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I KNOW WHAT YOU DID LAST QUARTER: ECONOMIC FORECASTS OF PROFESSIONAL FORECASTERS

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Abstract: In this paper we have examined data from the Survey of Professional Forecasters. We study nominal GDP, the unemployment rate, the Treasury bill rate and the implicit price deflator beginning with the first quarter of 1992. Forecasts for a single time period appear several times in consecutive forecasts in the survey. We study the revision of forecasts for a fixed points in time. We find that the forecasts were not unbiased, but they were biased in directions one would expect, ex post. There is strong dependence of revisions of expectations on the most recently observed one step forecast errors. For most series, lagged innovations do not enter the regression equations significantly and constant terms are not significantly different from zero. Most forecasters seem to be using information on several series in their forecasts.

I Know What You Did Last Quarter: Economic Forecasts of Professional Forecasters

1. Introduction

Expectations about future events have long been of central importance in both macroeconomics and microeconomics. Since John Muth's (1961) definition of rational expectations as being the "predictions of the relevant economic theory," the rational expectations hypothesis has been a major focus of research. The implications of the hypothesis for economic policy have been recognized since the early contributions of Robert E. Lucas Jr. (1972), Thomas J. Sargent (1973) and others. For a survey see David K.H. Begg (1984).

Many empirical studies incorporate rational expectations. As expectations are generally not observed, the models are completed by making assumptions about the form that expectations take and about the information sets of economic agents. As Muth (1961 pg.315) observed, "There is, however, little evidence to suggest that the presumed relations bear a resemblance to the way the economy works."

In an effort to study expectations formation, considerable attention has been paid to expectations data collected in two surveys of professional forecasters, the Livingston Survey and the Survey of Professional Forecasters (SPF). The rational expectations hypothesis yields sharp predictions on the relationship between expectations and subsequent realizations. These studies have focused on using price expectations data to test two predictions: unbiasedness and the efficient use of available information. Surely, if professional forecasters do not form rational expectations about prices, it becomes difficult to believe models in which individual economic agents routinely form rational expectations about a whole range of outcomes. In fact, evidence against accepting the rational expectations hypothesis appears to be the dominant finding among published studies. For reviews of these studies, as well as rational expectations tests using other sources of expectations data, see Michael Lovell (1986), G.S. Maddala (1994), and Victor Zarnowitz (1985).

Not surprisingly, critiques of this literature may be easily found. One rejection of the findings is based on the simple claim that survey respondents can not or will not accurately report the expectations that determine behavior (Edward C. Prescott, 1977). Even if, as Michael P. Keane and David E. Runkle (1990) argue, SPF respondents have sufficient incentive to accurately report subjective expectations, a number of econometric and measurement issues remain concerning aggregation and pooling, assumptions made on the information respondents possess, and the appropriate source of the realizations data to compare to the reported expectations.

We address these issues by trying to make minimal assumptions on the data-generating process. Unlike previous analyses of SPF data, we exploit unique characteristics of the survey to test predictions of the rational expectations hypothesis by analyzing revisions and innovations reported in consecutive surveys, rather than by comparing expectations with subsequent realizations reported by government agencies.

With this approach, analogous tests of unbiasedness and efficiency may be conducted, but concerns about the information available to the respondent and about the proper choice of realizations data may be circumvented. Moreover, analysis of these self-reports provides evidence on the validity of the survey data.

While the SPF provides an excellent source of data for studying expectations formation, the data may be of substantive interest as well. Romer and Romer (1996), for example, use the price expectations data to study the effect of monetary policy on interest rates and inflation. Joon-Ho Hahm and Douglas C. Steigerwald (1996) use the GDP expectations data to construct a measure of aggregate income uncertainty, which plays a key role in precautionary savings behavior. The bond yield expectations data could prove useful in studies of currency and bond market dynamics. Widespread adoption of these data for such purposes, however, awaits confirmation that the data are credible. Therefore, we are very interested in assessing data validity.

The plan of the paper is as follows. In Section 2 we set out the main issues concerning the use of survey expectations data to test the rational expectations hypothesis. A detailed description of the data is also given. In Section 3 we present our assessment of data validity. We find that forecasters agree with each other, as well as the most recent government report, about the previous quarter's data. In addition, each forecaster tends to report point forecasts that are consistent with his or her own reported subjective probability distributions, and the spread of these distributions tends to decrease as the forecast horizon approaches.

Section 4 contains our analysis of expectations formation. Recognizing the heterogeneity of forecasting models across forecasters, we conduct the analysis at the individual level. We find that, over the period studied, forecasts were not ex post unbiased, but the biases were as one might expect, ex post. That is, from 1992 to 1999, forecasters were consistently surprised to find stronger GDP growth and lower inflation, unemployment, and interest rates than they had expected. As is well known, rejection of rationality based on ex post bias in a short panel may not be wise (Gary Chamberlain, 1984). The remainder of Section 4 analyzes forecast revisions in an attempt to identify the forecasting models used and to assess the efficiency of these forecasts. Summary and conclusions are given in Section 5.

2. The Survey of Professional Forecasters

Empirical studies of economic behavior under uncertainty typically impose strong assumptions on the process of expectations formation. Therefore, any test of the behavioral model of interest jointly tests the hypothesis that individuals form expectations in the assumed manner in conjunction with other auxiliary assumptions. Some researchers believe, in fact, that the only way to test a model of expectations formation is to test some economic theory of behavior that incorporates this expectations-generating process. See, for example, Prescott (1977).

