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The Decomposition of Forecasting Error: The OBE Model

6.1 INTRODUCTION

Here the OBE model is subjected to the same type of analysis we performed on the Wharton forecasts in the previous chapter. In addition, we compare the individual Wharton and OBE forecasts. This procedure allows us to explain macroeconometric forecasting errors in two different models for each quarter under consideration.

Description of the Models[1]

The Office of Business Economics model has been used for forecasting since the beginning of 1966. However, some of the inputs used in the early forecasts—such as preliminary lagged variables, predicted exogenous variables, constant adjustments, and estimated parameters—were not well recorded. Since efforts to duplicate the forecasts prior to the second quarter of 1967 proved unsuccessful, we were forced to start our analysis of forecasting only with that quarter.

[1] For a complete description of the OBE models, see Chapter 2, pp. 35–42.

In general, the task of reproducing the OBE forecasts is complicated by the fact that the model has been continuously revised and different versions have been used in forecasting, necessitating respecification of equations and reestimation of parameters from time to time. Furthermore, each version contains several optional procedures for treating total fixed investment (*ISE*), housing starts (*HS*), and the price of government purchases (*PGG*). For instance, total fixed investment can be treated as endogenous or exogenous to the system, or it can be found by using one of two different equations that use anticipation variables.

In each quarter, forecasts are made on the basis of several different assumptions about monetary and fiscal policies over the forecasting period. Nevertheless, there is usually a preferred forecast. The forecasts we use for the second and third quarters of 1967 and for the first quarter of 1968 contain the set of exogenous values which, according to the recollection of OBE model builders, include those values for the exogenous variables that appeared to be the best estimate at the time the forecasts were made. There were several forecasts made in the fourth quarter of 1967, but only one was a "serious forecast"—the one we use. (The forecasts we use for the second quarter, 1968 through the third quarter, 1969 were designated as preferred forecasts internally by OBE but not identified as such publicly.)

The forecasting procedures employed here are similar to those we used for the Wharton model. Since there are nonlinearities in the model, the forecasting solution is obtained by using the structural form, not the reduced form, of the model. All endogenous variables are classified into three categories. The forecasts of endogenous variables that are a function of predetermined variables alone are obtained as soon as the judgmental guesses (or preliminary data) about the predetermined variables are established. For those endogenous variables that are determined by at least one other current endogenous variable, the forecasts are obtained by using the Gauss-Seidel iterative method. After these two types of endogenous variables are estimated, the forecasts of the endogenous variables determined by identities and not used elsewhere in the system are obtained.

Review of Types of Forecasts Used

The seven sets of forecasting errors[2] discussed here carry the same

[2] See Chapter 1.

definitions as in the previous chapter. The first four sets of forecasts (*OR*, *AR*, *GG*, and *NO*) are generated via different kinds of constant adjustments, and the last three sets (naive 1, naive 2, and *Auto*), directly from data.

To review briefly: the *OR* forecast is the model forecast with the constant adjustments originally used by the model builders; the *AR* and *GG* forecasts are the model forecasts with the mechanical adjustments described on p. 9; the *NO* forecast is the one produced by the model without the use of any constant adjustments; the naive 1 method uses the observed value in the jump-off quarter to forecast all four quarters ahead, while the naive 2 method uses the actual change in the jump-off quarter to predict the future change; and, finally, the autoregressive scheme uses four weighted lags to predict the variable in the current quarter. The implicit weights allocated to the various past values are determined by the regression of the current variable on its own lagged values in the past four quarters.

Notes on Forecast versus Realization Tables

These tables (see pp. 296–307) are similar to the Wharton forecast versus realization tables. They cover the OBE forecasts from the second quarter, 1967 to the third quarter, 1969. However, because the ex ante OBE forecast for the second quarter of 1967 covered only three quarters, the four-quarters-ahead and one-year-ahead forecasts for that quarter are blank in these tables. In Tables 6.1, 6.2, and 6.3, the forecasting error (*FE*) is the difference between the forecast and the realized data; the average absolute forecasting error (*AAFE*) is the arithmetic average of the absolute forecasting errors made in different quarters.[3]

Comparing the four different kinds of OBE forecasts, we find that, in general, the *NO* forecast has a distinctly larger *AAFE* than the other three in the first two quarters of prediction. As the forecasting span increases to three or four quarters ahead, the *NO AAFE* is almost as small as the *AR* and *GG* errors for some variables, and smaller for others. This indicates that mechanical constant adjustments are important in the first two quarters of forecast but of declining significance as the forecasting period is extended. However, the *OR* constant adjustments yield noticeably smaller errors (especially for the ex ante forecasts) than other

[3] The forecast versus realization tables for twelve other variables are in the appendix.

adjustments in the early quarters and marginally smaller errors in the later quarters. This may indicate that judgmental insights play a positive role in forecasting.

In summary, the *OR* forecasts are better and the *NO* forecasts worse than the others for most variables; the *GG* method does as well as the *AR* method in the first two quarters but becomes worse than the *AR* method in the last two quarters of forecasting.

In general, the forecasts of naive 2 and the autoregressive method are almost as good as those generated by the econometric model. The naive 1 (no change) forecasts, however, contain the largest error among the errors shown for most variables. This illustrates that the economy was not stagnant during this period. The naive 2 method gives a relatively small forecasting error in the one-quarter-ahead forecasts. However, as the forecasting quarters extend, the naive 2 forecasts deteriorate because the economy is not growing at a constant rate. For those variables that are mainly trend-dominated, such as *GNP*, *PD*, and some elements in the consumption sector, the naive 2 forecasts are even better than the forecasts with the OBE econometric model. Nevertheless, the inferiority of the naive 2 method is apparent for those variables that fluctuate widely during this period, such as total investment and its components. The autoregressive scheme, on the other hand, predicts the investment sector fairly well, since it captures some of the turning points.

In ex post forecasts, with realized values used for exogenous variables, the forecasting errors for composite variables are due to the errors in the endogenous variables. The total error in *GNP* is the sum of errors in the first-order endogenous components of GNP—i.e., total consumption, total investment, and net foreign balance. The errors in total consumption and total investment are the corresponding sums of errors in the consumption and investment components. (However, a trifling difference may be found owing to rounding errors.) Note that in all naive methods the component forecasting errors do not add up to their total. This is so because the projections for aggregate variables are independent of the projections for their components.

The ex ante forecasts are generally better than the ex post forecasts if *OR* constant adjustments are used. The *OR* ex ante forecasts seem to be superior to the *OR* ex post forecasts in the first two quarters. However, with mechanical adjustments or no adjustments at all, the

superiority of ex ante forecasts in the first two quarters disappears. In general, the ex ante forecast *AAFE*s are close to the corresponding ex post *AAFE*s. Thus, the errors in guessing values for the exogenous variables do not appear to contribute any significant net error.

6.2 DECOMPOSITION OF FIRST QUARTER ERROR

In presenting a detailed analysis of the origins of forecasting error in the OBE model we follow a pattern similar to that used in the Wharton decomposition of Chapter 5.

The Second Quarter, 1968 Forecast as an Example

We begin our analysis with the second quarter, 1968 forecast because the information required for decomposition was not available for earlier forecasts. The U.S. economy experienced a rapid growth in this quarter: current dollar GNP increased by $24.2 billion, from $826.5 billion to $850.7 billion, and constant dollar GNP, by $12.8 billion. The rapid growth in GNP was mainly due to the fast increase in the investment sector. Judging from the change in business inventroy (*II*), inventory was accumulating at a $10.9 billion annual rate, with housing investment (*IH*) up $2.7 billion, despite a slight drop in total domestic investment in plant and equipment (*ISE*). Consumption expanded at a rate of 1.35 per cent a year—slower than average. Relatively rapid growth occurred in expenditures on durables other than autos and on services (*COD* and *CS*); but the increases in expenditures on autos and nondurables (*CA* and *CN*) were trifling (lower than 0.6 per cent annually).

The detailed analysis of forecasting error in the prediction for one quarter ahead is presented in Table 6.4, which shows a similar arrangement as that of the corresponding table in Chapter 5 (Table 5.11). It reports on the forecasting errors of four different constant adjustment methods. The first column for each variety of adjustment is the structural equation residual, adjusted by the appropriate constant adjustment. The second column represents the error due to the reverberation of all errors in the system through the multiplier effect. Finally, total forecasting error for each variable is listed in the third column.

The ex post forecasting error of *GNP* (line 29) comes from two

nearly independent sources—the error in the real sector (line 25) and the error in prices (line 28). As discussed in the previous chapters, the errors in the real sectors are traced to structural equation residuals and their reverberation. Since all GNP components are measured in constant dollars, the *SER*s for the GNP components are given in constant dollars. In Table 6.4, most of the structural equation residuals in the consumption sector are positive for the equations without adjustment. This means that the forecast components of consumption, except *CA*, would have been too high even if the values of all other variables had been perfectly forecast. After offsetting, however, the net structural equation residual for GNP is only −$1.27 billion (1958 dollars). Multiplying this by the correct price deflator gives the net *SER* on the product side of −$1.52 billion.

The sum of the total error for the GNP components (−1.65) is the forecasting error for *GNP58*. This figure corresponds to the value (−1.50) in the forecasts versus realization table of *GNP58* (Table 6.2), but it does not agree precisely, for two reasons. First, the value in Table 6.4 was calculated by adding the errors in the components, and these are subject to rounding error. The second reason stems from the way the real values for the exogenous values of government spending and exports were calculated. The OBE model calculates these values on the basis of exogenously supplied values for prices and current dollar values of the variables. As explained in footnote 19 of Chapter 1 (p. 16), this method of calculating the realized value will lead to a value slightly different from the one obtained by working with the real series when all realized values are calculated by adding the revised change to preliminary values.

The calculated error in Table 6.4 does not include the discrepancy in the values used for the exogenous variables, even though it would be part of the component approach to finding the error in constant dollar GNP if we wanted to arrive at an exact value.

Since income has been used as an explanatory variable in the consumption functions, the *SER* in income will cause an error in GNP through the impact multiplier. In the OBE model presented in Chapter 2, the marginal propensity to consume is 0.464. A 1 billion dollar error in disposable income will yield a direct error of 0.464 billion in GNP before taking the multiplier effect into account. However, the *SER* on the income side is much more difficult to trace back, because logarithmic and

exponential functions have often been used to define income elements. The endogenous components of disposable income are also listed in the decomposition of error tables. Of course, social security contributions (*SIP*) and personal taxes (*TPF* and *TPSL*) have negative signs, since they enter the income identity negatively.

The total wage bill (*W*) in the OBE model is also determined by an identity which includes several endogenous variables defined by a compound function. Therefore, the *SER* of *W* for the second quarter of 1968 is found by looking at the lagged *SER*s for the forecast made in the third quarter. This was 0.79 and is used as a proxy for the *SER* for *W*. It is a proxy for the desired value for two reasons: first, the data set for the third quarter is slightly different from that for the second quarter, and second, it does not include the effect of any adjustment due to the statistical discrepancy adjustment (see p. A36 in the appendix). After determining the *SER*, the *OTHER* error (3.85) is easily obtained by subtracting the *SER* from the total error in *W* in that quarter.

The endogenous variables enter the equations for proprietors' income (*PRI*) and dividend income (*DIV*) in a linear form. Thus, the *OTHER* errors of these two variables are calculated in the same way as for the other GNP components. The *SER*s are simply the difference between *TOTAL* and *OTHER* errors. Both of them are negative and relatively small. This method of calculation yields the desired value and is used wherever feasible because it does not involve the shortcomings of the proxy system used for *W* above.

The only endogenous variable in the identity of transfer payments (*TRP*) is the state employment insurance benefits (*TRU*). The equation for *TRU* is in logarithmic form. Fortunately, the *TOTAL* error in *TRU* is negligible. Therefore, we assume that the *OTHER* error of *TRP* is zero, which makes it possible to attribute the forecasting error of −0.24 to the *SER*.

In the personal contributions for social insurance (*SIP*) identity, only old age insurance (*TSSW*) is an endogenous variable. Since half of *TSSW* is contributed by employees, the *SER* of *SIP* is equal to half of the *SER* for *TSSW*, and, since the *TSSW* equation is in logarithmic form, the *SER* of *TSSW* (0.22) is merely approximated. Thus, the *SER* for *SIP* is obtained by cutting this approximate *SER* in half.

The federal and state and local personal taxes (*TPF* and *TPSL*) are functions of the same tax base. The three endogenous variables in this

base are labor income, proprietors' income, and dividends (*W*, *PRI*, and *DIV*). Summing the forecasting errors for these three variables and multiplying the sum by the appropriate parameters in the equations gives the *OTHER* error for *TPF* and *TPSL*—1.10 and 0.16. The *SER* is then obtained by subtracting the *OTHER* errors from *TOTAL* errors.

Since three of the seven income components are determined by identities, the exact constant adjustment used for each cannot be found. Therefore, we have to repeat the effort just described to find the accurate *SER* − *CON* for every adjustment forecast. It is obvious that the *SER*s on the income side are almost completely offset by each other. The total *SER* is only −0.02 for the *NO* case. This total *SER* of disposable income times the marginal propensity to consume (0.464) gives the net effect on GNP from the income side (−0.01). By adding up the net *SER* effects from the income side and the demand side, we obtain the total *SER* effect in GNP (−1.53). This *SER* effect produces additional effects on GNP through the multiplier. Since we did not have the resources to run simulations with the OBE model, we were not able to find the exact multipliers, and used multipliers found in another study as proxies.[4] The approximate multiplier for exogenous disturbances is 1.16. Therefore, the total *SER* effect will produce an additional 16 per cent error, or −0.24, in *GNP*. The total error in the real sector is the forecasting error in *GNP58* (−1.50) times the correct price deflator (1.21). or −1.82. Thus, the residual (−0.05) is the error not decomposed by our analysis.

The forecasting error in *GNP* comes from the errors in forecasting real GNP and prices. The direct error due to incorrect price forecasts is the product of error in the GNP price deflator and in constant dollar GNP. The error in the GNP price deflator is obtained by subtracting the ratio of realized *GNP* to realized *GNP58* from the ratio of forecast *GNP* to forecast *GNP58*. This error is 0.015. Multiplying it by the realized *GNP58* gives the total price effect of $3.47 billion. The error from the real sectors and the error from prices in the *NO* forecast carry opposite signs and therefore have an offsetting effect on each other; the total ex post error for GNP is only $1.65 billion.

The *OR* constant adjustments used for the GNP components are so

[4] See George Green, "Multiplier Paths and Business Cycles: A Simulation Approach," presented at the North American meetings of the Econometric Society, Evanston, Illinois, December 28, 1968.

well determined that they have greatly reduced the *SER − CON* in the consumption and investment sectors and produced a smaller total *SER − CON* in GNP. The *GG* constant adjustments are not as good as the *OR* adjustments in reducing the *SER − CON*s of the GNP components, but they have created offsetting errors. The offsetting effect of the *AR* constant adjustments is especially evident in total investment, but the *AR* adjustments yield a large total *SER − CON* in GNP because the offsetting effect does not extend to offsets among the sectors of the model.

It seems that none of the constant adjustment methods help in reducing the *SER* on the income side. The total *SER − CON* in disposable income is larger than it is for *NO* adjustment with the application of any set of constant adjustments. The total effects of *SER − CON* on GNP are −1.53, −2.69, −1.73, and −1.57 with respect to *NO*, *AR*, *GG*, and *OR* methods, respectively. The *AR* adjustment is inferior for this forecast, but the *OR* method produces a significantly larger undecomposed error (2.47). Since we know that the "error not decomposed" is mainly due to the *SER* of endogenous variables in other than product and income sectors, this indicates that the *OR* constant adjustments perform poorly for those variables. Nevertheless, this large positive error offsets the large negative error due to the total *SER − CON*, and generates a small positive error (0.65) in the real sector.

In the price sector the constant adjustments reduce the errors significantly. Good results are found when *AR* and *OR* adjustments are applied. The errors in prices for the four different methods are 3.47, −0.46, 2.25, and 0.91, respectively, for *NO*, *AR*, *GG*, and *OR*.

However, the size of the total error depends on offsetting among component errors as well as on the size of component errors. This offsetting effect reduces total ex post error for *GNP* in the *NO* and *GG* predictions.

In this forecast the total effect of judgmental error is quite substantial due to underestimation in all three categories of exogenous variables. The error made in policy variables is relatively small (−0.30), reverberating to a total error of −0.37 in *GNP*. The most severe error (−3.46) comes from the other exogenous variables. Total export has an error of −2.1, and housing expenditure (*CH*), of −0.46. The error in other exogenous variables is reinforced by another negative error of −1.79 from exogenous prices. Fortunately, the negative judgmental error is

partly offset by the positive total error in endogenous variables in the *NO*, *OR*, and *GG* forecasts. This brings the ex ante GNP errors for these three forecasts in line with each other. Nevertheless, the ex ante forecasting errors for the *AR* results are large and negative, since the errors in both the endogenous and exogenous sectors are negative. In this quarter, the absolute ex ante error for GNP is greater than the ex post error in absolute value in all four different forecasts.

This first quarter error decomposition can be compared with the Wharton results (Table 5.11). This comparison reveals that the similarity in the ex ante *OR* and *AR* errors for *GNP* (−4.08 versus −4.10 and −10.73 versus −9.34) is not reflected in similar ex post results where the *OR* error is 1.56 for OBE and −2.85 for Wharton. The *AR* values are −3.76 versus −9.53. The *NO* error in Wharton is much larger for disposable income and for the net foreign balance sectors, but the Wharton performance is superior for the consumption and investment sectors.

