeding two billion dollars. In some of the forecasting techniques, demand for fixed capital is first projected in real terms; then prices of capital goods are predicted and used to obtain a forecast of investment outlays in current dollars. There was a rapid rise in the prices of capital goods during 1956; this unforeseen price movement is directly and primarily responsible for the underestimates of capital outlay in some of the forecasts.

As outlined above, the forecasters diverged sharply in evaluating the strength of demand in the consumer sector for 1956. In two cases the underestimate of 1956 GNP is primarily attributable to an excessively bearish appraisal of this sector.

The expansionary influence of net foreign investment in 1956 was a surprise to all of the forecasters. The actual rise in this item was produced by a record increase in merchandise exports. Continental Europe, South America, Canada, and Japan expanded their purchases from United States business by large amounts. These larger purchases, in turn, reflected the strength of economic activity in these foreign areas. Frequently, net foreign investment has received perfunctory treatment from economic forecasters, who have felt this item was too small to endanger the overall accuracy of their predictions of national product.\* Nevertheless, the minor component did cause trouble in the eight

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\* See, e.g., the comment in Abramson and Mack, *op. cit.*, p. 171.

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forecasts for 1956 reviewed above.

In principle, the success of forecasts should be evaluated with reference to their adequacy as a guide to policy decisions. The accuracy required varies with the nature of the decisions to be made: in some cases, the mere assurance that no major depression is imminent might be sufficient; in many others, the requirements would be far more stringent. Also, the macro-economic variable of greatest significance will depend on the policy issues involved: for different purposes, the most important information might be the forecast of real GNP, current dollar GNP, the price level, or the relative strength of particular sectors of national product. The forecasts for 1956 presented a good indication of the movement of output as a whole and of shifts in the composition of national product. They were least satisfactory in their appraisal of price behavior. The evidence presented in detail above should enable the reader to make his own overall

qualitative judgment concerning the predictive performance of these forecasts for 1955 and 1956. My own judgment would be rather favorable. In comparison with naive extrapolations of present levels or recent trends in the economy, the predictions of the national product account must be labelled successful as a group. The forecasters did display some positive insight into the future course of the economy for the two years under review.\*

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\* One might well ask whether the voluntary nature of the sample creates a bias in favor of successful predictions: forecasters with a poor record, it might be argued, would have been less willing to reveal their past forecasts to me. However, other evidence suggests that the views of the forecasters in my sample were typical of the thinking among leading analysts of business conditions. The mean prediction for 1956 corresponds very closely with the consensus on the GNP-total and other key variables among larger groups of forecasters as tabulated in University of Michigan, Third Annual Conference on the Economic Outlook (Ann Arbor, Mich., 1956), p. 99; Joint Economic Committee, Hearings on the January 1956 Economic Report of the President, pp. 604-607; and J.A. Livingston, "The Business Outlook," Philadelphia Sunday Bulletin, Dec. 25, 1955. The mean forecast of GNP in my sample of 1955 predictions exceeds by some four billions the consensus of Livingston's sample of 53 economists shown in his column of December 19, 1954. This is hardly a major difference.

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#### Concluding Comments

Two types of consistent errors in the forecasts bear further consideration for their theoretical implications. The price increases of 1955 and 1956 were either totally unforeseen or else markedly underpredicted by the forecasters. This error is hardly surprising, in view of the profession's inability ex post to account satisfactorily for the inflationary pressures which have marked the period from 1955 to date. The forecasts point to the dire need for a more adequate theory of the determination of the price level.

The other general error is the consistent underestimate of the expansion in GNP for both years. Such a tendency has also been noted in other discussions of national



product forecasts.\* This can be viewed as evidence of a downward bias in the predictions,

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\* Theil, *op. cit.*; Abramson and Mack, *op. cit.*, p. 172.

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reflecting perhaps bearish preconceptions of the forecasters. Alternatively, since declines also seem to be underestimated, the tendency may be interpreted as a bias toward inertia, possibly indicating the forecasters' reluctance to climb far out on a limb. However, the tendency also is displayed in econometric models where presumably the emotions of the analyst are suppressed. According to calculations I have made, the Klein-Goldberger model has a marked bias toward inertia over its sample period covering 1929 to 1952: GNP is consistently "underpredicted" in years when it rises and overstated in years when it falls. Primarily responsible for the inertia is the investment equation, which relates demand solely to lagged variables. The consumption equation, which places much weight on consumption of the previous year, also contributes to sluggishness. In brief, the short-run multipliers implied by the model seem inappropriately small. The underestimates in the forecasts studied above can be similarly explained. Trends in sales and earnings within the forecast period are seldom expected to affect planned investment concurrently. The absence of an induced component in predicted investment outlays was particularly apparent in 1955 and contributed substantially to the underestimate of GNP. The techniques employed by some of the forecasters to project consumption also tend to produce low values of the implicit short-run multiplier. If the forecast of autonomous changes is inaccurate, then small multipliers prevent a compounding of error, just as Friedman and Becker have argued.\*\* If, however, dynamic

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\*\* Milton Friedman and Gary S. Becker, "A Statistical Illusion in Judging Keynesian Models," *Journal of Political Economy*, LXV (February 1957).

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adjustments in the economy are in fact rapid and if autonomous changes are successfully predicted, the low multiplier produces a dilution of accuracy.

The data-input of the forecasts deserves a final comment. The business economists make extensive use of anticipations data and pre-flow data as barometers of activity in various sectors of the economy. The usefulness of these "non-causal" indicators was apparent in the review of the predictive performances for 1955 and 1956. The econometric models published to date have not included these data as variables. The forecasting performance of the Klein-Goldberger model is of interest in this regard. After performing well for 1953 and 1954, the model predicted only a minor rise in real GNP for 1955, underestimating investment by far more than the forecasts reviewed above. In preparing a forecast for 1956 based on the model, Suits adjusted the investment equation upward by the amount of its 1955 error when he learned the results of the McGraw-Hill preliminary survey of planned capital outlays for 1956.\* Because of Suits'

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\* Third Annual Conference on the Economic Outlook, pp. 40-44.

wise decision, 1956 real GNP was quite accurately predicted. The predictive accuracy of an econometric model might well be improved by the explicit inclusion of such data as variables.\*\*

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\*\* It should be emphasized that the Klein-Goldberger model has valuable uses outside of general forecasting for explanations of past movements and for the analysis of the probable effects over time of changes in fiscal policy. For these purposes, a "causal" model seems necessary.

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By incorporating this wider body of data, the econometric model would move toward formalizing and refining the techniques currently employed by the business forecaster. My own feeling is that, even now, there is frequent and unfortunate exaggeration of the gap between the formal model and the looser frameworks which produced the forecasts

analyzed above. When the wise econometrician forecasts, he does not close his eyes to evidence supplied by data which are not in his model. On the other hand, the forecaster who proudly announces that he never uses an equation does rely on many procedures which could be written as equations. The estimates of parameters implicit in his procedures may resemble closely those obtained from econometric calculations. The econometric model can take advantage of efficient statistical tools to obtain such estimates. It can, furthermore, provide an instrument for research on the testing and verification of alternative forecasting methods. And these are important contributions to the accumulation and communication of knowledge.