Our analysis proceeds from the viewpoint, that expectations data may be analyzed to learn about expectations formation. We recognize the potential limitations of survey data on expectations, but all survey data are subject to some such limitations. One may question the ability and the incentives respondents have to report expectations accurately, but this criticism applies equally to other survey data, as demonstrated in John Bound et al. (1994). This criticism, in fact, applies less to our data than to other expectations data, because we use data from professional forecasters who appear to have the incentive and, presumably, the ability to accurately report expectations. Moreover, the data are so comprehensive that we are able to conduct a number of internal consistency checks that, if passed, must cause critics to wonder how anyone could take the time to respond to such a survey in a consistent manner without accurately reporting subjective expectations.

It is worth noting that a number of researchers have analyzed either the SPF data or the Livingston data, but we do feel there is room for further study. Keane and Runkle (1990) offer a convincing critique of this literature, focusing on aggregation biases, assumptions on the information available to researchers, the choice of realizations data, and the correlation structure of forecast errors. They proceed to conduct rational expectations tests using one-quarter-ahead price expectations data from the 1968-1986 SPF. Still, by comparing realizations to expectations, the analysis rests on assumptions about the series being forecast (e.g., either the preliminary or the revised announcement of the realization). We exploit the unique characteristics of the SPF to avoid choosing among the published realizations data, while simultaneously bringing evidence to bear on the appropriate choice. Keane and Runkle fit separate equations for the individual forecasters, and we follow the same approach here. They, however, pool the data across forecasters and assume that the covariance matrices are constant over time and equal for different forecasters. Keane and Runkle note that these assumptions are "somewhat restrictive" and state that they amount to assuming that "no forecaster is systematically better than any other.." (page 721) We relax these restrictions. In addition, we study point expectations of outcomes other than prices, as well as the associated probability assessments, to provide a more complete description of the expectations-generating processes of these professional forecasters.

The Survey of Professional Forecasters has been conducted quarterly since 1968. Originally a joint project of the American Statistical Association and the NBER, the data are currently collected and stored by the Federal Reserve Bank of Philadelphia. The data are freely available on the internet from the web site of the Federal Reserve Bank of Philadelphia (www.phil.frb.org/spf/spfpage.html). The questions asked and the series covered have been changed occasionally (e.g., switching between real and nominal values and changing from GNP to GDP). The questions currently asked have not been changed since the first quarter of 1992, and these are the data we use in this paper. The series analyzed are: nominal GDP, the implicit price deflator, the unemployment rate and the Treasury bill rate. The period covered by the data (1992:1-1999:1) constitutes a time of relative stability; therefore, we believe it is reasonable to assume that the forecasting models have been stable over the period. Thus, we hope that our analysis is not subject to a " Lucas critique" (Lucas(1976)). See John Caskey (1985) for an analysis of the Livingston data in which the forecasting model is allowed to change over time.

Each quarter, SPF respondents are asked to provide forecasts for eighteen series and to provide their subjective probabilities of the growth rates for two of them (real GDP and the implicit price deflator). For each series, respondents are asked for the value of the series in the previous quarter, the forecast value for the current and four subsequent quarters, and the forecast level for the current and subsequent calendar years. A total of 91 forecasters took part in the surveys in our period, contributing a total of 1068 observations. Some respond only occasionally or drop out while others report in almost every quarter. Several forecasters were added to the survey in 1994 and 1995. Most of our analysis is based upon the full sample. For part of our analysis, we restrict the sample to forecasters who responded at least 15 times. In discussing the contents of the survey, it is hard not to refer to the forecasters as people. We do not know which, if any, of the forecasters are actually individuals. The forecasters are identified by number only, and we do not know if the respondents are particular individuals or are different members of a group. Nor can we tell if the identity of the person providing the information remains constant or changes over time.

At the time the survey is taken, official data for the previous quarter have been announced. For GDP, for example, the advanced figure for the previous quarter will have been published in the *Survey of Current Business*. By the time of the next survey, the final revision for that quarter will be available. Prior studies of the SPF data have varied in their definitions of the realization against which to compare forecasts (Keane and Runkle, 1990). The key feature of the data that we exploit in our analysis is that there are available five forecasts for a fixed point in time. That is, the forecast for the third quarter of 1995, for example, will appear as a four-quarter-ahead forecast in the third quarter of 1994, a three-quarter ahead forecast the following quarter, and so on, until it is the current period forecast. Finally, a sixth report will come in the fourth quarter of 1995, with which we can identify the innovation or forecast error (i.e., the difference between this self-reported realization and the previously-reported current period forecast).

In the analysis that follows, we look at the revisions of the forecasts and estimate equations relating the revisions of one-, two-, three- and four-step forecasts to the most recent one-step forecast error. As the forecasters could be using either VAR models or univariate forecasts, we allow the revisions in one series to depend on innovations in other macro time series. Note that focusing on revisions and innovations allows us to avoid a potential problem if some of the series have unit roots. Intuitively, if a series has a deterministic component or if some difference of it is stationary, then forecasts for the same time period computed at different points in time can differ only in the forecasts of the purely non-deterministic components. Thus, when computing the revision or the innovations, the common deterministic components cancel out. A formal statement and proof is given by Peter Whittle (1983, p.95).

3. Evidence on Data Validity

In this section we present evidence that we believe lends credibility to the SPF data. We acknowledge that we cannot prove that the forecasts obtained in the survey are the forecasters' "best" estimates (e.g., means of subjective probability distributions). Instead, we ask: Do the published forecasts exhibit behavior we would expect from rational forecasts?