The Third Quarter, 1968 Forecast

The U.S. economy followed a fairly rapid growth pattern in the third quarter of 1968; total consumption rose $9.2 billion from its previous level, domestic investment increased $1.0 billion, and exports expanded $2.7 billion. GNP rose by 7.0 billion 1958 dollars, whereas the total GNP price deflator increased at a moderate 1.5 per cent annual rate.

In this quarter the OBE team used an anticipation version of the OBE model for forecasting. In Table 6.5, the ex post error in *GNP* is −15.44 if no constant adjustments are used. This large, negative error is due to simultaneous underestimation in both the real sector and prices. In the real sector, the large structural equation residuals came mainly from the product side. The total of the *SER*s for the GNP components in terms of current dollars is −8.38. After reinforcement by the effect of −3.41 from the income side, there is a total *SER* effect of −9.96. In the GNP components, the large *SER*s are found in auto and nondurables consumption (*CA* and *CN*). If single equations had been used during this quarter the OBE model would have underestimated the fast increase in automobile consumption by $7.16 billion (1958 dollars) and overestimated the growth of nondurables consumption by $3.89 billion (1958 dollars). This indicates that consumers changed

their consumption pattern from nondurables to automobiles. The effect of this shift is not fully reflected in the total consumption error because of error cancellation. Although the tax surcharge took effect in this quarter, reducing the growth of disposable income, it was evidently not reflected in reduced consumption of automobiles. (This underestimate of consumption also occurs in the Wharton forecast, as shown in Table 5.12.) The negative total price effect indicates that the general price level was rising faster than expected.

Errors from all sectors, excluding the errors not decomposed, were substantially reduced by constant adjustments. In general, the *OR* adjustments improved the forecast over the *NO* adjustment case by reducing the ex post error in *GNP* to −8.61. The *AR* result is very similar to that for *OR*, and the *GG* error is relatively bigger. However, the *AR* forecast has the largest error not decomposed.

The ex ante forecasts in this quarter are generally about the same as the ex post forecasts (Table 6.5), as the positive error caused by the exogenous prices nearly counterbalances the small errors made in policy and other exogenous variables. The discrepancies generated by the nonlinearity of the model are not significant in the *AR* and *GG* results, but noticeable—at 0.43—in the *OR* result. This surprisingly large difference is about equal to the nonlinear effect for the Wharton model (5.12).

The Wharton and OBE first quarter forecasts for the third quarter of 1968 show striking similarities. Both models, whether adjusted or not, have large negative *SERs* in the consumption sectors, causing an underestimate of GNP. There is strong evidence that consumers did not respond to the temporary surtax as they had in the past to tax changes regarded as permanent.

The Fourth Quarter, 1968 Forecast

Here the OBE forecasting team switched back to the version of their model that had treated total investment in plant and equipment as an endogenous variable for forecasting. Thus, nonresidential fixed investment (*ISE*) was again completely determined by predetermined variables. The inventory equations used for the model split the total inventory change into two parts: automobile (*IIA*) and nonautomobile (*IINA*).

In this quarter the demand for all consumer goods was declining,

and so were exports and imports. However, current dollar GNP increased by 16.1 billion because of the fast expansion in investment and government expenditures. Total investment in plant and equipment rose $2.72 billion, and inventory accumulated at a rate of $10.5 billion per year. State and local government expenditures advanced a formidable $3.1 billion, while federal government expenditure increased by $0.9 billion.

The model underestimated all of the fast-growing sectors and significantly overestimated the consumption and import sectors. There was an ex post error of −7.33 in *GNP* where no constant adjustments were used. Among the individual structural equation residuals, large values were found in auto and nondurables consumption, nonresidential fixed investment, and imports (*CA*, *CN*, *ISE*, and *IMT*). The *SER* in disposable income was also relatively small and positive. The *SER*s in the income and demand sectors together had an effect of −5.03 before reverberating through the model. This effect, as well as the error not decomposed (1.98), and the price effect (−3.48) generated a −7.33 error in *GNP*.

All three types of constant adjustments improved the forecasting ability of the model. The most significant improvement was found in the *OR* results. The *AR* and *GG* results were similar, except for the price error, where the *AR* adjustments proved better, and the error in the real sectors, where the *GG* adjustments showed better results.

Among exogenous variables, a large error was found in policy variables. The OBE forecasters misjudged government expenditures by −1.4, and transfer payments, by −1.0. These judgmental errors alone generated a −2.93 error in the ex ante forecast of *GNP*. The error made in the other exogenous variables almost offsets the error in the exogenous prices. Therefore, the ex ante error in *GNP* is −10.30 in the *NO* forecast. The Wharton *NO* error (Table 5.12) is larger than OBE, as usual. The *OR* ex post results for *GNP* are similar (−2.93 for OBE versus −3.53 for Wharton), but the *OR* ex ante results for *GNP* are different (−6.03 for OBE versus −2.80 for Wharton). It is interesting to note that the incorrect guesses in the exogenous variables came from different sources in the forecasts.

The First Quarter, 1969 Forecast

In this quarter the general economy was still on a fast growth

course, but moved at a decreasing growth rate. Gross national product in dollars increased at the same annual rate (16.2) as in the last quarter, but real GNP rose at a slower rate, producing a faster rise in the price level. This occurred mainly because the prices of housing investment and fixed investment went up rapidly. Housing investment gained half a billion dollars compared with the previous quarter, while fixed investment advanced $2.1 billion, to a level of $79.4 billion. The moderate increase in consumer prices was associated with a $5.3 billion increase in consumption even though disposable income rose only $5.9 billion. Large increases were found in expenditures on durables other than autos and on nondurables (*COD* and *CN*). Foreign trade activities declined sharply in this quarter due to a dock strike, with both exports and imports down over 3 billion dollars from the previous quarter. In the government sector, there was a $0.3 billion cut in the federal budget. However, state and local government expenses increased by $3.7 billion.

In the forecast made in the first quarter of 1969, the anticipation version of investment was used for the first quarter forecast. The model performed well without constant adjustments in general, but would have underestimated auto consumption (*CA*) by 5.5 billion dollars and overestimated nondurables consumption (*CN*) by 5.7 billion if no constant adjustments had been used. In addition, it failed to predict the decrease in inventory change. The total *SER* effect in current dollars in the GNP components was only 2.77. For three equations—auto consumption, nondurables consumption, and change in nonauto inventory investment (*CA*, *CN*, and *IINA*)—the *OR* constant adjustments reduced the structural equation residuals substantially and led to better forecasts. However, this set of adjustments overadjusted the import sector and reduced the opportunity to offset some of the negative *SER* − *CON*s in GNP components. Therefore, the total *SER* − *CON* effect rose to −3.60 in the *OR* results. The mechanical adjustments did not perform as well as the *OR* adjustments in the individual equations, but significantly reduced the *SER* − *CON* for GNP as a whole.

On the income side, there is a large negative *SER* in the components of the wage identity, but it is partially offset by other positive *SER*s. The effect of the *SER*s from the income side, after they are adjusted by the marginal propensity to consume, is only −0.31. All constant adjustments, except the *AR* adjustment, reduce the *SER*s.

However, offsetting is also increased by the *AR* adjustments. The total effects due to *SER* − *CON*s are 2.66, −0.26, 0.20, and −4.41 with respect to four different sets of adjustments. The errors in the real sector which cannot be traced back to their origins are quite small.

The judgmental errors made in policy variables are relatively large. The error in government expenditures (−1.1) and in transfer payments (−0.8) reverberate to a total of −2.31. The largest error occurs in the other exogenous variables, caused by the forecaster's incorrect guess that exports would increase by $0.6 billion, when they actually decreased by $3.0 billion (due to an unforeseen dock strike during this quarter). The import equations also reflect this in the adjusted forecasts, as do the import and export functions in the Wharton model (Table 5.14). Errors in other nonpolicy exogenous variables are responsible for a total induced error of 7.45 from the nonpolicy exogenous variables, but this is offset by an error in exogenous prices, leaving a net induced error of 3.58 due to the bad guesses on the exogenous variables. Since this net error is about equal to the net error in the import equations and both can be ascribed to the dock strike, this may explain why the ex ante *OR* forecast is superior to the ex post *OR* forecast in this case. The same explanation for the superior *OR* ex ante forecast for Wharton (Table 5.14) would not be valid because there both exports and imports are determined endogenously. It is interesting to note that the substantial negative *SER*s in the Wharton consumption and investment equations (Table 5.14) do not occur in the corresponding OBE equations.

The Second Quarter, 1969 Forecast

Symptoms of the so-called "growth recession" of 1970 first appeared in the second quarter of 1969. Current dollar GNP increased another 16 billion, but constant dollar GNP advanced only 3.6 billion. Prices in the private sector moved up 1.6 per cent, with large increases in services, nondurables, imports, and nonresidential structures (*PS*, *PN*, *PIM*, and *PIS*). High prices were accompanied by a lack of increase in the consumption sector. Total consumption climbed $4.0 billion, while disposable income went up $11.8 billion.

In the investment sector, housing investment started to fall, inventory change was negligible, and total fixed investment increased very slowly. In the foreign sector, after the strike slump, exports

increased 9.5 billion dollars and imports increased 8.6 billion. Government expenditures in constant dollars fell by 0.4 billion as a result of the reduction in the federal budget.

In the second quarter, 1969 forecast, the structural equation residuals for auto and nondurables consumption (*CA* and *CN*) are large, but they have different signs. The endogenous equation for fixed investment (*ISE*) generates a huge *SER* (−8.9). However, since the rapid gain in imports in this quarter was missed by the model, and import error entered the GNP error with a negative sign, this offset the negative *SER* of *ISE*. Total *SER* on the product side was only 3.15. The *OR* method did very well in reducing the total *SER* even though it failed to capture the large *SER* in nondurables expenditure (*CN*), since a wrong adjustment of durables expenditure (*CD*) offset the *SER* of *CN* in the consumption sector. In the import sector, the *AR* and *GG* adjustments would obviously not reduce the *SER* because the mechanical adjustments are based on the *SER*s in the two previous quarters. Since the sudden increase in imports was due to the end of the dock strike, it left no clues in the previous residuals. The *GG* adjustment also missed the *SER* of *ISE*, but provided better offsets among *SER*s.

The total *SER* on the income side is not really large; it was reduced by the mechanical adjustments but not the *OR* adjustments. Nevertheless, the error not decomposed is larger when constant adjustments are used than in the no adjustment case. The errors in the real sector with respect to the four forecasts are 2.60, 7.03, 6.11, and −0.09. In the price sector, the model, even with the subjective adjustments, again underestimated the increase in prices in this quarter. The *AR* method overadjusted for the price error, since price had been underestimated consistently for three quarters.

The judgmental errors in the exogenous variables are not serious in this forecast. In policy variables set, the OBE forecasters underestimated transfer payments by $1.3 billion and overestimated government expenditures by $0.2 billion, generating a negative error of −1.34 in GNP as a whole after reverberation through the system. The judgmental errors made in other exogenous variables were 2.70, causing a $3.30 billion error in GNP. In predicting exogenous prices, the OBE group did very well: the total error in price is only −0.2. The sum of total judgmental error is 1.76. This offsets the negative export error in the *NO* and *OR* forecasts but reinforces the positive

ex post error in the *AR* and *GG* forecasts. Therefore, the ex ante errors are smaller than the ex post errors in the *NO* and *OR* forecasts, but not in the *AR* and *GG* forecasts.

The ex post *OR* errors for Wharton and OBE are nearly the same: −1.93 and −2.64, respectively. In both cases the error not decomposed and the *SER*s in individual sectors (excluding the consumption and disposable income sectors) have the same signs. The *NO* adjustment error for Wharton is larger than for OBE. This is due to Wharton's sizable negative errors in the consumption sector, as well as the smaller offsetting error in the imports sector.

The Third Quarter, 1969 Forecast

Economic expansion came to a halt in the third quarter of 1969. Gross national product continued growing at a rate of $18.0 billion per year owing to price increases. However, real consumption and overall investment increased only $0.5 billion, and total government expenditures actually decreased $0.8 billion from the level of the previous quarter. Business inventories rose at an annual rate of $9.3 billion.

During this slow growth period the constant dollar gross national product was overestimated by the model. The sum of the single equation residuals for GNP is 5.78, and it is equal to 7.46 in current dollars (see Table 6.9). However, the model underestimated the income variables. The total *SER* of disposable income had an effect of −2.57 on total GNP. After offsets from the product side, the total effect of the *SER*s after reverberation was 5.17. Different constant adjustments did reduce the *SER* on both the product and the income side, the *OR* adjustments proving superior to the mechanical adjustments.

The model also underestimated the endogenous price sector. This underestimation was reduced by the constant adjustments. Due to the lack of cancellation, the *AR* and *GG* results are worse than that of *NO*. The *OR* result is superior to the other three.

The upward judgmental error in policy variables is due mainly to the overestimation of local and state government expenditures. The downward judgmental error in other exogenous variables stems from the −2.7 error made in exports. The forecasters also underpredicted the growth in

exogenous price. On the whole, only the *OR* constant adjustment has significantly reduced the ex ante error of *GNP*.

All of the first quarter OBE forecasts made in the third quarter of 1969 were superior to their Wharton counterparts (Table 5.16). The superior OBE performance can be traced primarily to the investment sector, especially the inventory equations within that sector. Here the OBE errors amount to only a fraction of the underestimates by Wharton.

6.3 FOUR-QUARTER FORECASTS

Our procedure in isolating the error due to incorrectly predicted values for the lagged variables in multiperiod forecasts is similar to that used in Chapter 5. However, model changes were more frequent at OBE than at Wharton and therefore contributed more to the difference between any two forecasts of the same quarter than they did in the case of Wharton.

The charts for multiperiod forecasts—Charts 6.1–6.7 (pp. 329–335)—cover all of the forecasts from the second quarter of 1967 to the fourth quarter of 1968. The charts, arranged like those in Chapter 5, show the *NO*, *AR*, and *OR* ex post forecasts for nine variables, the actual time path for each variable, and the naive I forecasts, which are presented for comparison.

The first four charts illustrate the performance of the multiperiod forecasts made from the second quarter of 1967 through the first quarter of 1968. A detailed analysis of these four forecasts is omitted because we do not have the decomposition of the first quarter forecasting error tables covering this period. In general, the model forecasts performed relatively well for GNP, consumption, and income in these first four forecasts. Since consumption is the largest element of GNP, and disposable income determines consumption, there are some similarities in the time paths for each forecast of these variables. The forecast values produced by using different constant adjustments show some similarities. In general, the *NO* forecast has the highest values and the *OR* forecast, the lowest. The accumulation of lag effects is not significant in the forecasts for GNP, consumption, and disposable income. The forecasting errors in the third and fourth quarters are not necessarily larger than those in the first and second quarters. There are two

possibilities: one, that the effect of lags are not significant, and two, that it is possible that the effect of lags offset a part of the error from other sources.

None of the methods produce good predictions for investment variables. There is no resemblance among the time paths of the three different adjustment forecasts for total investment, mainly because none of the three captured the turning points in inventory change and plant and equipment investment. However, there is no significant error accumulation in the investment variables that can be traced to the effect of lags. The balance of foreign trade is the difference between imports and exports, the latter treated as exogenous to the system. The four-quarter OBE predictions of import variation are not very successful. This may be the reason why the sectors on inventory change, plant and equipment investment, and imports were often revised during this period.

We can compare the Wharton and OBE forecasts for the second quarter of 1967 by looking at the two relevant charts—Chart 5.4 for Wharton and Chart 6.1 for OBE. We see that both models tracked *GNP58* fairly well. The Wharton *NO* forecast is the only exception in the first quarter where the persistent underestimate of disposable income shows up. In the investment sector, the model forecasts correspond more to each other than to the realized data. In the third quarter, 1967 forecasts (Charts 5.5 and 6.2, respectively), the predictions for *GNP*, *GNP58*, and consumption are good. However, both models miss the downturn in inventory accumulation (in the first quarter of 1968) and in fixed investment (in the second quarter of 1968). The fourth quarter, 1967 forecast (Charts 5.6 and 6.3, respectively) again reveals a similarity in the behavior of the two models, except for the fourth quarter forecast of inventory accumulation, where Wharton shows a steep decline not predicted in the OBE forecast. The first quarter, 1968 forecast (Charts 5.7 and 6.4) shows this difference in the prediction of inventory change once again, but this time it has, of course, moved to the third quarter. This causes an erroneous prediction by the Wharton model of a sharp downturn in the last part of 1968, compared with an only moderately incorrect forecast by the OBE model of a small dip, during this period of continued expansion in the economy.

The Second Quarter, 1968 Forecast

The time shapes of the multiperiod forecasts generated by the *OR*, *AR*, and *NO* methods in the second quarter of 1968 are shown in Chart

6.5. While it is quite obvious that the forecasting errors increase as the forecast gets longer, we are unable to judge just how large the effects of the lags are by looking at the diagram. In general, the model underestimated the growth of the economy. All of the forecasts predicted a downturn in GNP in the third quarter of forecast (or the first quarter of 1969), while the actual gross national product continued growing rapidly. The *OR* and *AR* methods forecast the first quarter's consumption expenditures quite successfully, but failed to capture the rapid growth in the first quarter of 1969, predicting a decline instead. The *NO* forecast started too high in the first quarter of forecast for consumption, and this overestimate moderated the error in the following quarters. The fast growth of disposable personal income (*DPI*) was not forecast well by any predictions in the second and third quarters of forecast. All three forecasts predicted a downward turning point in the fourth quarter, when income was actually moving upward. All forecasts performed very poorly for the three investment components. They failed to predict the fluctuations in inventory changes, and completely missed the rapid growth in nonresidential fixed investment (*ISE$*). As a result, the third and fourth quarter forecasts of total investment were off track. The forecast of imports was close in the first three quarters, but the upward turning point in the fourth quarter was missed.