In Section 2 we pointed out that, at the time the survey is taken, the values of the variables are not known for the current quarter, but published preliminary figures are available for the preceding quarter. For each series, respondents are asked to report the value of the series for the preceding quarter. The responses show that the forecasters almost always agree with the published figures. For example, in the first quarter of 1992 (the first quarter used in our analysis), 38 of the 40 respondents gave 5736.6 as the previous quarter's GDP. The other two did not answer the question. This is fairly typical. Most forecasters agree, and most occasional disagreements appear to arise from use of a different rounding rule than the published data or from a typographical error (e.g., switched digits). A sample of the data for 1993 is presented in the appendix as Table A-11. Table 1 describes the cross-sectional (i.e., across forecasters) variance of point forecasts for each of the six forecast lengths. Notice that the variation generally increases in forecast length as would be expected. Also notice that the variance for the previous quarter is, in each of the four series, at least an order of magnitude less than the variance for the current period. For example, the variance in the preceding quarter's nominal GDP is 10, and the variance of the estimates of the current quarter's GDP is 780.

In addition to forecasting the levels of various macro time series, respondents report their subjective probability distributions for rates of growth of two series: real GDP and the implicit price deflator. The distributions are elicited by asking for the subjective probability that the realized growth rate will fall in each of ten intervals. For each series, eight of the intervals are of the same size (one percentage point) and two open-ended intervals at the top and bottom of the scales. For the price deflator (GDP), the intervals range from more than an eight (six) percent increase to more than zero (two) percent decrease. The subjective distributions refer to rates of growth from the previous to the current calendar year and from the current to the next calendar year. Notice that the point estimates of the rates of growth are not elicited. There is, therefore, no direct check on the consistency of their stated subjective distributions and their point forecasts. Respondents are asked, however, to give estimates of the annual values of the series for the current and next calendar years. From these we can calculate the implied rates of growth and check to see if they are consistent with the stated distributions. The short answer is yes. The calculated rates of growth tend to be in the center of the stated subjective distributions. We calculated the subjective probability mass assigned to the closed, one percentage-point-wide interval in which the calculated growth-rate fell. For the price deflator, the cross-sectional median amount of probability mass assigned to this interval was 0.50 (mean=0.46), while for GDP the median is .45 (mean=.42). In summary, though no questions are asked directly relating to the consistency of the point forecasts and the subjective probabilities, both sets of answers do appear quite consistent with each other.

Since the survey asks for the subjective probability distributions of rates of growth for the current and next calendar years, a single year (e.g., 1994) appears eight times (from 1993:1 through 1994:4). While it is not logically required, we would expect that, as the forecast period shortens, the amount of subjective uncertainty tends to decrease. We noted earlier that the cross-sectional dispersion of forecasts increases with forecast length. That increasing dispersion seems intuitively reasonable, but it is not a direct measure of any forecaster's uncertainty. Forecasters could be quite certain about their own forecasts but hold quite differing opinions. To assess subjective uncertainty, we computed for each forecaster the entropy of the subjective distribution. The use of entropy as a measure of the amount of information in a probability distribution dates from the work of Clyde Shannon (1948). Figures 1 and 2 give box and whisker plots for the GDP series and the price deflator. Each plot gives the median and interquartile range, in addition to individually identifying outliers.

The entropy for a discrete distribution is defined as:

$$- p \log(p).$$

For these figures, the entropy numbers use logarithms base 8 so that the measure ranges from 0 (each probability equals 1/8) to 1 (one probability equal to 1.0 and the rest equal to 0.0). Both figures show the same patterns. The cross-sectional median entropy rises as the forecast horizon grows from zero to three-quarters ahead, and it is basically flat from then on. During the period of this study, the growth in GDP was fairly steady and the rate of increase in prices was mild, so that virtually no one placed any subjective probability in the open-ended categories. We omitted those few observations that did assign tail probabilities rather than arbitrarily allocate this probability mass to one or more subintervals.

In summary, the forecasters in the survey get the previous quarter's data right, give point forecasts that are consistent with their reported probability distributions and show decreasing uncertainty as the forecast length shortens. While we acknowledge that this evidence does not prove that the forecasts are actually the forecasters' expectations of future realizations, it is clear that, at a minimum, the forecasts are systematic.

4. Expectations Formation

Researchers have typically focused on two questions about expectations: are they unbiased, and are they efficient? We begin with the issue of unbiasedness. Table 2 presents the mean innovation or surprise (i.e., the difference between self-reported realizations and prior-quarter, one-step forecasts) for each of the four series for each forecaster who appears in the survey at least fifteen times. The general conclusion has to be that the mean surprises are not large, but too many of them are statistically significant to attribute the results to chance. Thus, the data cannot support the finding of ex post unbiasedness. For unemployment, 11 of the 29 means are significant at the .05 level and 7 of these are significant at .01. Note also that 27 of the 29 means are negative, including all of those that are statistically significant. Thus it appears that unemployment was less than these forecasters expected over the period 1992:1 to 1999:1.

The results for the other series are similarly systematic. Interest rates and inflation were lower than expected, while GDP exceeded expectations. In particular, twelve mean innovations in interest rates are significant at the .05 level and seven of these are significant at the .01 level as well. Twenty-one of the 29 means are negative, including all of those significant at the .01 level and all but one of those that clear the bar at .10. Only one of the mean innovations is positive for the price level series, and it has a p-value of .62; whereas eighteen forecasters have mean innovation that are negative and significant at the .10 level. For gross domestic product, all but one of the means are positive, with the null hypothesis of zero mean (i.e., ex post unbiased) rejected for 16 forecasters at the ten percent level and for four of them at the one percent level.

The overall picture is that, over the period 1992 through 1999, the forecasters found higher output and lower prices, unemployment and interest rates than they had expected. That description probably agrees with the position of most commentators on that period during which the United States economy experienced steady growth with low unemployment and interest rates and, by historical standards, low inflation. Note that because the period studied is relatively short and contains relatively homogeneous experience, we are not arguing that the forecasts would be biased in the long run. We merely document that over this particular period we reject the hypothesis of ex post unbiasedness, and that the directions of the biases are consistent with our ex post intuition.

Tests of efficient use of information generally involve estimating regressions involving predictions and realizations for the series considered. Keane and Runkle (1990), for example, regressed the realized value of a series on its forecast value, a constant term and one of several additional variables assumed to be in the forecasters' information sets at the time the forecasts were made. If the forecasters make efficient use of available information, these other variables should have zero coefficients. This is what Keane and Runkle found (see their tables 2,3 and 4).

Let x(t+k,t) be the forecast, made at time t, of the time t+k value of x (i.e., the k-step-ahead forecast), and let e(t) be the value of the innovation or surprise that the forecaster observes at time t (i.e., x(t,t)-x(t,t-1)). Then, if individuals form least squares forecasts based on a univariate model, forecast revisions are a linear function of contemporaneous innovations:

$$x(t+k,t) - x(t+k,t-1) = b(k)\,(x(t,t) - x(t,t-1)) = b(k)\,e(t) \qquad (1)$$

where b(k) is a scalar. See the discussion in James Hamilton (1994, Chapter 4) or in Marc Nerlove, David Grether, and José Carvalho (1995, Chapter 5). For the multivariate case see Gregory C. Reinsel (1997, Chapter 2). Notice that the slope of the relation depends upon the forecast horizon k and that there is no constant or error term. It is unbiasedness that yields the zero constant, while efficiency implies that earlier innovations (e.g. e(t-1), e(t-2),etc.) are not included in the equation. In the above it is assumed that x(t,t) is the actual value of the series to be forecast.

Figure 3 illustrates the variation of price deflator one-step-ahead forecast revisions with corresponding innovations for our sample forecasters. We do not actually expect the forecasts to satisfy equation (1), because we already know that the forecasters are not all using the same univariate model and information sets to forecast the prices; otherwise, their forecasts would be unanimous. Nevertheless, the graph pooling all the forecasts together certainly suggests linearity. The corresponding plots for longer forecast periods are similar, but with more dispersion. As we shall discuss later, this is true at the individual level as well.

From inspection of the data we know that nearly all the forecasters agree as to the value of the series in the previous quarter. Indeed, the values for the previous quarter correspond to those found in the then-current issue of the *Survey of Current Business*. As stated above, this fact justifies our use of the difference between self-reports for the previous quarter and their one step forecast to identify the innovation.

Tables A-1, A-2, A-3 and A-4 in the appendix give the results of estimating regressions at the individual level, corresponding to equations (2) and (3):

$$x(t+k,t) - x(t+k,t-1) = a(k) + b(k) (x(t,t) - x(t,t-1)) + u(t) = a(k) + b(k) e(t) + u(t) \quad (2)$$

and

$$x(t+k,t) - x(t+k,t-1) = a(k) + b(k) e(t) + c(k)e(t-1) + u(t) \quad (3).$$

In order to allow the reader to get a reasonably quick visual impression of the results, we have shown only those regression coefficients that are significant at a .10 level or better. As before, we restrict this analysis to those forecasters who responded to the survey at least fifteen times. This restriction selects in favor of those forecasters who take the SPF seriously. Twenty-nine forecasters satisfy this criterion. With four single period forecast intervals for each series, we estimated 126 regressions for each specification

The estimated constant terms and coefficients on lagged innovations tend not to be significantly different from zero in either specification, whereas the estimated coefficients on the current innovations typically are highly significant. For the unemployment rate, for example, only four of the estimated coefficients of the innovations in (2) were not significant at the .10 level. Exactly two of the intercepts were significant at that level and none were at the .05 level of significance. The estimates of equation (3) show six significant lagged terms (from four different forecasters), three of which are significant at .05 with one at .01. No estimate of equation (3) had a significant intercept. The regression estimates exhibit a common pattern across the series; the fit, measured by the fraction of variance explained, deteriorates as the length of the forecast period increases. Thus, the forecasters appear to be using other information in addition to the own series innovations, and this other information is more important the longer the term of the forecasts.

For the price deflator, all the slopes are significant in equation (2). The estimates of the intercept for the price level are significant 31 times, far exceeding the nominal significance level. There are twelve significant coefficients for the lagged innovations of the price deflator, all from four forecasters.

Interest rates are somewhat of an exception as six forecasters have no significant coefficients for either specification. Otherwise the results are similar. Just four constant terms are significant, with only two at .05. Lags are almost always not significant with eight significant at .05 and five other coefficients with p-values between .05 and .10.