In order to detect the lag effect, the two-quarters-ahead forecast made in this quarter is compared with the first quarter forecast made in the third quarter of 1968. The three-quarters-ahead forecast is compared with the first quarter forecast made in the fourth quarter of 1968, and the four-quarters-ahead forecast is compared with the first quarter forecast made in the first quarter of 1969. The differences between these ex post forecasts are listed in Table 6.10.

The incorrect lags in the two-quarters-ahead forecast did not hurt the forecast performance of the second quarter, 1968 model. Their effect increased the forecast error for *ISE* by -1.73 in the *NO* forecast, but improved the average accuracy in the consumption sector. The huge positive effect of lags on disposable income (6.66) should have caused the errors in the consumption sector to show a positive tendency. However, the value that appears in the column on the effect of lags for nondurables consumption expenditure (*CN*) is -2.72. This is due to a substantial downward data revision of the *CN* series in July 1968. The overall effect of incorrect lags reduced the error in *GNP58* by 0.96.

The effect of lags in the *OR* forecast was to improve the forecasting performance of the model in general. The positive effect of lags in disposable income generated positive effects in most consumption components. The small negative effect in auto expenditures (*CA*) is probably a result of data revision of other determinants of *CA*. The total effect on *GNP58* offset the forecasting error by 3.14.

The effect of lags in the *GG* forecast is not really very significant as far as the GNP error is concerned. The forecasts in the consumption sector are improved but those in the investment sector impaired by the effect of lags. The overall effect on GNP after offsetting is only 0.72, and the effect on disposable income is only 1.83. The *AR* forecast is damaged by the incorrect lags and the continuing constant adjustments.

Consumption behavior in the third quarter of 1968 is predicted better by this second quarter forecast via *OR*, *NO*, and *GG* methods than by the same methods in the forecasts actually made in the third quarter because the effect of lags in these three predictions creates an error that offsets a part of forecasting error from other sources.

The effects of lags in the prediction for three quarters ahead made in the second quarter, 1968 forecast are shown in the center part of Table 6.10. They represent the cumulated effects of the errors made in the first two quarters of forecasting. It is evident in Table 6.10 that the effects of these lags in the consumption sector, except *CN*, are smaller than those in the second quarter of this forecast where no constant adjustments were used. It is likely that there were offsetting effects of incorrect lags from the first to the second quarter, which, however, disappeared when constant adjustments were used. In the investment sector, the lag effects are cumulative. The *OR* adjustment reduces the lag effect in *IH* and *ISE*, but the effects of lags are bigger if the *AR* adjustment is used. Since all lag effects are negative, the total effect due to lags in GNP is -13.00. This negative error reinforced the negative error due to the *SER*s in the second quarter, 1968 forecast.

In general, all variables, except those in the consumption sector, were underestimated in the three-quarters-ahead forecast, which generated negative effects for lags in the four-quarters-ahead forecast. As a result, the underestimation was even more serious in the four-quarters-ahead forecast. The effect of incorrect lags built up to -37.76 in the *NO* forecast. The *OR* adjustment reduced the lag effects slightly, but the *AR*

adjustment increased them significantly. In most variables, the effects of lags in the *GG* forecast were similar to those in the *NO* forecast.

The Wharton *OR* and *AR* forecasts (Chart 5.8) made in the second quarter of 1968 are inferior to the OBE forecasts in the second quarter of forecast, but show an upturn later that makes them superior to the OBE forecast by the fourth quarter. The main difference in the forecast is that the Wharton model predicts the deceleration of the rate of inventory accumulation two quarters earlier than OBE. By the third and fourth quarters, Wharton shows accumulation at about the same rate as that of OBE, but for Wharton it is on the upgrade, whereas it is declining for OBE.

The differences between the ex ante and ex post OBE predictions are caused by the incorrect values for the exogenous variables. The effects of these differences are shown in the last column of Table 6.10. The OBE forecasters underpredicted exogenous variables in the last two quarters. While this increased the second quarter errors, the overprediction in the later quarters offset model errors and made the ex ante forecast error smaller than the ex post error.

The Third Quarter, 1968 Forecast

The multiperiod forecast made in this quarter was designed to predict the path of the economy in the two last quarters of 1968 and the first two quarters of 1969. Chart 6.6 shows that it was not very accurate. Generally speaking, the U.S. economy moved ahead very rapidly during these four quarters. Underestimation in the forecast, found in most variables, started in the first quarter of forecast and became more serious as the forecasting period went on due to a snowballing effect in the multiperiod forecast through lags. The underestimation of the first quarter was mainly due to the negative *SER* – *CON*s shown in Table 6.5. The model predicted a smooth declining path over this year, when most variables were moving up. A false downward turning point was predicted in the noninvestment variables by all model forecasts in the third quarter. In the investment sector, the growth trend of every variable was predicted in the opposite direction of the actual outcome, with none of the forecast values even close to the actual values after the first forecast. The constant adjustments, however, were made in the correct direction, and the *OR* and *AR* forecasts were closer to

reality than the *NO* forecast but still far from successful.

Looking at Table 6.11, it is obvious that the failure of the multiperiod forecast was caused by the cumulated negative effect of lags. This accumulation moved at a faster rate in the second and third quarters than in the fourth quarter. In the second and third quarters of forecast, all constant adjustments reduced the effects of lags in *GNP*, *GNP58*, and disposable income (*DI$*); in the fourth quarter, only the *OR* adjustment reduced the lag effects in these variables.

The errors contributed by the incorrect values of the exogenous variables were positive for all types of adjustments. They offset the negative errors from the incorrect lags in the model and improved the ex ante forecasts.

A glance at the Wharton ex post forecast for the comparable quarter (Chart 5.9) reveals the same underprediction of *GNP* and *GNP58* that we find in the OBE prediction. While the forecasts for consumption are too low in both models, only the OBE forecast shows a steep decline in the investment sector. This underprediction of investment, combined with the other underestimates, explains OBE's forecast of a serious recession, in contrast to the slight dip in *GNP58* predicted by Wharton. Thus, in this period of continued economic expansion, the Wharton performance was superior to the OBE record.

The Fourth Quarter, 1968 Forecast

On the whole, this multiperiod forecast, although still too low, made better predictions than those of the two previous quarters. The model missed the fast growth in GNP and *C$* in the second quarter of forecast, but recaptured their growth trends in the third and fourth quarters, as shown in Chart 6.7. The forecasts of *GNP58* were very poor; the false turning point predicted for the second quarter forced the forecast trend away from the actual one. It is obvious from this diagram that the forecasting errors in residential investment and disposable income (*IH$* and *DPI$*) were due mostly to consistent bias. While the path of the forecasts have the appropriate shape, they are all below the actual values.

The *OR* method gives the highest forecast values for most variables, while the *NO* method yields the lowest values. Learning from the experience of underestimation in the past several quarters, the OBE team was able to use the *OR* adjustments in an appropriate direction. The *AR*

results were also better than the *NO* results, because the negative *SER*s in the two previous forecasts generated positive constant adjustments in this quarter that shifted all forecasts upward.

Table 6.12 shows that the lag errors in all constant dollar variables were not cumulative in this multiperiod forecast. Instead, the effect of lags in most of the variables was smaller in the third quarter of forecast than in the second quarter. However, the effects of lags in *GNP* and *DI$* were accumulating as the forecasting quarters wore on, leading us to suspect that serious lag effects exist in the price sector.

The effects of lags in all variables were considerably reduced by using the *OR* adjustment, but the *AR* and *GG* adjustments did not perform very well. The *AR* method has a tendency to generate large lag effects in *GNP* and *DI$* as the forecasting period lengthens, although the *AR* forecast has the least price effect in the first quarter.

Most of the effects due to judgmental errors in the exogenous variables were positive and small in this forcast. They offset a part of the negative errors in ex post forecasts and improved the performance of the ex ante forecasts.

The Wharton and OBE forecasts of the fourth quarter, 1968 are quite similar (Charts 5.10 and 6.7, respectively). Both err in showing a slight dip in economic activity in the first two quarters of forecast, but then show a resumption of growth for the last quarters.

The First Quarter, 1969 Forecast (Three Quarters)

The multiperiod forecast made in the first quarter of 1969 is carried for only three quarters in this study. Forecasts of *GNP*, *GNP58*, *C$*, and *DI$* were quite accurate (Table 6.13). They captured the upward trend in nonresidential fixed investment (*ISE$*), but the *AR* and *NO* forecasts started at a lower point in the first quarter of forecast due to the effects of the *SER* – *CON*s. In residential investment (*IH$*), the slightly declining trend was mistakenly predicted as a slightly increasing trend. However, the effects of underestimation in the first quarter reduced the forecasting error in succeeding quarters. The forecasting errors in inventory change were large, and can be attributed to the structural equation residuals. As to the strange behavior of the forecasts on imports, we cannot determine the sources of those errors.

Table 6.13 shows that the effects of lags were not serious in this multiperiod forecast. The large lag effect in *ISE$* (7.78) helped to offset the error from other sources and was not carried to the next quarter. The effects of lags in *GNP* and *DI$* were all negative, probably because of the large negative price effect in the first quarter. The Wharton forecast (Table 5.27) paralleled the OBE forcast for all sectors except fixed investment, where Wharton incorrectly predicted a decline in the second and third quarters of forecast.

The lag effects of the judgmental errors made in exogenous variables were not large. Since they offset the errors in ex post forecasts, the errors in ex ante are slightly smaller than those in the ex post forecasts.

The Second Quarter, 1969 Forecast (Two Quarters)

It is quite difficult to evaluate the performance of the multiperiod forecast made in this quarter, since the forecast is cut off at the third quarter of forecast in our study. Table 6.14 shows that the trends in most major variables are correctly predicted. However, the second quarter forecasts of inventory changes contain large errors. These errors can be attributed mainly to the lag effects, since the first quarter forecasts are quite accurate. The largest error exists in the imports forecast, reflecting the cessation of the first quarter's dock strike.

The effects of lags in the second quarter forecasts are presented in Table 6.14. It is apparent that the lag effects in the investment sector were much larger than those in the consumption sector. In general, the constant adjustments reduced the effects of lags.

The errors due to bad guesses in the exogenous variables were relatively small, and most of them offset other errors in the ex post forecasts. Therefore, the ex ante forecasts were slightly better than the ex post forecasts. The Wharton ex post prediction (Table 5.28) is similar to the OBE forecast, except for the repetition of the incorrectly predicted dip in fixed investment we saw in Wharton's first quarter, 1969 forecast.

6.4 DECOMPOSITION OF FIRST PERIOD AND MULTIPERIOD ERROR: GENERALIZATIONS

The error decomposition presented above has traced the forecast errors back to their sources for the OBE model forecasts from the second

quarter of 1968 through the third quarter of 1969. This analysis enables us to make a number of observations.

To determine the sector of the model primarily responsible for the errors, one should first investigate the structural equation residuals. The automobile consumption function shows large negative structural equation residuals, while the nondurables consumption function shows large positive structural equation residuals from the third quarter of 1968 through the third quarter of 1969. This indicates a structural change in the economy. Consumers changed their consumption pattern by shifting from nondurables to automobiles. We know that the surcharge on income taxes was instituted in the third quarter of 1968, but it is difficult to explain why the surtax should have shifted consumer expenditures from *CN* to *CA*. It is clear, nevertheless, that the structures of these two equations in the OBE model were not appropriate after that quarter.

The constant adjustment is mainly used to counterbalance the *SER*. The perfect way to determine the constant adjustment would be to set it equal to the *SER*. Since, unfortunately, the *SER*s of the equations in the forecasting quarter are unknown, a forecast of the future *SER* is used as a constant adjustment. The smaller the difference that prevails ex post between the constant adjustment (the predicted *SER* without adjustment) and the *SER* for the *NO* adjustment equation, the better the forecast. The consistent over- and underestimation in the *CN* and *CA* variables enabled the OBE model builders to estimate the *OR* adjustments relatively successfully. On the other hand, the *AR* adjustment, which uses the average of two previous *SER*s to adjust the *SER* in the current forecast, also performed well during the first three quarters of 1969. The *GG* adjustment, which uses the previous *SER* weighted by the serial correlation coefficients of the equation to adjust the current *SER*, did not perform as well as the *AR* adjustment, because the serial correlation coefficients in these two equations are not very large.

Fortunately, the large *SER*s in the *CA* and *CN* equations carry opposite signs and tend to cancel each other. Therefore, their net effect on total consumption is very small. The forecasting errors in the consumption sector stem mainly from *SER*s, which were significantly reduced by the use of constant adjustments in the forecast period we observed.

The *SER* of the plant and equipment investment equation is large

whenever the endogenous version of nonresidential fixed investment (*ISE*) is used for the OBE model. This leads us to suspect that the specification of this equation is invalid. A large *SER* is also found in the inventory change equation, even though the equation has been revised several times. This large *SER* has different signs in different quarters, indicating that the *SER* of inventory changes has a large variance. Therefore, none of the constant adjustments can be very successful in improving performance. The sum of *SER*s in total investment is very large in the second and fourth quarters of 1968 and in the second quarter of 1969 because there is little offsetting among the investment component errors. However, all types of constant adjustments reduce the *SER* − *CON*s to a certain extent during these three quarters.

From the second quarter of 1968 through the third quarter of 1969 the *SER*s in the equation for merchandise imports are also large and positive. The specification of this equation should be examined.

On the income side, the *SER* of the wage bill equation becomes large and is negative after the third quarter of 1968. This means that the model consistently underestimates the wage bill. Since wages are the product of the wage rate and employment, and both are determined by stochastic equations, the goodness of fit of these two equations could be inspected. However, this task in not of primary urgency because the errors in GNP come mainly from the *SER*s in the components of GNP, and the effects of the *SER*s from the income side are relatively insignificant.

Since the third quarter of 1968, the price effects have been negative where no constant adjustments are used due to the start of a serious inflation at that point. All constant adjustments reduce price error quite efficiently. Among them, the *AR* adjustments perform best. According to these empirical findings, it is evident that the price sector in the OBE model has not succeeded in capturing the fast growth path of inflation since the third quarter of 1968. Perhaps the equations in this sector should be restructured as an alternative to the reliance on constant adjustments.

The errors not decomposed in these five forecasts are relatively small. None of the constant adjustments function very well in reducing this type of error. We are unable to isolate their sources. (Possibly the error may be caused by any of the factors we have not included in our decomposition; see page 141.)

The ex post error in GNP comes from two different sources: the *SER*s in the real sector and the *SER*s in the price sector. The error in GNP is affected by both the size of these errors and the extent of offsets between them. The large ex post errors of GNP in the third and fourth quarters of 1968 are due to simultaneous underprediction in both the real and price sectors.

The difference between ex ante and ex post forecasts is due to judgmental errors about exogenous variables. If the effect of judgmental error offsets the ex post error, the ex ante forecast is better than the ex post forecast; conversely, of course, if the effect of judgmental error reinforces the ex post error, the ex ante is worse than the ex post forecast. In a period of rapid expansion, both the model and the forecasters may underpredict the economy's growth. This is what happened in the period from the second through the fourth quarter of 1968. Noticing the underprediction in the past several quarters, the model forecasters may overestimate the exogenous variables in order to compensate for the underprediction made by the model. This would explain why the ex ante forecasts generated by the *OR* and *NO* methods in the first two quarters of 1969 are better than the ex post forecasts. The superiority of the first quarter's ex ante over the ex post forecast might also be explained by the dock strike, which reduced the ex post exogenous value while the strike-induced underprediction remained in the import equation.

In the multiperiod forecasts discussed above, the effects of lags do not show a pronounced tendency to accumulate over the forecasting period. However, a large error in the first quarter tends to generate large lag effects in the subsequent quarters. Sometimes the effect of errors in lags may offset a part of other errors. In general, constant adjustments reduce the lag effects in the forecasts examined here. In the first four forecasts beginning with the second quarter of 1967, the *NO* results have the largest forecast values for most of the variables. This means that the constant adjustments have shifted the forecasting trend downward. However, from the second quarter of 1968 through the third quarter of 1969 the constant adjustments shift the forecasting trend upward. Therefore, the *NO* results have the lowest forecast values for this later period.

GLOSSARY OF SYMBOLS FOR THE OBE TABLES

Note: Figures are in billions of dollars unless otherwise noted.

C	Personal consumption expenditures
CA	Personal consumption expenditures, autos and parts
CD	Personal consumption expenditures, durables other than autos and parts
CN	Personal consumption expenditures, housing
CS	Personal consumption expenditures, services except housing
DI	Personal disposable income
DIV	Dividends
IH	Fixed investment, residential structures
IIA	Change in auto inventory, domestic new cars
IINA	Change in nonauto inventory
IMS	Imports, other nonmilitary (mainly services)
IMT	Imports, merchandise
ISE	Fixed investment, nonresidential
NFB	Net foreign balance
PRI	Proprietors' income
SIP	Social insurance, personal contributions
TPF	Personal tax and nontax payments, federal
TPSL	Personal tax and nontax payments, state and local
UNRATE	Unemployment rate, per cent
W	Wages and salaries plus other labor income

TABLE

GNP in Current Dollars, Forecasts

Date of Forecast	OR		AR		GG	
	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error
	First Quarter of Forecast					
2nd Q 1967	0.60	0.80	6.00	6.30	2.40	2.70
3rd Q 1967	−5.60	0.30	−4.50	1.30	−0.20	5.70
4th Q 1967	−3.80	−1.20	−6.40	−3.40	2.40	5.60
1st Q 1968	7.90	0.90	4.60	−2.40	7.80	0.90
2nd Q 1968	1.60	−4.10	−3.80	−9.30	0.80	−4.80
3rd Q 1968	−8.60	−7.80	−9.10	−8.70	−11.70	−11.40
4th Q 1968	−6.00	−2.70	−8.00	−5.10	−9.40	−4.50
1st Q 1969	−6.40	−2.80	−2.20	1.50	−2.80	0.80
2nd Q 1969	−2.60	−0.50	7.90	9.80	4.40	6.60
3rd Q 1969	0.40	−0.10	4.00	3.50	−3.90	−4.30
AAFE	4.35	2.12	5.65	5.13	4.58	4.73
	Second Quarter of Forecast					
2nd Q 1967	−6.40	−1.40	−0.50	4.30	−1.60	3.40
3rd Q 1967	−9.90	4.70	−7.70	6.70	1.00	15.80
4th Q 1967	8.30	2.80	−4.20	−8.50	10.10	6.00
1st Q 1968	−0.70	−14.60	1.30	−12.70	5.90	−8.10
2nd Q 1968	−2.80	−8.10	−13.40	−18.70	−5.00	−10.40
3rd Q 1968	−21.40	−15.80	−26.80	−22.30	−29.30	−24.80
4th Q 1968	−18.70	−11.90	−22.80	−15.70	−25.60	−17.60
1st Q 1969	−4.80	−7.50	2.20	−0.50	−2.10	−6.50
2nd Q 1969	−5.80	−3.60	13.00	14.60	−2.70	−0.40
AAFE	8.76	7.82	10.21	11.56	9.26	10.33

6.1

versus Realization for OBE

NO					
Ex Post Error	Ex Ante Error	Naive 1 Error	Autoregr. Error	Naive 2 Error	Realized Data
		First Quarter of Forecast			
3.50	3.80	−9.00	1.62	−5.20	773.30
5.40	11.40	−16.90	−2.97	−7.90	792.00
9.30	12.80	−15.70	3.33	1.20	805.90
13.50	5.30	−19.20	−1.71	−3.50	826.50
1.70	−4.00	−23.40	−5.14	−4.20	850.70
−15.40	−15.10	−17.70	2.86	5.70	868.70
−10.30	−7.30	−16.10	1.64	1.60	887.10
−2.40	1.20	−16.20	0.90	−0.10	903.80
−2.10	−0.30	−16.10	2.45	0.10	919.50
−0.80	−1.40	−18.00	1.15	−1.90	942.80
6.44	6.26	16.83	2.38	3.14	
		Second Quarter of Forecast			
−1.50	3.40	−25.90	−0.62	−18.30	790.20
9.10	24.10	−32.60	−0.97	−14.60	807.70
19.60	16.00	−34.90	3.10	−1.10	825.10
13.00	−2.90	−42.60	−7.62	−11.20	849.90
−5.70	−11.10	−41.10	−4.58	−2.70	868.40
−33.00	−28.40	−33.80	5.79	13.00	884.80
−26.30	−20.00	−32.30	3.28	3.10	903.30
−3.30	−6.20	−32.30	3.77	−0.10	919.90
−12.50	−11.00	−34.10	4.71	−1.70	937.50
13.78	13.68	34.40	3.83	7.31	

(*Continued*)

TABLE 6.1

Date of Forecast	OR		AR		GG	
	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error
			Third Quarter of Forecast			
2nd Q 1967	−9.00	−2.80	−4.90	4.20	−1.10	8.70
3rd Q 1967	−5.40	6.60	−5.80	5.90	4.50	16.70
4th Q 1967	10.20	−2.90	−3.00	−14.00	12.30	0.80
1st Q 1968	−3.50	−21.50	2.20	−16.10	6.40	−12.00
2nd Q 1968	−17.50	−16.20	−29.90	−29.50	−17.90	−17.40
3rd Q 1968	−39.60	−25.60	−49.60	−36.60	−50.30	−38.00
4th Q 1968	−17.80	−18.00	−25.10	−24.30	−26.80	−26.80
1st Q 1969	−6.20	−8.20	3.00	0.70	−5.60	−10.10
AAFE	13.65	12.73	15.44	16.41	15.61	16.31
			Fourth Quarter of Forecast			
2nd Q 1967	−7.00		−6.40		3.70	
3rd Q 1967	−2.40	2.20	−5.40	−0.50	7.80	13.20
4th Q 1967	9.20	−8.30	3.10	−13.00	18.70	1.50
1st Q 1968	−16.50	−29.20	−7.80	−21.00	−5.00	−18.00
2nd Q 1968	−39.30	−28.70	−53.50	−43.70	−37.80	−27.60
3rd Q 1968	−40.70	−32.50	−55.50	−48.10	−54.20	−47.70
4th Q 1968	−20.50	−16.00	−30.90	−25.10	−29.80	−26.40
AAFE	19.37	19.48	23.23	25.23	22.43	22.40
			Forecast One Year Ahead			
2nd Q 1967	−5.45		−1.45		0.85	
3rd Q 1967	−5.82	3.45	−5.85	3.35	3.28	12.85
4th Q 1967	5.98	−2.40	−2.62	−9.72	10.88	3.48
1st Q 1968	−3.20	−16.10	0.08	−13.05	3.78	−9.30
2nd Q 1968	−14.50	−14.27	−25.15	−25.30	−14.97	−15.05
3rd Q 1968	−27.57	−20.42	−35.25	−28.92	−36.37	−30.47
4th Q 1968	−15.75	−12.15	−21.70	−17.55	−22.90	−18.82
AAFE	11.18	11.47	13.16	16.32	13.29	15.00

(*Concluded*)

NO					
Ex Post Error	Ex Ante Error	Naive 1 Error	Autoregr. Error	Naive 2 Error	Realized Data
		Third Quarter of Forecast			
−2.40	7.30	−41.60	1.63	−30.20	805.90
10.50	23.20	−51.80	−1.68	−24.80	826.90
18.90	8.40	−58.30	−2.26	−7.60	848.50
13.40	−7.10	−60.30	−7.34	−13.20	867.60
−20.30	−19.80	−57.20	−2.49	0.40	884.50
−53.30	−40.90	−50.00	7.89	20.20	901.00
−26.60	−27.00	−48.40	6.41	4.70	919.40
−4.60	−6.90	−50.30	6.17	−2.00	937.90
18.75	17.58	52.24	4.48	12.89	
		Fourth Quarter of Forecast			
0.70			0.79		
13.00	19.30	−75.20	−6.80	−39.20	850.30
23.40	8.20	−76.00	−2.25	−8.40	866.20
1.50	−13.70	−76.40	−5.10	−13.60	883.70
−41.00	−30.90	−73.40	0.40	3.40	900.70
−56.30	−49.60	−66.10	10.78	27.50	917.10
−28.90	−24.90	−66.40	8.67	4.40	937.40
23.54	24.43	72.25	4.92	16.08	
		Forecast One Year Ahead			
0.08			0.85		
9.50	19.50	−44.12	−3.10	−21.62	819.22
17.80	11.35	−46.22	0.47	−3.97	836.43
10.35	−4.60	−49.62	−5.44	−10.37	856.92
−16.32	−16.45	−48.77	−3.04	−0.77	876.07
−39.50	−33.50	−41.90	6.83	16.60	892.90
−23.02	−19.80	−40.80	5.00	3.45	911.80
16.65	17.53	45.24	3.53	9.47	

TABLE

GNP in Constant Dollars, Forecasts

Date of Forecast	OR		AR		GG	
	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error
	First Quarter of Forecast					
2nd Q 1967	−0.50	−0.70	3.30	3.10	0.90	0.60
3rd Q 1967	−1.70	2.20	−1.20	2.80	−2.20	1.70
4th Q 1967	−2.40	0.10	−3.00	−0.10	1.00	3.70
1st Q 1968	5.90	1.40	3.00	−1.60	5.10	0.60
2nd Q 1968	0.50	−3.10	−2.70	−6.40	−1.20	−4.80
3rd Q 1968	−5.80	−5.00	−5.50	−4.80	−7.50	−6.80
4th Q 1968	−1.80	0.90	−3.30	−0.70	−3.20	0.30
1st Q 1969	−3.50	0.70	−0.20	4.00	0.20	4.30
2nd Q 1969	−0.10	2.70	5.60	8.10	4.80	7.50
3rd Q 1969	0.80	0.80	2.80	2.70	0.00	0.00
AAFE	2.30	1.76	3.06	3.43	2.61	3.03
	Second Quarter of Forecast					
2nd Q 1967	−6.30	−1.20	−1.90	3.00	−2.60	2.50
3rd Q 1967	−2.80	7.20	−1.60	8.40	0.50	10.30
4th Q 1967	7.20	5.20	−1.40	−1.80	6.90	5.40
1st Q 1968	−0.70	−9.30	0.30	−8.30	4.60	−3.90
2nd Q 1968	−2.50	−5.30	−9.50	−12.30	−6.60	−9.40
3rd Q 1968	−13.20	−9.00	−17.40	−13.40	−17.40	−13.40
4th Q 1968	−8.60	−2.00	−11.60	−4.60	−11.50	−4.10
1st Q 1969	0.40	0.50	5.50	5.70	4.10	3.90
2nd Q 1969	0.00	3.50	7.70	11.00	2.20	5.70
AAFE	4.63	4.80	6.32	7.61	6.27	6.51

6.2

versus Realization for OBE

NO					
Ex Post Error	Ex Ante Error	Naive 1 Error	Autoregr. Error	Naive 2 Error	Realized Data
		First Quarter of Forecast			
2.10	1.90	−4.00	1.74	−5.60	661.20
1.50	5.30	−7.50	0.95	−3.50	672.20
4.70	7.40	−5.50	6.27	2.00	677.50
8.20	3.50	−9.80	−0.19	−4.30	689.40
−1.50	−5.10	−12.50	−1.31	−2.70	702.20
−8.70	−7.90	−7.00	5.80	5.50	708.70
−3.10	−0.50	−5.70	3.73	1.30	718.00
2.10	6.30	−4.60	4.20	1.10	723.70
2.10	4.70	−3.60	6.05	1.00	727.20
4.00	3.90	−3.90	5.73	−0.30	730.60
3.80	4.65	6.41	3.60	2.73	
		Second Quarter of Forecast			
−2.00	3.10	−11.50	3.51	−14.70	668.70
5.90	15.40	−13.00	7.67	−5.00	677.70
13.00	11.60	−15.30	9.05	−0.30	687.30
9.50	0.60	−22.30	−1.59	−11.30	701.90
−7.60	−10.40	−19.50	3.87	0.10	709.20
−18.80	−14.80	−12.70	12.28	12.30	714.40
−11.40	−4.80	−10.30	9.70	3.70	722.60
5.80	5.90	−8.20	12.24	3.20	727.30
−2.90	0.40	−7.50	14.64	1.70	731.10
8.54	7.44	13.37	8.28	5.81	

(*Continued*)

TABLE 6.2

Date of Forecast	OR		AR		GG	
	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error
			Third Quarter of Forecast			
2nd Q 1967	−5.60	3.10	−2.60	4.60	0.40	8.80
3rd Q 1967	2.20	9.80	1.30	8.90	3.70	11.10
4th Q 1967	8.70	2.70	−0.40	−5.80	8.00	2.30
1st Q 1968	−1.70	−13.20	1.50	−10.00	7.50	−3.80
2nd Q 1968	−11.30	−9.40	−20.10	−18.30	−16.10	−14.20
3rd Q 1968	−23.80	−13.00	−32.30	−21.70	−28.90	−18.50
4th Q 1968	−3.80	−1.90	−8.70	−6.40	−6.20	−4.60
1st Q 1969	2.20	3.10	8.10	8.90	6.00	6.20
AAFE	7.41	7.03	9.38	10.58	9.60	8.69
			Fourth Quarter of Forecast			
2nd Q 1967	−1.70		−1.10		6.30	
3rd Q 1967	4.90	7.20	2.40	5.00	5.50	7.90
4th Q 1967	8.20	−0.20	4.50	−2.90	11.70	3.30
1st Q 1968	−8.80	−16.70	−3.30	−11.30	4.60	−3.30
2nd Q 1968	−23.80	−14.80	−34.30	−25.40	−29.00	−20.00
3rd Q 1968	−21.00	−14.60	−33.80	−27.50	−26.70	−20.50
4th Q 1968	−2.20	2.90	−9.00	−3.40	−2.60	1.20
AAFE	10.09	9.40	12.63	12.58	12.34	9.37
			Forecast One Year Ahead			
2nd Q 1967	−3.52		−0.57		1.25	
3rd Q 1967	0.65	6.60	0.23	6.28	1.88	7.75
4th Q 1967	5.43	1.95	−0.07	−2.65	6.90	3.68
1st Q 1968	−1.32	−9.45	0.38	−7.80	5.45	−2.60
2nd Q 1968	−9.27	−8.15	−16.65	−15.60	−13.22	−12.10
3rd Q 1968	−15.95	−10.40	−22.25	−16.85	−20.12	−14.80
4th Q 1968	−4.10	−0.02	−8.15	−3.77	−5.87	−1.80
AAFE	5.75	6.10	6.90	8.83	7.81	7.12

(*Concluded*)

NO					
Ex Post Error	Ex Ante Error	Naive 1 Error	Autoregr. Error	Naive 2 Error	Realized Data
		Third Quarter of Forecast			
0.00	8.60	−17.00	10.54	−21.80	674.20
6.80	14.00	−22.80	10.61	−10.80	687.50
11.50	6.10	−27.80	8.76	−5.30	699.80
12.90	1.20	−29.30	3.55	−12.80	708.90
−17.90	−16.00	−25.20	10.11	4.20	714.90
−29.90	−19.40	−17.30	19.28	20.20	719.00
−5.40	−3.50	−13.90	−18.40	7.10	726.20
9.90	10.60	−12.10	21.58	5.00	731.20
11.79	9.93	20.67	12.86	10.90	
		Fourth Quarter of Forecast			
4.70			13.28		
7.20	9.60	−35.30	10.21	−19.30	700.00
13.50	5.60	−34.80	13.15	−4.80	706.80
10.10	1.80	−35.00	9.82	−13.00	714.60
−31.00	−22.00	−29.80	17.27	9.40	719.50
−23.10	−20.90	−20.90	27.28	29.10	722.60
−1.40	3.50	−17.80	27.29	10.20	730.10
13.00	10.57	28.93	16.90	14.30	
		Forecast One Year Ahead			
1.20			7.27		
5.35	11.08	−19.65	7.36	−9.65	684.35
10.68	7.68	−20.85	9.31	−2.10	692.85
10.18	1.78	−24.10	2.89	−10.35	703.70
−14.50	−13.37	−21.75	7.48	2.75	711.45
−20.12	−15.75	−14.47	16.16	16.78	716.17
−5.32	−1.32	−11.92	14.78	5.58	724.22
9.62	8.50	18.79	9.32	7.87	

TABLE

Unemployment Rate, Forecasts

Date of Forecast	OR		AR		GG	
	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error
	First Quarter of Forecast					
2nd Q 1967	0.00	0.00	−0.20	−0.20	−0.10	−0.10
3rd Q 1967	0.00	0.00	0.40	0.30	0.10	0.00
4th Q 1967	0.20	0.10	0.20	0.10	−0.40	−0.50
1st Q 1968	−0.10	−0.10	0.30	0.20	0.50	0.40
2nd Q 1968	0.00	0.00	0.00	0.00	0.00	−0.40
3rd Q 1968	0.10	0.10	0.10	0.10	0.20	0.20
4th Q 1968	0.40	0.30	0.50	0.30	0.50	0.30
1st Q 1969	0.30	0.30	0.20	0.20	0.20	0.20
2nd Q 1969	0.00	−0.20	−0.90	−1.00	−0.30	−0.40
3rd Q 1969	−0.10	0.00	−0.20	0.20	−0.10	−0.20
AAFE	0.12	0.11	0.30	0.26	0.24	0.27
	Second Quarter of Forecast					
2nd Q 1967	0.30	0.10	0.00	−0.20	0.10	−0.20
3rd Q 1967	0.30	−0.10	0.50	0.10	0.20	−0.20
4th Q 1967	0.30	0.30	0.60	0.50	−0.20	−0.20
1st Q 1968	0.20	0.30	0.60	0.70	1.00	1.00
2nd Q 1968	0.00	0.10	0.10	0.10	0.10	−0.40
3rd Q 1968	0.60	0.40	0.60	0.40	0.80	0.60
4rd Q 1968	0.70	0.50	0.80	0.60	0.90	0.70
1st Q 1969	0.20	0.20	0.10	0.00	0.20	0.20
2nd Q 1969	0.00	−0.10	−1.40	−1.50	−0.10	−0.30
AAFE	0.29	0.23	0.52	0.46	0.40	0.42