The GDP series is the most extreme case, with 21 significant lagged coefficients contributed by eleven particular forecasters. For this series, however, there is an additional complication. That is, the figures for GDP two quarters previous are revised versions of the figures given for that quarter one quarter earlier. Thus, in quarter t, there is new information about the levels of that series in two previous quarters, rather than just one. We calculated the published revisions in GDP and included them in statistical models corresponding to equation (1) Since we do not have self-reported values for the level two quarters earlier, this imposes a further assumption that the revisions constitute for each forecaster the new information concerning the level of GDP in quarter t-2. We then re-estimated equations (2) and (3) with the revision of the previous lagged quarter data as an additional regressor. This revision equals the difference between the preliminary estimate and the so-called final estimate. Including this extra variable adds an extra lag, and reduces the sample sizes. The results of these calculations are shown in Tables A-5 and A-6 in the Appendix. With these adjustments, the number of significant lag coefficients is in line with the results for the other three series. The calculations in Tables A-1 through A-6 are summarized in Figures 4 through 8, which show pie charts of the number of forecasters with none, one, or more than one significant coefficients on the lagged innovations. The change in the GDP performance when the adjustments are taken into account is especially clear.

Generally, the number of coefficients found to be significant and the number of forecasters associated with them is within what one would expect by chance. Assuming (somewhat implausibly) independence, the probability of a forecaster having one or more lag terms (intercepts) significant at the .10 level is .815. With four different forecast horizons for each of the four series, the probability that no lag coefficient is significant is $.9^{16}$. This probability yields an expected number of forecasters with significant coefficients of about 24, which is consistent with the observed counts. The probability of a forecaster having a significant coefficient on the lagged innovation (constant term) for a single series is .344 ($1-.9^4$), which implies that one would expect about ten forecasters to show significance for a series, which also is in line with the observed counts. The chance of having significant slopes (intercepts) in two or more series is .426, implying that we expect 12 of the forecasters to do so, and we observe nine. Overall, it appears that lagged values of innovations do not increase explanatory power.

The results thus far have established that innovations in a series are generally statistically significant predictors of forecast revisions for that same series. Given that the forecasters are generating predictions for several interrelated series, it seems likely that some of them might use information about several series when forecasting any one of them. To learn about such forecasting models, we estimate regressions with forecast revisions as the dependent variable and innovations in all four series as independent variables. We did not explore the possibility of lags in this specification, because the number of observations is too small to do so with any precision. The results of this exercise are shown in Tables A-7 through A-10 of the Appendix. To limit clutter, we have reported only those equations for which estimates of the coefficients on one, two, or all three of the other innovations were significant at the .10 level or better. The tables identify the variable and the pair of variables that were most statistically significant and gives the associated p-values. In addition, we report the results of F tests of the hypothesis that all three of the innovations in the other series are jointly significant.

As the number of regressions is large and the number of combinations of tests is even larger we shall confine our discussion to the F tests of the joint significance of the innovations in the other series. The innovations reflect the effects of shocks to the system, so it seems reasonable to expect that the innovations will be correlated across series. This makes the assumption that the test statistics are independent even less palatable. We summarize these results in Table 3. For 23 of the 29 forecasters, the null hypothesis that the three other innovations are not significant was rejected at the ten percent level or better. Notice that this is almost exactly what one would expect by chance. Though the number of forecasters with significant sets of coefficients is consistent with the null hypothesis from Table 4, we note that the number of times the hypothesis is rejected at the series level is higher. In other words, there is the expected number of forecasters with significant coefficients, but their coefficients are significant more than chance would lead us to expect. While the null hypothesis is not rejected for all four series for any of the forecasters, it is rejected for three of the series for seven forecasters, and there are ten additional forecasters whose revisions to two series of forecasts appear to be based on all of the innovations. One inference that seems quite clear is that the forecasters are using information on several series in forming their forecasts. The interested reader can consider other combinations of tests. We provide summaries of the regressions in the Appendix.

5. Summary and Conclusions

In this paper we have reexamined data from the Survey of Professional Forecasters. We limited our investigation to four series, nominal GDP, the unemployment rate, the Treasury bill rate and the implicit price deflator over the period beginning with the first quarter of 1992. Our study is differentiated from earlier ones in at least two significant ways. First, we have explicitly explored the issue of the validity of the forecasts. That is, do the forecasts behave in ways we would expect them to if they were, indeed, real forecasts, as opposed to simply what you get from someone thoughtlessly filling out a form? We conclude that those forecasters responding to the survey 15 or more times provide numbers that behave in ways consistent with the hypothesis that the numbers are real forecasts. By concentrating on forecasters with the most responses, we may have eliminated some forecasters who do not take the survey seriously. A key finding supported in Tables 1 and 2 and alluded to in the title of this paper is that the forecasters are nearly unanimous in their agreement about the levels of the series in the previous quarter.

A key feature of the data which, as far as we know, has not been exploited before is that forecasts for a single time period appear several times in consecutive forecasts. Respondents are asked each quarter to provide values for the series in the previous quarter, the current quarter and for each of the next four quarters. Thus, it is possible to study the revision of forecasts for a fixed point in time. We treat the difference between the reported value of a series for the previous quarter and the previously announced prediction of the then-current quarter as the surprise or innovation in that series. We examine the relation between revisions of forecasts for fixed points in time and the current and past surprises in all series. This allows use to use a larger fraction of the data and to avoid potential problems with unit roots.

Over the period studied, we find that the forecasts were not unbiased, but they were biased in precisely the directions one would expect, ex post. The forecasters were consistently surprised to find GDP levels as high as they were, and they generally expected more inflation, higher unemployment and higher interest rates than the economy experienced. In this they are probably no different from the majority of forecasters.

There is strong dependence of revisions of expectations on the most recently observed one step forecast errors. For most series and forecasters, lagged innovations do not enter the regression equations significantly and constant terms are not significantly different from zero. The primary exception appears at first to be GDP, but, after incorporating quarterly revisions in government reports, the results for GDP are similar to those obtained with the other series.