6.3

versus Realization for OBE

NO					
Ex Post Error	Ex Ante Error	Naive 1 Error	Autoregr. Error	Naive 2 Error	Realized Data
		First Quarter of Forecast			
0.60	0.60	−0.20	0.05	−0.20	3.90
−0.10	−0.10	0.00	0.26	0.20	3.80
−0.50	0.60	0.00	−0.10	0.00	3.90
0.70	0.60	0.20	0.32	0.20	3.80
−0.60	−0.50	0.10	0.10	−0.10	3.60
0.10	0.00	0.00	0.03	−0.10	3.60
0.40	0.30	0.20	0.35	0.20	3.40
0.20	0.20	0.10	0.02	−0.10	3.30
−0.50	−0.60	−0.20	0.03	−0.30	3.50
−0.30	−0.20	−0.20	0.12	0.00	3.70
0.40	0.37	0.12	0.14	0.14	
		Second Quarter of Forecast			
1.30	1.00	−0.20	0.34	−0.20	3.90
−0.10	−0.50	0.00	0.30	0.40	3.80
−0.50	−0.05	0.20	0.18	0.20	3.70
0.90	0.90	0.30	0.59	0.30	3.70
−0.50	−0.40	0.10	0.18	−0.03	3.60
0.80	0.60	0.20	0.40	0.00	3.40
0.90	0.70	0.30	0.56	0.30	3.30
0.20	0.20	−0.10	0.06	−0.50	3.50
0.00	−0.10	−0.40	0.16	−0.60	3.70
0.58	0.54	0.20	0.31	0.31	

(*Continued*)

TABLE 6.3

Date of Forecast	OR		AR		GG	
	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error	Ex Post Error	Ex Ante Error
	Third Quarter of Forecast					
2nd Q 1967	0.60	0.00	0.30	−0.20	0.30	−0.40
3rd Q 1967	0.40	−0.10	0.70	0.10	0.30	−0.30
4th Q 1967	0.00	0.20	0.60	0.70	−0.40	−0.20
1st Q 1968	0.30	0.40	0.70	0.80	1.00	1.00
2nd Q 1968	0.60	0.40	0.70	0.50	0.70	−0.10
3rd Q 1968	1.00	0.70	1.20	0.80	1.30	1.00
4th Q 1968	0.60	0.40	0.70	0.50	0.90	0.70
1st Q 1969	0.10	0.10	−0.10	−0.10	0.20	0.20
AAFE	0.45	0.29	0.63	0.46	0.64	0.49
	Fourth Quarter of Forecast					
2nd Q 1967	0.80		0.60		0.30	
3rd Q 1967	0.20	−0.20	0.60	0.10	0.10	−0.40
4th Q 1967	−0.10	0.20	0.40	0.70	−0.60	−0.30
1st Q 1968	0.80	0.70	1.20	1.10	1.40	1.30
2nd Q 1968	1.20	0.80	1.30	1.00	1.30	0.40
3rd Q 1968	1.00	0.70	1.30	1.00	1.40	1.10
4th Q 1968	0.50	0.30	0.70	0.50	0.80	0.60
AAFE	0.66	0.48	0.87	0.73	0.84	0.68
	Forecast One Year Ahead					
2nd Q 1967	0.43		0.18		0.15	
3rd Q 1967	0.23	−0 10	0.55	0.15	0.18	−0.22
4th Q 1967	0.10	0.20	0.45	0.50	−0.40	−0.30
1st Q 1968	0.30	0.33	0.70	0.70	0.98	0.93
2nd Q 1968	0.45	0.33	0.53	0.40	0.53	−0.12
3rd Q 1968	0.68	0.48	0.80	0.58	0.93	0.73
4th Q 1968	0.55	0.38	0.68	0.48	0.78	0.58
AAFE	0.39	0.30	0.55	0.47	0.56	0.48

(*Concluded*)

NO					
Ex Post Error	A: Er	Naive 1 Error	Autoregr. Error	Naive 2 Error	R(
		Third Quarter of Forecast			
1.80	1.20	−0.20	0.40	−0.20	3.90
0.00	−0.50	0.20	0.62	0.80	3.60
−0.60	−0.50	0.30	0.43	0.30	3.60
0.70	0.60	0.30	0.72	0.30	3.70
0.10	−0.10	0.30	0.56	−0.30	3.
1.30	1.00	0.30	0.61	0.00	
0.90	0.70	0.10	0.66	0.10	
0.20	0.20	−0.30	0.20	−0.90	3.70
0.70	0.63	0.25	0.53	0.36	
		Fourth Quarter of Forecast			
2.20			0.70		
−0.10	−0.60	0.30	0.80	1.10	3.50
−0.80	−0.50	0.30	0.59	0.30	3.60
1.00	1.00	0.50	1.02	0.50	3.50
0.80	0.40	0.40	0.75	−0.40	3.30
1.40	1.10	0.10	0.71	−0.30	3.50
0.70	0.50	−0.10	0.70	−0.10	3.70
1.00	0.68	0.28	0.75	0.45	
		Forecast One Year Ahead			
1.48			0.37		
−0.07	−0.42	0.13	0.50	0.63	3.67
−0.60	−0.52	0.20	0.27	0.20	3.70
0.83	0.83	0.33	0.66	0.33	3.67
−0.05	0.15	0.23	0.40	−0.27	3.47
0.90	0.68	0.15	0.44	−0.10	3.45
0.73	0.55	0.13	0.57	0.13	3.47
0.66	0.53	0.19	0.46	0.27	

TABLE

Decomposition of First Quarter

	NO			AR		
	SER	Other	Forecast Error	SER − CON	Other	Forecast Error
CA	−1.52	0.13	−1.39	−2.05	−0.19	−2.24
CD	3.07	0.39	3.46	−0.25	−0.03	−0.28
CN	3.57	0.59	4.14	0.51	0.53	1.04
CS	2.14	0.13	2.27	0.21	0.11	0.31
C	7.26	1.22	8.48	−1.59	0.42	−1.17
IH	0.48	−1.20	−0.72	0.27	−1.48	−1.21
ISE	−1.29	0.00	−1.29	4.92	0.00	4.92
DII	−6.79	0.07	−6.72	−4.48	0.08	−4.40
I	−7.60	−1.13	−8.73	0.71	−1.40	−0.69
−IMT	0.56	−0.40	0.16	−0.63	−0.23	−0.85
−IMS	−1.49	−0.07	−1.56	−0.15	−0.01	−0.16
−NFB	−0.93	−0.47	−1.40	−0.78	−0.23	−1.01
GNP58	−1.27	−0.38	−1.65	−1.66	−1.21	−2.87
GNP$	−1.52			−2.01		
W	0.79	3.85	4.64	−0.75	2.33	1.58
PRI	−0.06	1.84	1.78	0.08	−0.34	−0.26
DIV	−0.15	−0.12	−0.27	−0.59	−0.03	−0.62
TRP	−0.24	0.00	−0.24	0.14	0.00	0.14
−SIP	−0.11	−0.26	−0.37	−0.23	0.07	−0.16
−TPF	−0.27	−1.10	−1.37	−0.30	−0.15	−0.45
−TPSL	0.02	−0.16	−0.14	0.18	−0.02	0.16
Total DI$ SER	−0.02	4.05	4.03	−1.47	1.86	0.39
.46XDI$ SER	−0.01			−0.68		
All GNP-Price	−1.53	−0.29	−1.82	−2.69	−0.61	−3.30
Induced		−0.24			−0.43	
Not decomposed		−0.05			−0.18	
Price			3.47			−0.46
Ex post GNP$			1.65			−3.76
Policy var.			−0.37			−0.37
Other exog.			−3.46			−3.46
Exog. price			−1.79			−1.79
Nonlinearity						−0.04
Ex ante GNP$			−3.97			−9.34

NOTE: For definition of symbols, see glossary.

6.4

Error, 2nd Quarter, 1968

GG			OR		
SER – CON	Other	Forecast Error	SER – CON	Other	Forecast Error
–1.28	0.11	–1.17	–1.51	0.10	–1.41
1.18	0.26	1.44	–0.33	0.36	0.03
2.93	0.65	3.58	1.77	0.96	2.73
1.02	0.16	1.18	0.54	0.25	0.79
3.85	1.18	5.03	0.47	1.67	2.14
0.26	–1.28	–1.02	0.28	0.08	0.36
1.61	0.01	1.62	3.01	0.00	3.01
6.89	0.06	–6.83	–4.79	0.06	–4.73
–5.02	–1.21	–6.23	–1.50	0.14	–1.36
0.56	–0.40	0.16	0.56	–0.49	0.07
–0.23	–0.07	–0.30	–0.39	–0.06	–0.45
0.33	–0.47	–0.14	0.17	–0.55	–0.38
–0.84	–0.50	–1.34	–0.86	1.26	0.40
–1.02			–1.04		
–0.45	5.32	4.87	–1.07	4.08	4.10
–0.43	1.24	0.81	–0.32	0.59	0.27
–0.16	–0.13	0.29	0.15	–0.08	0.07
–0.11	–0.01	–0.10	0.28	0.00	0.28
–0.27	–0.01	–0.26	–0.21	–0.01	–0.22
–0.28	–0.97	–1.25	–0.29	–0.80	–1.09
0.17	–0.14	0.03	0.31	–0.11	0.20
–1.53	5.34	3.81	–1.15	4.76	3.61
–0.71			–0.53		
–1.73	0.30	–1.43	–1.57	2.22	0.65
	–0.28			–0.25	
	0.58			2.47	
		2.25			0.91
		0.82			1.56
		–0.37			–0.37
		–3.46			–3.46
		–1.79			–1.79
		–0.03			–0.04
		–4.38			–4.10

TABLE

Decomposition of First Quarter

	NO			AR		
	SER	Other	Forecast Error	SER − CON	Other	Forecast Error
CA	−7.16	−0.18	−7.34	−4.79	0.62	4.17
CD	−0.51	−0.20	−0.71	−0.92	0.01	−0.91
CN	3.89	0.35	4.24	−1.16	1.40	0.24
CS	−0.94	−0.09	−1.03	−0.95	0.29	−0.66
C	−4.72	−0.12	−4.84	−7.82	2.32	−5.50
IH	−0.91	−1.96	−2.87	−0.17	−1.92	−2.09
ISE	−0.10	−0.36	−0.46	4.24	−2.88	1.36
DII	−1.28	0.06	−1.22	0.77	0.06	0.83
I	−2.29	−2.26	−4.55	4.84	−4.74	0.10
−IMT	1.05	0.21	1.26	−0.44	0.00	−0.44
−IMS	−0.88	0.10	−0.78	0.18	−0.07	0.11
−NF8	0.17	0.31	0.48	−0.26	−0.07	−0.33
GNP58	−6.84	−2.07	−8.91	−3.24	−2.49	−5.73
GNP$	−8.38			−3.97		
W	−1.68	−4.40	−6.08	0.45	−2.76	−2.31
PRI	−0.31	0.53	0.22	−0.03	0.00	−0.03
DIV	−0.33	−0.29	−0.62	0.24	−0.23	0.01
TRP	−0.18	0.00	−0.18	0.03	0.00	0.03
−SIP	−0.46	0.27	−0.19	0.11	0.15	0.26
−TPF	−1.47	1.16	−0.31	−1.47	6.31	4.84
−TPSL	1.02	0.16	1.19	0.44	0.06	0.50
Total DI$ SER	−3.41	−2.57	−5.97	−0.23	3.53	3.30
.46XDI$ SER	−1.58			−0.11		
All GNP-Price	−9.96	−0.68	−10.64	−4.08	−2.67	−6.75
Induced		−1.59			−0.65	
Not decomposed		0.91			−2.02	
Price			−4.80			−2.34
Ex post GNP$			−15.44			−9.09
Policy var.			−0.49			−0.49
Other exog.			−0.45			−0.45
Exog. price			1.31			−1.31
Nonlinearity						0.02
Ex ante GNP$			−15.07			−8.70

NOTE: For definition of symbols, see glossary.

6.5

Error, 3rd Quarter, 1968

GG			OR		
SER-CON	Other	Forecast Error	SER – CON	Other	Forecast Error
−6.48	0.77	−5.71	−4.76	−0.06	−4.82
−0.30	−0.42	−0.72	−0.71	−0.23	−0.94
1.71	0.73	2.44	−1.51	0.09	−1.42
−0.91	−0.06	−0.97	−0.94	−0.17	−1.11
−5.98	1.02	−4.96	−7.92	−0.37	−8.29
−0.94	−1.00	−1.94	0.09	−0.67	−0.58
1.81	−2.18	−0.37	−0.10	0.39	0.29
−1.28	0.05	−1.23	−0.28	0.04	−0.24
−0.41	−3.13	−3.54	−0.29	−0.24	−0.53
0.95	−0.44	0.51	2.55	−0.13	2.42
0.27	0.00	0.27	0.32	0.06	0.38
1.22	−0.44	0.78	2.87	−0.07	2.80
−5.17	−2.55	−7.72	−5.34	−0.68	−6.02
−6.33			−6.54		
−1.32	−3.62	−4.94	−0.23	−2.81	−3.04
0.34	0.02	0.36	0.09	−0.69	−0.60
−0.34	−0.19	−0.53	0.17	0.14	0.03
−0.04	0.00	−0.04	−0.03	0.00	−0.03
−0.05	0.23	0.18	0.14	0.17	0.31
−1.47	5.02	3.55	−1.47	0.65	−0.82
0.71	0.13	0.84	0.47	0.09	0.56
−2.17	1.59	−0.58	−0.86	−2.73	−3.59
−1.00			−0.40		
−7.33	−1.86	−9.19	−6.94	−0.18	−7.12
	−1.17			−1.11	
	−0.69			0.93	
		−2.56			−1.49
		−11.75			−8.61
		−0.49			−0.49
		−0.45			−0.45
		1.31			1.31
		0.01			0.43
		−11.37			−7.81

TABLE

Decomposition of First Quarter

	NO			AR		
	SER	Other	Forecast Error	SER – CON	Other	Forecast Error
CA	−5.12	−0.23	−5.35	−1.19	−0.33	−1.52
CD	0.45	−0.10	0.35	0.67	−0.15	0.52
CN	7.03	0.42	7.45	2.00	−0.08	1.92
CS	0.75	0.13	0.88	0.72	−0.04	0.68
C	3.11	0.22	3.33	2.20	−0.60	1.60
IH	−1.25	−0.05	−1.30	−1.13	−0.03	−1.16
ISE	−6.87	0.00	−6.87	−3.46	0.00	−3.46
IIA	−0.31	−0.42	−0.73	−0.39	−0.12	−0.51
IINA	−2.03	−0.37	−2.40	0.19	0.21	0.40
I	−10.46	−0.84	−11.30	−4.79	0.06	−4.73
−IMT	5.84	0.08	5.92	−0.57	0.19	−0.38
−IMS	−1.29	0.08	−1.21	−0.08	0.08	0.00
−NFB	4.55	0.16	4.71	−0.65	0.27	−0.38
GNP58	−2.80	−0.46	−3.26	−3.24	−0.27	−3.51
GNP$	−3.46			−4.00		
W	−4.55	−9.14	−9.22	−2.78	−8.16	−8.24
PRI	−0.67	1.61	0.94	−0.55	0.88	0.38
DIV	0.16	−0.02	0.14	0.50	0.02	0.52
TRP	0.04	0.00	0.04	0.20	0.00	0.20
−SIP	−0.52	0.60	0.08	0.21	0.15	0.36
−TPF	0.69	1.46	2.15	0.70	1.31	2.01
−TPSL	1.47	0.21	1.68	0.38	0.19	0.57
Total DI$ SER	−3.38	−0.81	−4.19	−1.34	−2.86	−4.20
.46XDI$ SER	−1.57			−0.62		
All GNP-price	−5.03	1.18	−3.85	−4.62	0.49	−4.13
Induced		−0.80			−0.74	
Not decomposed		1.98			1.23	
Price			−3.48			−0.95
Ex post GNP$			−7.33			−5.08
Policy var.			−2.93			−2.93
Other exog.			0.70			0.70
Exog. price			−0.74			−0.74
Nonlinearity						0.04
Ex ante GNP$			−10.30			−8.01

NOTE: For definition of symbols, see glossary.