Most forecasters seem to be using information on several series in their forecasts. The hypothesis that forecasters are using univariate models is rejected for most of the forecasters and over half of them use information on other series in forming expectations for at least two of the four series studied.

We believe that we have shown that the forecasts contained in the SPF have significant information content and are generally consistent with the rational expectations hypothesis. We note that there are many more series covered in the survey than we have analyzed and new observations are generated each quarter. We encourage readers interested in these data or who doubt our conclusions to explore the data that are freely available on the internet at the Web site of the Federal Reserve Bank of Philadelphia.

Are these data or other data on expectations useful for the purpose of modeling or forecasting the course of the economy or of economic sectors? The forecasts covered in the survey are relatively short term, so it may be that the value gained in using them is limited. Without understanding in detail how the forecasts are generated it is hard to see how they could be incorporated into models used for longer-term forecasts. However, it seems to us that if these data are of substantive interest, there could be significant value in the systematic collection and analysis of expectations about longer-term economic developments.

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Table 1

Residual variances from regressions on quarterly dummies
for the period 1992-1 to 1999-1

Dependent variable	Mean Square
Nominal GDP last quarter	10
Nominal GDP this quarter	780
Nominal GDP next quarter	1146
Nominal GDP +2 quarters	3302
Nominal GDP +3 quarters	4983
Nominal GDP +4 quarters	6775
Price deflator last quarter	.00
Price deflator this quarter	.04
Price deflator next quarter	.12
Price deflator +2 quarters	.25
Price deflator +3 quarters	.44
Price deflator +4 quarters	.68
Unemployment rate last quarter	.00
Unemployment rate this quarter	.01
Unemployment rate next quarter	.03
Unemployment rate +2 quarters	.05
Unemployment rate +3 quarters	.08
Unemployment rate +4 quarters	.10
Treasury bill rate last quarter	.00
Treasury bill rate this quarter	.03
Treasury bill rate next quarter	.06
Treasury bill rate +2 quarters	.10
Treasury bill rate +3 quarters	.17
Treasury bill rate +4 quarters	.25

The raw data showed variance of the next period forecast unemployment rate of .06, which is larger than the .05 for the two-quarter ahead forecasts. One forecaster predicted the following sequence of unemployment rates 5.5,5.5,0.5,5.5. We assumed that rather than expecting a one-quarter boom and bust, the 0.5 is an error. The figures in Table 1 replaced the 0.5 with 5.5.

Table 2

Means of innovations for all forecasters appearing at least 15 times in the survey.
Figures in parentheses are p- levels.

ID	mean u	sample size	mean	sample i	mean size	sample	mean p	sample size		gdp	size
20	-.06 (.10)	16		-.05 (.63)	16		-.35 (.01)	14		-13.6 (.66)	16
40	-.07 (.12)	17		.03 (.61)	17		-.43 (.01)	9		12.9 (.30)	17
65	-.13 (.00)	29		-.07 (.03)	29		-.05 (.60)	25		25.7 (.00)	27
84	-.01 (.65)	24		-.04 (.11)	25		-.11 (.08)	21		16.5 (.08)	25
94	-.07 (.07)	21		.05 (.07)	21		-.04 (.71)	12		24.0 (.02)	21
99	-.08 (.17)	9		.00 (.95)	9		-.14 (.38)	7		15.0 (.04)	9
404	-.03 (.27)	24		-.07 (.00)	24		-.07 (.33)	20		22.0 (.04)	24
405	.11 (.05)	9		0.05 (.53)	9		-.21 (.02)	8		5.1 (.72)	9
407	-.04 (.33)	25		-.05 (.17)	25		-.29 (.01)	17		3.6 (.57)	23
411	-.06 (.09)	23		-.02 (.43)	23		-.06 (.46)	21	21.9	23 (.00)	
414	-.03 (.46)	22		-.15 (.02)	21		-.11 (.28)	20		16.0 (.15)	22
420	-.12 (.00)	20		-.09 (.00)	20		-.30 (.00)	19		17.7 (.06)	22
421	-.06 (.08)	22		-.05 (.08)	25		-.16 (.06)	23		20.1 (.02)	27
423	-.01 (.89)	12		-.18 (.10)	11		.10 (.62)	7		6.1 (.56)	11
426	-.131 (.00)	27		.02 (.43)	27		-.22 (.02)	23		17.6 (.05)	27
428	-.06 (.11)	25		-.06 (.07)	25		-.30 (.01)	21		14.6 (.10)	25
429	-.06 (.05)	25		-.04 (.03)	25		-.01 (.88)	14		27.0 (.00)	25

Table 2 (continued)

ID	mean u	sample size	mean i	sample size	mean p	sample size	gdp	size
431	-.11	19	.01	19	-.06	16	29.1	18
	(.00)		(.79)		(.52)		(.03)	
433	-.06	29	.02	29	-.10	25	21.9	29
	(.02)		(.51)		(.22)		(.01)	
439	.02	23	-.10	16	-.24	19	10.3	23
	(.78)		(.00)		(.01)		(.22)	
442	-.11	17	.03	17	-.31	13	13.2	15
	(.01)		(.27)		(.01)		(.39)	
446	-.12	19	-.11	19	-.29	17	18.6	17
	(.00)		(.00)		(.00)		(.08)	
452	-.11	15	-.03	14	-.39	10	18.0	15
	(.01)		(.35)		(.02)		(.21)	
456	-.03	15	-.17	6	-.32	11	21.3	15
	(.43)		(.04)		(.02)		(.15)	
463	-.01	15	-.16	15	-.17	13	9.4	11
	(.61)		(.00)		(.09)		(.42)	
469	-.07	13	-.13	13	-.12	11	28.3	13
	(.06)		(.04)		(.04)		(.10)	
472	-.05	13	-.07	15	-.25	13	21.6	14
	(.16)		(.05)		(.01)		(.11)	
475	-.13	13	-.02	13	-.29	11	34.7.	13
	(.02)		(.38)		(.02)		(.05)	
481	-.05	13	-.12	13	-.28	8	___	
	(.17)		(.01)		(.17)			

Table 3

Summary of tests of joint significance of innovations

Number of forecasters with all three innovations significant in forecasting

Series	Interest Rate	Price Deflator	GDP	Unemployment Rate
Number	19	13	18	14
Expected number	10.0	10.0	9.6	10.0

Number of forecasters with all three innovations significant for more than one forecast length

Number	16	10	14	7
Expected number	7.8	7.8	7.6	7.8

Number of forecasters with innovations significant for more than one series: 17
Expected number 12.5

Pair of series (i,g) 9 (i,p) 6 (i,u) 3 (g,p) 4 (g,u) 6 (p,u) 3

Number of forecasters with all innovations significant for three series: 7
Expected number 3.1

Sets of series (i,g,p) 2 (i,u,g) 2 (i,p,u) 1 (u,g,p) 2
Number of forecasters with all innovations significant for four series: 0
Expected number 0.4

Legend: i- interest rate, g-nominal GDP, p- implicit price deflator, u-unemployment rate
Expected values computed assuming the null hypothesis is true and that the tests are independent with size equal to the nominal significance level of .1.

For GDP one forecaster never responded so there are only 28 respondents.

Appendix

Table A-1 Unemployment Rate

Coefficients and significance levels for current and lagged innovations
Dependent variable is forecast revision.

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
20	0	.63 (.02)			.28	16
	1	.76 (.01)			.33	16
	1		-.62 (.10)		.40	10
	2	.71 (.02)			.31	16
	3	.64 (.03)			.24	16
	3		-.63 (.05)		.45	10
40	0	1.26 (.00)			.87	17
	1	1.51 (.00)			.79	17
	2	1..55 (.00)			.73	17
	3	1.51 (.00)			.64	17
65	0	1.13 (.00)			.65	29
	1	.86 (.00)			.45	29
	2	.73 (.00)			.31	29
	3	.57 (.03)			.16	25
84	0	1.18 (.00)			.44	24
	1	1.15 (.00)			.43	24
	2	1.45 (.01)			.29	23
	3	1.41 (.04)			.19	18
94	0	.891 (.00)			.40	21
	1	1.13 (.00)			.38	20
	2	1.40 (.00)			.38	19
	3	1.43 (.00)			.35	19
99	0	1.20 (.00)			.51	9
	1	1.11 (.03)			.43	9
404	0	.94			.30	20

Table A-1 Unemployment Rate (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
		(.00)				
	1	1.02			.32	24
		(.001)				
	2	1.03			.27	24
		(.01)				
	3	1.13			.25	24
		(.01)				
405	0	1.13			.53	8
		(.03)				
407	0	.92			.64	25
		(.00)				
	1	.81			.38	25
		(.00)				
	2	.53			.12	25
		(.05)				
	3		.52		.12	24
			(.10)			
411	0	1.134			.45	23
		(.00)				
	1	1.13			.45	23
		(.00)				
	2	1.10			.38	23
		(.00)				
	3	.90			.27	23
		(.01)				
414	0	.90			.61	22
		(.00)				
	1	.93			.46	22
		(.00)				
	2	1.09			.49	22
		(.00)				
	3	1.05			.49	22
		(.00)				
420	0	.82			.34	20
		(.00)				
	1	.96			.32	20
		(.01)				
	2	.87			.27	20
		(.01)				
	3	.69			.20	20
		(.03)				
421	0	1.52			.64	27
		(.00)				
	1	1.48			.59	27
		(.00)				
	2	1.57			.56	27
		(.00)				
	3	1.78			.57	27
		(.00)				
423	0	1.09			.78	12
		(.00)				
	1	1.27			.73	12
		(.00)				
	2	1.36			.72	12

Table A-1 Unemployment Rate (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size

		(.00)				
	3	1.53			.73	12
		(.00)				
426	0	1.19			.59	27
426	1	1.17			.40	27
		(.00)				
	2	1.12			.41	27
		(.00)				
	3	.81			.23	27
		(.01)				
428	0	1.21			.69	25
		(.00)				
	1	1.00			.45	25
		(.00)				
	2	.88			.373	25
		(.00)				
	2	.84	.55		.44	24
		(.01)	(.02)			
	3	.47			.10	25
	(.07)					
	3	.44	.62		.31	24
		(.06)	(.01)			
429	2	1.38			.39	25
		(.00)				
	3	1.42			.33	25
		(.00)				
431	0	1.63			.59	19
		(.00)				
	1	1.85			.55	19
		(.00)				
	2	1.78			.50	19
		(.00)				
	3	1.74			.47	19
		(.00)				
433	0	1.06			.47	29
		(.00)				
	1	.99			.32	29
		(.00)				
	2	.83			.22	29
		(.01)				
	3	.74			.13	29
		(.03)				
439	0	.75			.58	23
		(.00)				
	1	.67			.50	23
		(.00)				
	2	.49			.17	23
		(.03)				
	3	.40			.11	23
		(.07)				
442	0	.94			.34	17
		(.01)				
	1	1.31			.38	17
		(.01)				
	2	1.48			.33	17