6.6

Error, 4th Quarter, 1968

GG			OR		
SER – CON	Other	Forecast Error	SER – CON	Other	Forecast Error
−2.57	−0.52	−3.09	−1.42	−0.23	−1.65
1.02	−0.37	0.65	1.05	−0.14	0.91
5.60	0.09	5.69	2.73	0.12	2.85
1.36	−0.49	0.87	1.05	0.03	1.08
5.41	−1.29	4.12	3.41	−0.22	3.19
−1.63	0.35	−1.28	−1.25	−0.03	−1.28
−3.14	−0.01	−3.15	−1.67	0.00	−1.67
−0.35	−0.26	−0.61	−0.31	−0.13	−0.44
−1.81	−0.08	−1.89	−0.76	0.01	−0.75
−6.93	0.00	−6.93	−3.99	−0.15	−4.14
1.09	−0.64	0.45	−0.86	−0.03	−0.89
−0.20	0.08	−0.12	−0.19	0.06	0.13
0.89	−0.56	0.33	−1.05	0.03	−1.02
−0.63	−1.85	−2.48	−1.63	−0.24	−1.97
−0.78			−2.01		
−3.85	−9.29	−9.28	−1.66	−5.12	−6.78
−0.51	1.43	0.92	−0.70	1.08	0.38
0.13	0.02	0.15	0.50	0.04	0.54
0.22	0.00	0.22	0.17	0.00	0.17
−0.24	0.47	0.23	−0.20	0.52	0.32
0.69	1.47	2.16	0.70	1.05	1.75
1.02	0.21	1.23	0.16	0.15	0.31
−2.54	−1.83	−4.37	−1.03	−2.28	−3.31
−1.18			−0.48		
−1.96	−0.91	−2.87	−2.49	0.25	−2.24
	−0.31			−0.40	
	−0.60			0.65	
		−2.75			−0.51
		−5.62			−2.75
		−2.93			−2.93
		0.70			0.70
		−0.74			−0.74
		−0.77			−0.31
		−9.36			−6.03

TABLE

Decomposition of First Quarter

	NO			AR		
	SER	Other	Forecast Error	SER – CON	Other	Forecast Error
CA	−5.50	0.18	−5.32	−0.52	0.03	−0.49
CD	−0.24	0.17	−0.07	−0.27	−0.04	−0.31
CN	5.70	0.79	6.49	−0.03	0.21	0.18
CS	−0.27	0.27	0.00	−0.12	0.07	−0.05
C	−0.31	1.41	1.10	−0.94	0.27	−0.67
IH	−0.98	−0.13	−1.11	−0.70	−0.13	−0.83
ISE	−0.36	−0.13	−0.49	1.11	0.25	1.36
IIA	−0.02	−0.42	−0.44	−0.61	−0.04	−0.65
IINA	3.24	−0.45	2.79	4.90	0.32	5.22
I	1.88	−1.13	0.75	4.70	0.40	5.10
−IMT	1.74	−0.01	1.73	−4.39	0.13	−4.26
−IMS	−1.09	0.00	−1.09	−0.01	0.00	−0.01
−NFB	0.65	−0.01	0.64	−4.40	0.13	−4.27
GNP58	2.22	0.27	2.49	−0.64	0.80	0.16
GNP$	2.77			−0.80		
W	−4.05	−0.12	−4.17	−1.14	−1.61	−2.75
PRI	0.51	0.03	0.58	0.43	−0.58	−0.15
DIV	0.38	0.08	0.46	0.43	0.05	0.48
TRP	−0.38	0.00	−0.38	−0.15	0.00	−0.15
−SIP	−0.51	0.27	−0.24	−0.08	0.21	0.13
−TPF	0.89	0.56	1.45	0.90	0.43	1.33
−TPSL	2.49	0.08	2.57	0.89	0.06	0.95
Total DI$ SER	−0.67	0.94	0.27	1.28	−1.12	−0.16
.46XDI$ SER	−0.31			0.59		
All GNP-price	2.46	0.20	2.66	−0.21	−0.05	−0.26
Induced		0.39			−0.03	
Not decomposed		−0.19			−0.02	
Price			−5.08			−1.98
Ex post GNP$			−2.42			−2.24
Policy var.			−2.31			−2.31
Other exog.			7.45			7.45
Exog. price			−1.56			−1.56
Nonlinearity						0.15
Ex ante GNP$			1.16			1.49

NOTE: For definition of symbols, see glossary.

6.7

Error, 1st Quarter, 1969

GG			OR		
SER – CON	Other	Forecast Error	SER – CON	Other	Forecast Error
–3.43	0.04	–3.39	–1.60	–0.23	–1.83
–0.61	–0.02	–0.63	–0.44	0.03	–0.41
3.11	0.42	3.53	1.40	–0.24	1.16
–0.18	0.14	–0.04	0.07	–0.09	–0.16
–1.11	0.58	–0.53	–0.71	–0.53	–1.24
–0.41	–0.06	–0.47	–0.58	–0.13	–0.71
1.23	–0.23	1.00	–0.96	–0.26	–1.22
–0.02	–0.27	–0.29	–0.02	–0.15	–0.17
3.54	–0.07	3.47	2.64	0.34	2.98
4.34	–0.63	3.71	1.08	–0.20	0.88
–2.67	0.12	–2.55	–2.96	0.39	–2.57
–0.13	0.01	–0.12	–0.29	0.05	–0.24
–2.80	0.13	–2.67	–3.25	0.44	–2.81
0.43	0.08	0.51	–2.88	–0.29	–3.17
0.54			–3.60		
–2.42	–1.71	–4.13	–1.57	–3.95	–5.52
0.29	–0.05	0.24	–0.03	–0.20	–0.23
0.38	0.05	0.43	0.36	–0.01	0.37
–0.17	0.00	–0.17	–0.12	0.00	–0.12
–0.16	0.26	0.10	–0.11	0.31	0.20
0.89	0.62	1.51	0.89	0.96	1.85
1.47	0.09	1.56	0.39	0.14	0.53
0.28	–0.74	–0.46	–0.19		–2.92
0.13			–0.09		
0.67	0.47	0.20	–3.69	–0.72	–4.41
	0.11			–0.55	
	0.58			–0.17	
		–3.02			–2.02
		–3.22			–6.43
		–2.31			–2.31
		7.45			7.45
		–1.56			1.56
		0.37			0.04
		0.79			–2.81

TABLE

Decomposition of First Quarter

	NO			AR		
	SER	Other	Forecast Error	SER − CON	Other	Forecast Error
CA	−5.28	−0.36	−5.64	−0.27	−0.36	−0.63
CD	−0.80	−0.19	−0.99	−0.81	−0.36	−1.17
CN	5.99	0.51	6.50	0.52	−0.11	0.41
CS	0.78	−0.12	0.66	0.63	−0.34	0.29
C	0.69	−0.16	0.53	0.07	−1.17	−1.10
IH	0.32	0.00	0.32	0.33	0.01	0.34
ISE	−8.90	0.00	−8.90	−0.36	0.00	−0.36
IIA	1.25	−0.45	0.80	1.60	−0.05	1.55
IINA	−0.45	−0.44	−0.89	−1.29	−0.34	−1.63
I	−7.78	−0.89	−8.67	0.28	0.35	−0.10
−IMT	9.91	0.00	9.91	5.83	−0.44	5.39
−IMS	−0.33	−0.03	−0.36	0.79	−0.06	0.73
−NFB	9.58	−0.03	9.55	6.62	−0.50	6.12
GNP58	2.49	−1.08	1.41	6.97	−1.31	4.93
GNP$	3.15			8.81		
W	−3.33	2.31	−1.02	1.88	3.00	4.88
PRI	−1.23	0.93	−0.30	−1.82	0.41	−1.41
DIV	−0.15	−0.06	−0.21	−0.42	0.04	−0.38
TRP	−0.42	0.00	−0.42	−0.33	0.00	−0.33
−SIP	−0.41	0.01	−0.40	0.08	−0.19	−0.11
−TPF	−0.15	0.27	0.12	−0.18	−0.55	−0.73
−TPSL	3.22	0.04	3.26	0.88	−0.08	0.80
Total DI$ SER	−2.47	3.50	1.03	0.09	2.63	2.72
.46XDI$ SER	−1.15			0.04		
All GNP-price	2.00	0.60	2.60	8.85	−1.82	7.03
Induced		0.32			1.42	
Not decomposed		0.28			−3.24	
Price			−4.68			0.85
Ex post GNP$			−2.08			7.88
Policy var.			−1.34			−1.34
Other exog.			3.30			3.30
Exog. price			−0.20			−0.20
Nonlinearity						0.14
Ex ante GNP$			−0.32			9.78

NOTE: For defininition of symbols, see glossary.

6.8

Error, 2nd Quarter, 1969

GG			OR		
SER − CON	Other	Forecast Error	SER − CON	Other	Forecast Error
−3.05	−0.46	−3.51	−0.38	−0.99	−1.37
−0.44	−0.26	−0.70	−5.40	4.04	−1.36
4.41	0.12	4.51	5.99	−5.31	0.68
0.53	−0.26	0.27	0.78	−0.55	0.23
1.45	−0.86	0.59	0.99	−2.81	−1.82
0.23	0.01	0.24	0.32	0.00	0.32
−4.06	0.00	−4.06	−2.14	0.00	−2.14
1.28	−0.28	1.00	1.25	−0.11	1.14
−1.14	−0.57	−1.71	−1.15	0.08	−1.07
−3.69	−3.74	−4.53	−1.72	5.73	−1.75
7.58	−0.24	7.34	1.91	0.11	2.02
0.82	−0.03	0.79	0.77	0.07	0.84
8.40	−0.27	8.13	2.68	0.18	2.86
6.16	−4.87	4.19	1.95	3.10	−0.71
7.79			2.47		
−0.85	1.43	0.58	−1.95	−2.49	−4.44
−1.98	0.96	−1.02	−1.34	0.04	−1.30
−0.14	0.06	−0.08	−0.15	0.01	−0.14
0.08	0.00	0.08	0.12	0.00	0.12
−0.06	−0.05	−0.11	−0.01	0.12	0.11
−0.16	0.09	−0.07	−0.13	1.05	0.92
1.79	0.01	1.80	0.12	0.15	0.27
−1.32	2.50	1.18	−3.34	−1.12	−4.46
−0.61			−1.55		
7.18	−1.07	6.11	0.92	−1.01	−0.09
	1.15			0.15	
	−2.22			−1.16	
		−1.74			−2.55
		4.37			−2.64
		−1.34			−1.34
		3.30			3.30
		−0.20			−0.20
		0.48			−0.39
		6.61			−0.49

TABLE

Decomposition of First Quarter

	NO			AR		
	SER	Other	Forecast Error	SER − CON	Other	Forecast Error
CA	−6.99	−0.15	−7.14	−0.12	0.08	−0.04
CD	0.97	−0.22	0.75	1.90	−0.19	1.71
CN	8.62	0.36	8.98	2.78	0.15	2.93
CS	0.08	0.12	0.20	0.48	0.05	0.53
C	2.68	0.11	2.79	5.04	0.09	5.13
IH	−0.74	0.10	−0.64	−0.12	0.11	−0.01
ISE	−0.81	−0.85	−1.66	−1.25	−0.32	−1.57
IIA	−0.45	−0.57	−1.02	−0.80	−0.01	−0.81
IINA	−0.75	−1.16	−1.91	−1.78	−0.44	−2.22
I	−2.75	−2.48	−5.23	−3.95	−0.66	−4.61
−IMT	5.99	0.00	5.99	1.51	−0.15	1.36
−IMS	−0.14	0.64	0.50	0.38	0.57	0.95
−NFB	5.85	0.64	6.49	1.89	0.42	2.31
GNP58	5.78	1.73	4.05	2.98	−0.16	2.83
GNP$	7.46			3.85		
W	−0.22	1.16	0.94	−0.23	2.70	2.47
PRI	−0.12	0.51	0.39	−0.46	0.72	0.26
DIV	−0.23	0.08	−0.15	−0.41	−0.04	0.37
TRP	−0.46	0.00	−0.46	−0.09	0.00	−0.09
−SIP	−0.50	0.26	−0.24	−0.05	0.20	0.15
−TPF	−1.02	−0.21	−1.23	−1.02	−0.42	−1.44
−TPSL	−2.99	−0.03	−3.02	−0.08	−0.06	−0.14
Total DI$ SER	−5.54	1.77	−3.77	−2.34	3.18	0.84
.46XDI$ SER	−2.57			−1.09		
All GNP-price	4.89	0.28	5.17	2.76	0.83	3.59
Induced		0.78			0.44	
Not decomposed		0.50			0.39	
Price			−5.96			0.45
Ex post GNP$			−0.79			4.04
Policy var.			1.74			1.74
Other exog.			−1.46			−1.46
Exog. price			−0.86			−0.86
Nonlinearity						0.04
Ex ante GNP$			−1.37			3.50

NOTE: For definition of symbols. see glossary.

6.9

Error, 3rd Quarter, 1969

GG			OR		
SER − CON	Other	Forecast Error	SER − CON	Other	Forecast Error
−3.85	−0.42	−4.27	−1.49	−0.09	−1.58
1.72	−0.38	1.34	1.67	−0.23	1.44
6.27	−0.23	6.04	2.12	−0.14	1.98
0.28	−0.09	0.19	0.38	−0.05	0.33
4.42	−1.12	3.30	2.68	−0.51	2.17
−0.38	0.10	−0.28	−0.44	0.10	−0.34
−0.12	−1.42	−1.54	−1.31	−0.06	−1.37
−0.46	−0.39	−0.85	−0.95	−0.13	−1.08
−0.46	−0.49	−0.95	−0.75	−0.35	−1.10
−1.42	−2.20	−3.62	−3.45	−0.44	−3.89
−0.48	0.25	−0.23	0.81	0.41	1.22
−0.05	0.68	0.63	0.76	0.59	1.35
−0.53	0.93	0.40	1.57	1.00	2.57
2.47	2.39	0.08	0.80	0.05	0.85
3.19			1.03		
−0.23	−4.31	−4.54	−0.23	0.89	0.66
−0.39	0.58	0.19	−0.42	0.27	−0.15
−0.23	−0.09	0.14	−0.43	−0.01	−0.44
−0.08	0.00	−0.08	−0.03	0.00	−0.03
−0.24	0.46	0.22	−0.10	0.27	0.17
0.99	−0.80	−1.19	−1.01	−0.01	−1.02
−1.31	0.07	−1.24	−0.08	0.00	−0.08
−3.47	−2.31	−5.78	−2.30	1.41	−0.89
−1.61			−1.07		
1.58	1.53	0.05	−0.04	1.09	1.05
	0.25			0.00	
	1.28			1.09	
		−3.94			−0.61
		−3.89			0.44
		1.74			1.74
		−1.46			−1.46
		−0.86			−0.86
		0.17			0.08
		−4.30			−0.06

TABLE 6.10

Effects of Errors in Inputs for O8E. 2nd Quarter, 1968

Variable	No Constant Adjustments		AR Constant Adjustments		GG Constant Adjustments		OR Constant Adjustments		Ex Ante Minus Ex Post
	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	
					Second Quarter of Forecast				
CA	2.23	−5.11	−2.41	−6.58	0.61	−5.10	−0.34	5.16	1.59
CD	2.95	2.24	−0.20	−1.11	1.61	0.89	0.55	−0.39	−0.08
CN	−2.72	1.52	−2.10	−1.86	1.08	1.36	1.77	0.35	−0.35
CS	1.73	0.70	−0.79	−1.45	1.09	0.12	0.33	−0.78	−0.12
C	4.19	−0.65	−5.50	−11.00	2.23	−2.73	2.31	−5.98	−1.67
IH	0.31	−2.56	−1.02	−3.11	−0.85	−2.79	0.83	0.25	−0.69
ISE	−1.73	−2.19	3.60	4.96	0.12	−0.25	1.75	2.04	−0.15
DII	−0.99	−2.21	−1.37	−0.54	−1.03	−2.16	−0.06	−0.30	−0.83
I	−2.41	−6.96	1.21	1.31	−1.76	−5.20	2.52	1.99	−1.67
−IMT	−0.27	0.99	0.04	−0.40	0.45	0.96	−1.17	1.25	−0.16
−IMS	−0.55	−1.33	0.13	0.24	−0.30	−0.03	−0.52	−0.14	−0.04
−NFB	−0.82	−0.34	0.17	−0.16	0.15	0.93	−1.69	1.11	−0.20
GNP58	0.96	−7.95	−4.12	−9.85	0.72	−7.00	3.14	−2.88	−2.72
GNP$	9.51	−5.73	−4.50	−13.39	6.56	−4.99	5.59	−2.82	−5.27
DI$	6.66	1.10	−8.64	−4.96	1.83	1.64	5.24	1.33	−2.25
					Third Quarter of Forecast				
CA	−0.87	−6.22	−6.33	−7.85	−2.97	−6.06	−4.41	−6.06	2.17
CD	1.54	1.89	−1.78	−1.26	0.40	1.05	−0.83	0.08	−0.01
CN	3.81	3.64	−1.99	−0.07	−2.02	3.67	−0.21	2.64	−0.07
CS	1.33	1.21	−1.79	−1.11	0.01	0.88	−1.37	−0.29	−0.03
C	−2.81	0.52	−11.89	−10.29	−4.58	−0.46	−6.82	−3.63	2.06

IH	−4.26	−5.56	−5.18	−6.34	−4.53	−5.81	−1.30	−2.58	0.10
ISE	2.51	−4.36	6.96	3.50	0.11	−3.04	1.65	−0.02	−0.26
DII	−4.78	−7.91	−6.06	−6.17	−4.86	−7.36	−4.83	−6.02	−0.48
I	−6.53	−17.83	−4.28	−9.01	−9.28	−16.21	−4.48	−8.62	−0.64
−IMT	−5.49	0.43	−1.32	−1.70	−0.17	0.28	−1.53	0.64	−0.65
−IMS	−0.25	−1.46	0.27	0.27	0.00	−0.12	0.03	−0.16	−0.17
−NFB	−5.74	−1.03	−1.05	−1.43	−0.17	0.16	−1.50	0.48	−0.82
GNP58	−15.08	−18.34	−17.22	−20.73	−14.03	−0.46	−9.80	−11.77	0.66
GNP$	−13.00	−20.33	−24.86	−29.94	−12.31	−17.93	−14.75	−17.50	0.86
DI$	−1.67	−5.88	−9.56	−13.76	0.69	−4.56	−2.89	−6.21	0.45
				Fourth Quarter of Forecast					
CA	−3.18	−8.50	−9.72	−10.21	−4.87	−8.26	−6.55	−8.38	2.95
CD	−0.32	−0.39	−3.10	−3.41	−0.37	−0.97	−0.99	−1.40	0.16
CN	−5.13	1.36	−2.63	−2.45	−2.11	1.42	−0.66	0.50	−0.09
CS	0.63	0.63	−1.83	−1.88	0.44	0.40	−0.76	−0.92	0.00
C	−8.00	−6.90	−17.28	−17.95	−6.98	−7.41	−8.96	−10.20	3.02
IH	−5.12	−6.23	−6.38	−7.21	−6.02	−6.49	−2.71	−3.42	−0.08
ISE	−6.25	−6.74	−0.12	1.24	−6.80	−5.80	−1.44	−2.66	−0.15
DII	−10.02	−7.67	−10.70	−6.13	−10.09	−6.91	−8.67	−5.86	1.18
I	−21.39	−20.64	−17.20	−12.10	−22.91	−19.20	−12.82	−11.94	0.95
−IMT	−4.06	−2.33	−0.68	−4.94	−0.01	−2.56	0.62	−1.95	−1.64
−IMS	−0.38	−1.47	0.44	0.43	0.03	−0.09	0.18	−0.06	−0.35
−NFB	−4.44	−3.81	−0.24	−4.51	0.02	−2.65	0.80	−2.01	−1.99
GNP58	−33.83	−31.34	−34.72	−34.56	−29.77	−29.26	−20.98	−24.15	1.98
GNP$	−37.76	−40.38	−50.46	−52.90	−34.19	−37.17	−32.04	−38.67	10.12
DI$	−15.99	−15.73	−25.50	−25.70	−13.58	−14.04	−13.84	−16.75	3.73

NOTE: For definition of symbols, see glossary.

TABLE 6.11

Effects of Errors in Inputs for OBE, 3rd Quarter, 1968

Variable	No Constant Adjustments		AR Constant Adjustments		GG Constant Adjustments		OR Constant Adjustments		Ex Ante Minus Ex Post
	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	
					Second Quarter of Forecast				
CA	−2.88	−8.23	−3.96	5.48	−4.38	−7.47	−4.14	−5.79	2.01
CD	−0.73	−0.38	−1.25	−0.73	−1.22	−0.54	−1.61	−0.70	0.09
CN	−0.92	6.53	0.32	2.24	0.37	6.06	−2.01	0.84	0.01
CS	−1.29	−0.41	−0.73	−0.05	−1.18	−0.31	−1.49	−0.41	0.03
C	−5.82	−2.49	−5.62	−4.02	−6.41	−2.29	−9.25	−6.06	2.14
IH	−5.70	−7.00	−5.07	−6.23	−5.05	−6.33	−1.92	−3.20	1.22
ISE	4.49	−2.38	2.74	−0.72	0.85	−2.30	0.08	−1.59	0.11
DII	−3.82	−6.95	−4.88	−4.99	−3.99	−6.49	−3.28	−4.47	0.20
I	−5.03	−16.33	−7.21	−11.94	−8.19	−15.12	−5.12	−9.26	1.53
−IMT	−5.17	0.75	−1.21	−1.59	−0.75	−0.30	2.60	1.71	−0.48
−IMS	0.36	−0.85	0.08	0.08	0.37	0.25	0.48	0.35	−0.08
−NFB	−4.81	−0.10	−1.13	−1.51	−0.38	−0.05	3.08	2.06	−0.56
GNP58	−15.69	−18.92	−13.96	−17.47	−14.98	−17.46	−11.29	−13.26	3.11
GNP$	−22.46	−32.76	−18.58	−21.59	−19.35	−29.11	−15.21	−21.23	5.63
DI$	−10.68	−14.89	0.22	−3.98	−6.37	−10.24	−6.36	−9.68	2.31
					Third Quarter of Forecast				
CA	−4.89	−10.21	−7.44	−7.93	−6.38	−9.77	−5.75	−7.58	2.62
CD	−2.23	−2.30	−2.50	−2.81	−1.56	−2.49	−1.99	−2.40	0.38
CN	−1.74	4.75	−0.42	−0.24	1.08	4.61	−2.36	−1.20	0.49
CS	−0.78	−0.78	−0.51	−0.56	−0.66	−0.70	−0.61	−0.77	0.21
C	−9.64	−8.54	−10.87	−11.54	−7.82	−8.35	−10.71	−11.95	3.70

IH	−6.93	−8.04	−6.46	−7.29	−7.09	−7.56	−3.31	−4.02	0.93
ISE	−4.38	−4.87	−4.83	−3.47	−5.76	−4.76	−2.65	−3.87	0.35
DII	−7.98	−5.63	−9.66	−5.09	−8.41	−5.23	−5.74	−2.91	1.22
I	−19.29	−18.54	−20.95	−15.85	−21.26	−17.55	−11.68	−10.80	2.50
−IMT	−5.65	−1.92	−0.73	−4.99	−0.67	−3.22	1.20	−1.37	−1.41
−IMS	0.24	−0.85	−0.16	0.17	0.43	0.31	0.66	0.42	−0.26
−NFB	−3.41	−2.77	−0.57	−4.82	−0.24	−2.91	1.86	−0.95	−1.67
GNP58	−32.34	−29.85	−32.39	−32.21	−29.32	−28.81	−20.53	−23.70	4.53
GNP$	−50.45	−53.07	−47.00	−49.44	−47.13	−50.11	−32.78	−39.41	12.37
DI$	−24.43	−24.17	−13.49	−13.66	−20.26	−20.72	−14.31	−17.22	6.73
					Fourth Quarter of Forecast				
CA	−5.36	−11.00	−8.91	−9.54	−7.36	−10.87	−7.16	−8.53	3.06
CD	−2.53	−3.52	−3.04	−4.21	−3.03	−3.73	−2.06	−3.42	0.41
CN	−0.34	6.16	−0.01	0.40	1.52	6.05	−0.84	−0.16	0.31
CS	−1.64	−0.98	−1.21	−0.92	−1.21	−0.94	−1.22	−0.99	0.17
C	−9.87	−9.34	−13.17	−14.27	−10.08	−9.49	−11.28	−13.10	3.95
IH	−7.78	−7.46	−7.07	−6.73	−7.35	−7.11	−3.85	−3.53	1.00
ISE	1.69	−7.21	−6.11	−6.47	−2.96	−7.02	−3.93	−6.07	0.83
DII	−8.55	−8.64	−9.38	−9.46	−7.74	−8.45	−5.67	−5.60	3.37
I	−14.64	−23.31	−22.36	−22.66	−18.05	−22.58	−13.45	−15.20	5.20
−IMT	−4.46	5.45	−3.45	1.94	−3.31	4.03	3.80	5.82	−1.57
−IMS	0.39	0.03	0.40	1.13	0.46	1.25	0.53	1.37	−0.27
−NFB	−4.07	5.48	−3.05	3.07	−2.85	5.28	4.33	7.19	1.84
GNP58	−28.58	−27.17	−38.78	−33.86	−30.98	−26.79	−20.40	−21.11	7.31
GNP$	−54.04	−56.12	−63.16	−55.28	−58.41	−54.04	−37.90	−40.54	6.69
DI$	−30.70	−29.57	−22.18	−19.36	−28.41	−27.13	−16.51	−20.86	5.76

NOTE: For definition of symbols, see glossary.

TABLE 6.12

Effects of Errors in Inputs for OBE, 4th Quarter, 1968

Variable	No Constant Adjustments		AR Constant Adjustments		GG Constant Adjustments		OR Constant Adjustments		Ex Ante Minus Ex Post
	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	
					Second Quarter of Forecast				
CA	−1.30	−6.62	−2.91	−3.40	−2.31	−5.70	−1.32	−3.15	0.63
CD	−0.99	−1.06	−0.29	−0.60	−0.46	−1.09	0.26	−0.15	0.03
CN	−0.63	5.86	−0.17	0.01	1.63	5.16	0.04	1.20	−0.14
CS	0.59	0.59	0.42	0.37	0.63	0.59	1.03	0.87	−0.01
C	−2.33	−1.23	−2.95	−3.62	−0.51	−1.04	0.01	−1.23	2.51
IH	0.01	−1.10	−0.10	−0.93	−0.56	−1.03	−0.34	−1.05	0.12
ISE	−7.76	−8.25	−7.25	5.89	−6.76	−5.76	−1.82	−3.04	0.14
IIA	−0.80	−1.24	−0.06	−0.71	−0.67	−0.96	−0.48	−0.65	0.08
IINA	−4.22	−1.43	−2.56	2.66	−3.99	−0.52	−1.65	1.33	0.18
I	−12.77	−12.02	−9.97	−4.87	−11.98	−8.27	−4.29	−3.41	0.52
−IMT	1.27	3.00	1.03	−3.23	1.14	−1.41	−1.41	−3.98	−2.67
−IMS	−0.14	−1.23	0.06	0.05	0.01	−0.11	0.13	−0.11	−0.20
−NF8	−1.13	−1.77	1.09	−3.18	1.15	−1.52	−1.28	−4.09	−0.87
GNP58	−13.97	−11.48	−11.83	−11.67	−11.34	−10.83	−5.56	−8.73	0.16
GNP$	−23.70	−26.32	−20.33	−22.77	−22.80	−25.60	−12.05	−18.68	6.75
DI$	−12.61	−12.35	−10.72	−10.89	−11.60	−12.10	−5.68	−8.59	1.13
					Third Quarter of Forecast				
CA	−1.99	7.63	−4.09	−4.72	−3.85	−7.36	2.80	−4.17	0.90
CD	−0.76	−1.75	0.10	−1.07	−1.15	−1.85	0.80	−0.56	−0.09
CN	1.36	7.86	0.99	1.40	2.79	7.32	2.13	2.81	−0.39
CS	−0.04	0.62	−0.02	0.27	0.29	0.56	0.64	0.87	−0.07

C	−1.43	−0.90	−3.02	−6.87	−1.92	−1.33	0.77	−1.05	0.33
IH	−1.12	−0.80	−0.97	−0.63	−0.95	−0.71	−1.06	−0.74	0.66
ISE	2.69	−6.21	−4.37	−4.73	−0.47	−4.53	1.21	−0.93	0.42
IIA	0.33	1.13	−0.18	1.37	0.11	1.11	0.34	1.48	0.10
IINA	−4.59	−5.48	−1.25	−2.88	−3.98	−5.69	−2.53	−3.60	1.40
I	−2.69	−11.36	−6.77	−6.87	−5.29	−9.82	−2.04	−3.79	2.53
−IMT	0.08	9.99	−1.34	4.05	−0.74	6.60	1.01	3.03	−0.49
−IMS	−0.02	−0.38	0.28	1.01	0.01	0.80	−0.03	0.81	−1.19
−NF8	0.06	−9.61	1.06	5.06	−0.73	7.40	−0.98	3.84	−0.68
GNP58	−4.06	−2.65	−10.85	−5.93	−7.94	−3.75	0.29	−1.00	2.23
GNP$	−24.48	−26.58	−33.00	−25.10	−31.20	−26.80	−30.38	−17.78	−0.44
DI$	−17.27	−16.17	−17.44	−14.64	−6.10	−4.80	−6.42	−10.72	−0.50
				Fourth Quarter of Forecast					
CA	0.52	−6.62	−4.36	−4.40	−2.58	−6.85	−1.99	−3.57	0.55
CD	−0.13	0.62	−0.32	1.39	−0.89	0.45	0.51	1.95	−0.01
CN	2.34	11.32	0.99	3.92	4.75	10.79	3.65	5.63	−0.42
CS	1.19	1.39	0.27	0.80	1.10	1.29	1.19	1.52	−0.10
C	3.92	6.71	−3.42	1.71	1.38	4.68	3.36	5.53	0.02
IH	−0.36	−1.00	−0.82	−0.83	−0.64	−0.92	−0.60	−0.94	2.08
ISE	−2.22	−3.88	−2.01	−3.58	−1.39	−2.93	2.43	1.06	0.39
IIA	−0.15	−1.17	−0.30	−1.11	−0.45	−1.30	0.09	−0.99	0.07
IINA	−2.33	−4.24	−1.11	−3.33	−4.11	−5.06	−2.33	−3.43	0.27
I	−5.06	−10.29	−4.24	−8.85	−6.59	−0.21	−0.41	−4.30	2.81
−IMT	1.72	7.71	−0.83	2.19	5.37	5.14	−0.30	0.92	−0.58
−IMS	−0.34	0.16	0.74	1.69	0.77	1.40	0.08	1.43	−0.39
−NFB	1.38	7.87	1.57	3.88	6.14	6.54	−0.22	2.35	−0.97
GNP58	0.24	4.29	−6.09	−3.26	0.93	1.01	2.73	3.58	1.86
GNP$	−28.14	−28.93	−34.97	−30.23	−20.55	−30.44	−30.96	−20.52	4.06
DI$	−13.79	−17.56	−18.32	−17.50	−12.16	−17.90	−10.73	−11.62	0.42

NOTE: For definition of symbols, see glossary.

TABLE 6.13

Effects of Errors in Inputs for OBE, 1st Quarter, 1969

Variable	No Constant Adjustments		AR Constant Adjustments		GG Constant Adjustments		OR Constant Adjustments		Ex Ante Minus Ex Post
	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	
	Second Quarter of Forecast								
CA	0.24	−5.40	−0.38	−1.01	−1.36	−4.87	−1.34	−2.71	0.54
CD	0.12	−0.87	0.40	−0.77	0.87	−1.57	0.38	−0.98	−0.06
CN	1.68	8.18	1.23	1.64	2.31	6.84	1.85	2.53	−0.06
CS	−0.72	−0.06	−0.37	−0.08	−0.37	−0.10	−0.48	−0.25	−0.01
C	1.32	1.85	0.88	−0.22	−0.29	0.30	0.41	−1.41	0.41
IH	−0.78	−0.46	−0.52	−0.18	−0.06	0.18	−0.38	−0.06	0.57
ISE	7.78	−1.12	1.21	0.85	2.75	−1.31	0.05	−2.09	0.44
IIA	0.56	−1.36	0.19	1.74	0.57	1.57	0.73	1.87	0.05
IINA	−3.33	−4.22	1.64	0.01	2.60	0.89	−0.90	−1.97	1.04
I	4.23	−4.44	2.52	2.42	5.86	1.33	−0.50	−2.25	2.10
−IMT	−1.28	8.63	−2.89	2.50	−2.06	5.28	1.39	3.41	−0.18
−IMS	0.12	−0.24	0.14	0.87	−0.04	0.75	−0.19	0.65	−0.11
−NFB	−1.16	8.39	−2.75	3.37	−2.10	6.03	1.20	4.06	−0.29
GNP58	4.39	5.80	0.65	5.57	3.47	7.66	1.11	0.40	2.22
GNP$	−1.43	−3.51	−5.83	2.05	−6.50	−2.30	−2.38	−5.02	−2.70
DI$	−4.91	−3.78	−3.62	−0.80	−4.50	−3.20	−0.57	−4.92	0.04

Third Quarter of Forecast

CA	2.28	−4.86	−0.44	−0.48	−0.14	−4.41	−0.77	−2.35	0.15
CD	0.54	1.29	−0.08	1.63	−1.07	0.27	−0.10	1.34	−0.05
CN	2.52	11.50	1.48	4.41	3.83	9.87	3.34	5.32	−0.53
CS	0.47	0.67	0.05	0.58	0.39	0.58	0.06	0.39	−0.16
C	5.81	8.60	1.01	6.14	3.01	6.31	2.53	4.70	−0.59
IH	1.38	0.74	1.02	1.01	1.47	1.19	1.48	1.14	0.39
ISE	0.04	−1.62	2.02	0.45	−0.60	−2.14	−1.54	−2.91	0.25
IIA	0.17	−0.85	0.15	−0.66	0.06	−0.79	0.45	−0.63	0.05
IINA	−1.51	−3.42	1.94	−0.28	−1.89	−2.84	−1.26	−2.36	0.28
I	0.08	−5.15	5.13	0.52	−0.96	−4.58	−0.87	−4.76	0.97
−IMT	0.39	6.38	−1.10	0.26	3.37	3.14	0.06	1.28	0.08
−IMS	−0.19	0.31	0.52	1.47	0.74	1.37	−0.10	1.25	0.26
−NFB	0.20	6.69	−0.58	1.73	4.11	4.51	−0.04	2.53	0.34
GNP58	6.09	10.14	5.56	8.39	6.16	6.24	1.62	2.47	0.72
GNP$	−8.83	−4.78	−1.29	2.75	−1.93	−5.82	−6.85	−6.41	−2.33
DI$	−1.69	−5.46	−0.95	−0.11	0.96	−4.82	−4.73	−5.62	−1.88

NOTE: For definition of symbols, see glossary.

TABLE 6.14

Effects of Errors in Inputs for OBE, 2nd Quarter, 1969

Variable	No Constant Adjustments		AR Constant Adjustments		GG Constant Adjustments		OR Constant Adjustments		Ex Ante Minus Ex Post
	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	Effect of Errors in Lagged Inputs	Total Ex Post Error	
					Second Quarter of Forecast				
CA	1.90	−5.24	0.32	0.28	0.23	−4.04	0.17	−1.41	0.58
CD	0.13	0.88	−0.57	1.14	−0.48	0.86	−0.49	0.95	−0.07
CN	−0.44	8.54	0.04	2.97	2.00	8.04	0.81	2.79	−0.17
CS	0.74	0.94	0.33	0.86	0.67	0.86	0.28	0.61	−0.03
C	2.33	5.12	0.12	5.25	2.42	5.72	0.77	2.94	0.31
IH	0.85	0.21	0.23	0.22	0.42	0.14	0.55	0.21	0.53
ISE	−9.25	−10.91	1.28	−0.29	−5.58	−7.12	−1.93	−3.30	0.12
IIA	−1.07	−2.09	−0.19	−1.00	−0.97	−1.82	−0.34	−1.42	0.56
IINA	−2.47	−4.38	1.00	−1.22	−1.62	−2.57	−1.10	−2.20	1.75
I	−11.94	−17.17	2.32	−2.29	−7.75	−11.37	−2.82	−6.71	2.96
−IMT	2.42	8.41	1.75	3.11	6.27	6.04	0.64	1.86	−0.26
−IMS	−0.23	0.27	0.30	1.25	0.76	1.39	0.15	1.50	−0.16
−NFB	2.19	8.68	2.05	4.36	7.03	7.43	0.79	3.36	−0.42
GNP58	−7.42	−3.37	4.49	7.32	1.70	1.78	−1.26	−0.41	2.85
GNP$	−11.70	−12.49	8.93	12.97	1.21	−2.68	−6.26	−5.82	1.50
DI$	−2.14	−5.91	5.86	6.70	3.89	−1.89	−6.98	−7.87	−0.52

NOTE: For definition of symbols, see glossary.

CHART 6.1

OBE Ex Post Forecasts: 2nd Quarter, 1967

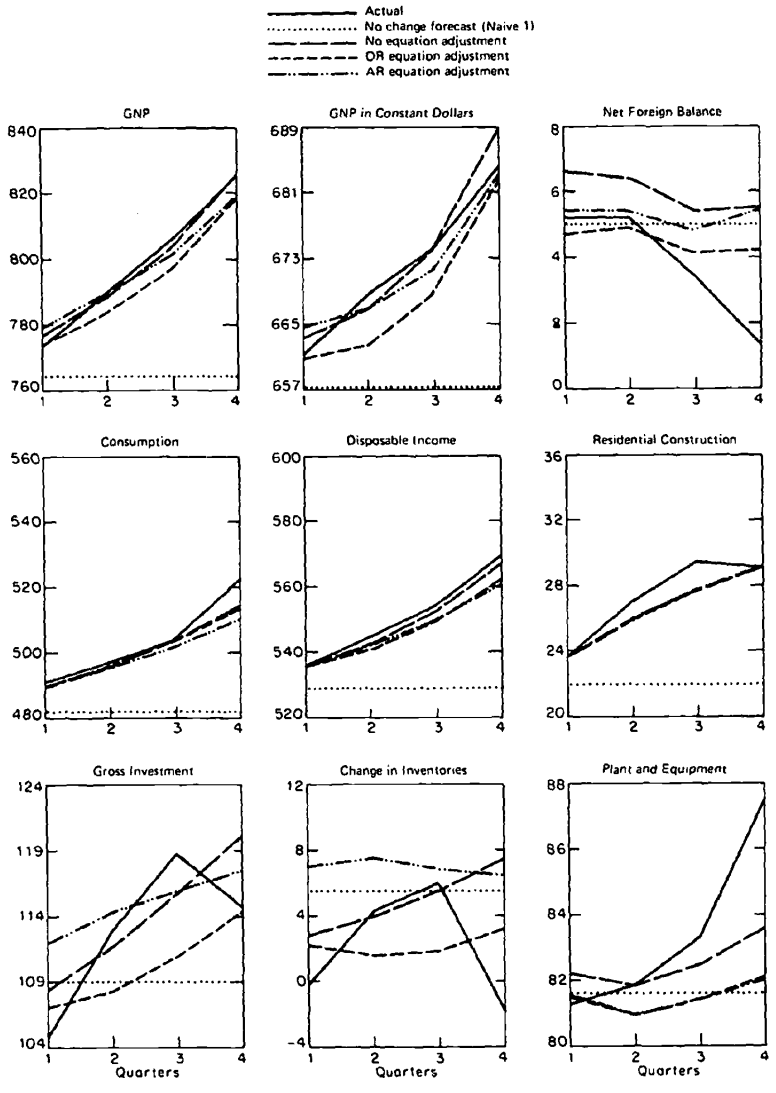

CHART 6.2

OBE Ex Post Forecasts: 3rd Quarter, 1967

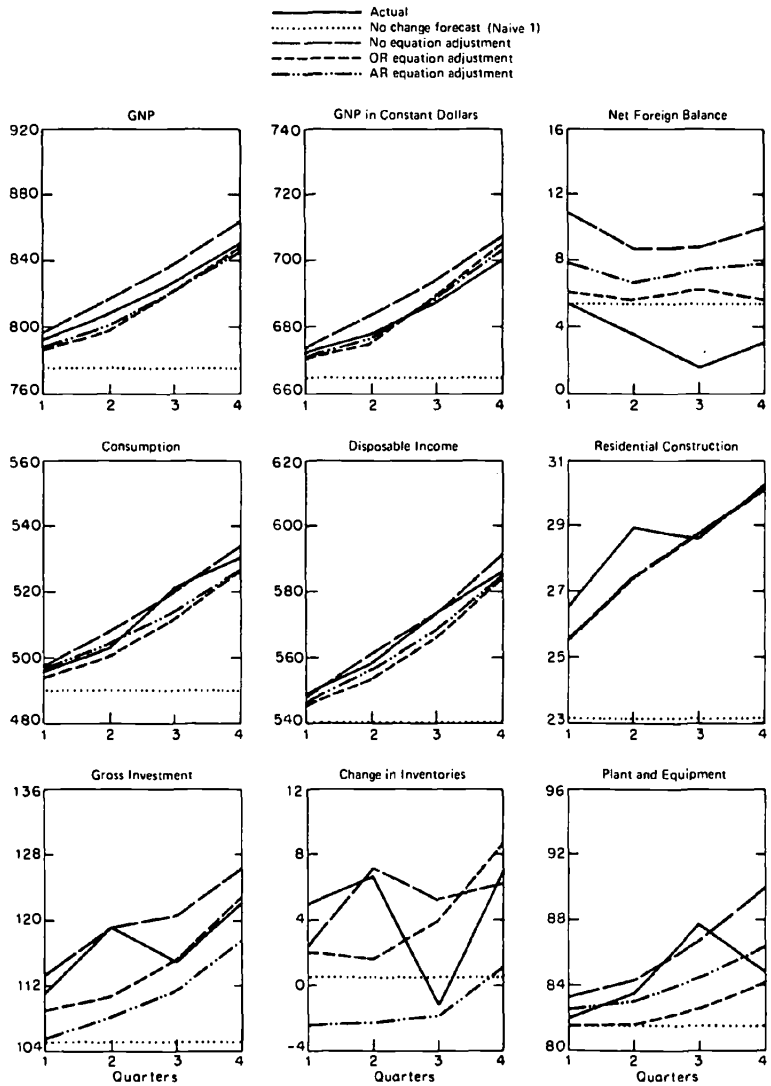

CHART 6.3

OBE Ex Post Forecasts: 4th Quarter, 1967

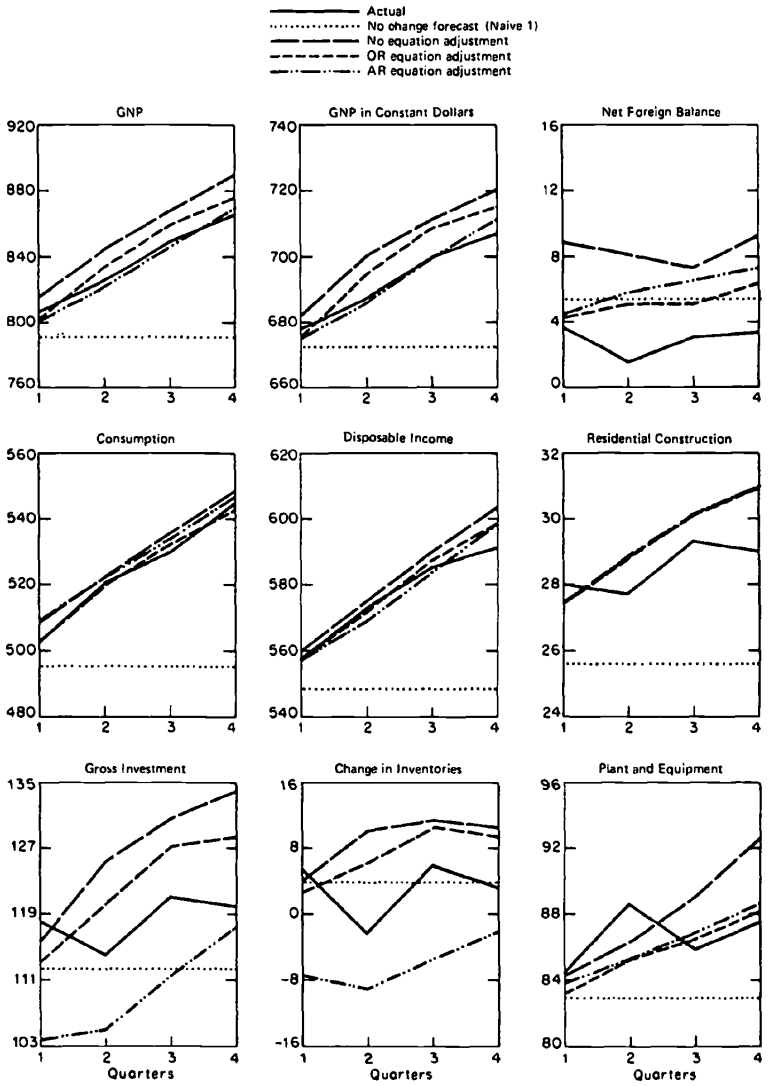

CHART 6.4

OBE Ex Post Forecasts: 1st Quarter, 1968

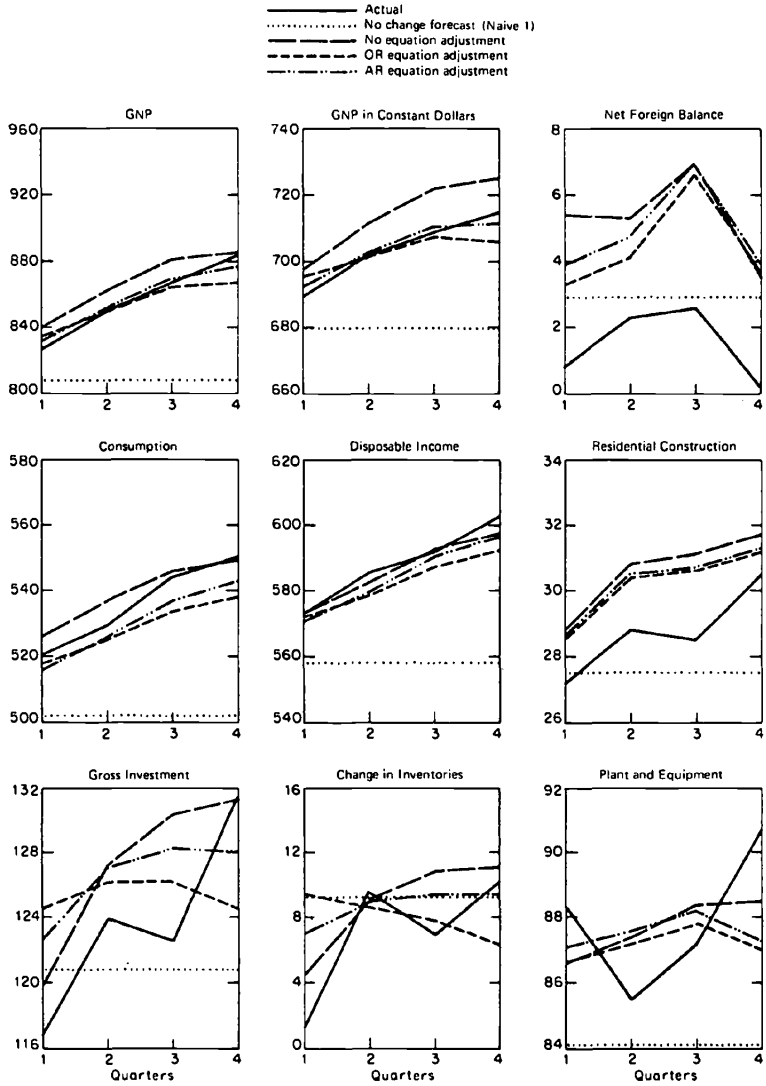

CHART 6.5

OBE Ex Post Forecasts: 2nd Quarter, 1968

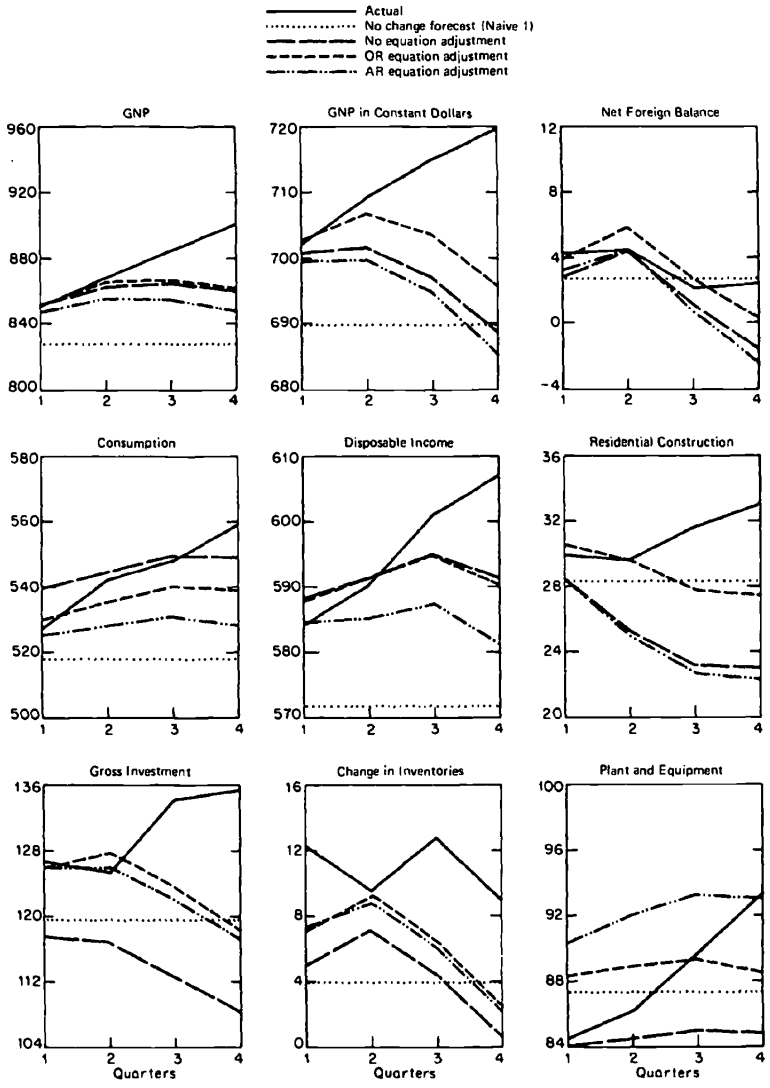

CHART 6.6

OBE Ex Post Forecasts: 3rd Quarter, 1968

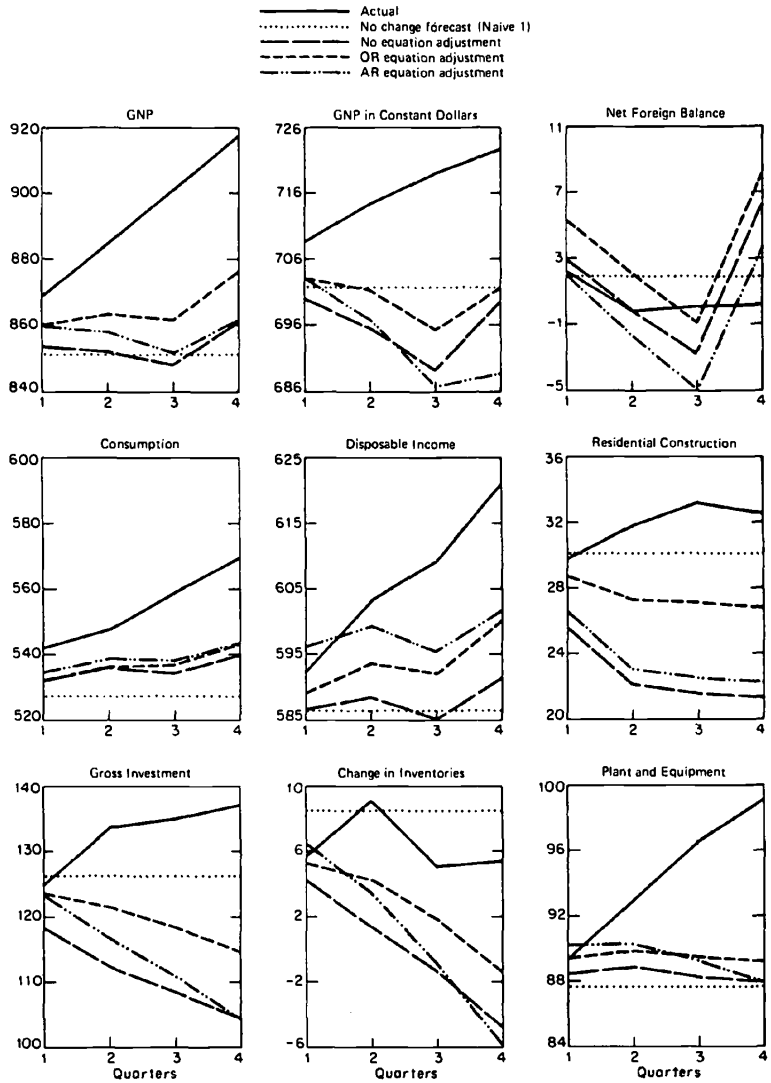

CHART 6.7

OBE Ex Post Forecasts: 4th Quarter, 1968