Table A-1 Unemployment Rate (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
		(.01)				
	3	1.14			.22	16

		(.04)				
446	0	1.01			.37	19
		(.00)				
	1	1.06			.34	19
		(.01)				
	2	.90			.27	19
		(.01)				
	3	.83			.23	19
		(.02)				
452	0	.79			.22	15
		(.05)				
	2		.84		.19	13
			(.07)			
456	0	1.92			.60	15
		(.00)				
	1	2.03		.12	.50	15
		(.00)		(.09)		
	2	1.78			.30	15
		(.02)				
	3	1.79			.23	15
		(.04)				
463	0	1.18			.42	15
		(.01)				
	1	1.54			.48	15
		(.00)				
	2	1.11			.22	15
		(.05)				
469	0	1.09			44	13
		(.01)				
	1	.86			.20	13
		(.07)				
472	0	.47		-.08	.16	15
		(.08)		(.06)		
475	0	1.16			.35	13
		(.02)				
	1	.84			.16	13
		(.10)				
481	0	.91			.28	13
		(.04)				
	1	1.23			.24	13
		(.05)				
	2	1.25			.24	13
		(.05)				
	3	1.51			.24	12
		(.05)				

The figures in parentheses are significance levels. Coefficients with p levels greater than .10 are not shown. All IDs occurring at least fifteen times for one or more series are included.

Table A-2 Implicit Price Deflator

Coefficients and significance levels for current and lagged innovations
Dependent variable is forecast revisions.

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
20	0	.81			.54	14
		(.00)				
	1	1.22			.23	14
		(.04)				
	2	1.89			.29	14
		(.03)				
	3	1.98			.25	14
		(.04)				
40	0	.92			.75	9
		(.00)				
	1	.92			.61	9
		(.01)				
	2	.84			.39	9
		(.04)				
	3	.92			.36	9
		(.05)				
65	0	1.06			.30	25
		(.00)				
	1	1.13			.58	25
		(.00)				
	2	1.29			.51	25
		(.00)				
	3	1.20			.32	23
		(.00)				
84	0	1.09		-.11	.85	21
		(.00)		(.00)		
	1	1.08		-.18	.64	21
		(.00)		(.00)		
	2	.96		-.28	.38	20
		(.00)		(.00)		
	3	.88		-.40	.25	16
		(.03)		(.00)		
94	0	.93		-.09	.90	12
		(.00)		(.03)		
	1	.99			.74	11
		(.00)				
	2	.87			.61	10
		(.01)				
94	3	.81			.47	10
		(.02)				
99	0	1.01		-.15	.90	7
		(.00)		(.05)		
	0	.94	.18	-.11	1.00	4
		(.00)	(.01)	(.00)		
	1	.97			.62	7
		(.02)				
	1	.39	-.08	.14	1.00	4
		(.02)	(.09)	(.02)		
	2	1.01			.35	7

Table A-2 Implicit Price Deflator (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
		(.09)				
404	0	1.02		-.07	.84	20
		(.00)		(.05)		
	0	.99	.21		.85	16
		(.00)	(.08)			
	1	1.01		-.14	.69	20
		(.00)		(.01)		
	1	.82	.37	-.13	.68	16
		(.00)	(.05)	(.03)		
	2	.83		-.19	.40	20
		(.00)		(.02)		
	2	.68	.51	-.17	.51	16
		(.05)	(.05)	(.05)		
	3	.78		-.29	.26	20
		(.01)		(.00)		
405	0	.78			.51	8
		(.03)				
407	0	1.16			.88	17
		(.00)				
	1	1.22			.70	17
		(.00)				
	2	1.25			.51	17
		(.00)				
	3	1.122			.32	17
		(.01)				
411	0	1.13		-.09	.92	21
		(.00)		(.00)		
	1	1.32		-.12	.72	20
		(0.0)		(.02)		
	2	1.29		-.19	.70	21
		(.00)		(.01)		
	3	1.20		-.20	.57	21
		(.00)		(.02)		
414	0	.94			.85	20
		(.00)				
	1	.83			.70	20
		(.00)				
	2	.84			.62	20
		(.00)				
	3	.82			.40	20
		(.00)				
420	0	1.23			.90	19
		(.00)				
	1	1.26			.84	19
		(.00)				
	2	1.35			.73	19
		(.00)				
	3	1.44			.34	19
		(.00)				
421	0	1.04		-.09	.91	23
		(.00)		(.01)		
	1	.94		-.15	.71	23

Table A-2 Implicit Price Deflator (continued)

ID Horizon Innovation Lagged Constant Adjusted Sample Size

			Innovation		R^2	
		(.00)		(.01)		
	1	1.33	-.23	-.11	.73	20
		(.00)	(.06)	(.01)		
	2	.82		-.21	.52	23
		(.00)		(.01)		
	2	1.37	-.32	-.15	.64	20
		(.00)	(.04)	(.03)		
	3	.70		-.27	.37	23
		(.00)		(.00)		
	3	1.47	-.40	-.18	.60	20
		(.00)	(.03)	(.03)		
423	0	1.16			.97	7
		(.00)				
	1	1.37			.95	7
		(0.0)				
	2	1.61			.90	7
		(.00)				
	3	1.74			.38	7
		(.00)				
426	0	1.02			.68	23
		(.00)				
	1	.99			.51	23
		(.00)				
	2	1.04			.44	23
		(.00)				
	3	1.11			.55	23
		(.00)				
428	0	.97			.85	21
		(.00)				
	1	.96			.76	21
		(.00)				
	2	.93		-.24	.66	21
		(.00)		(.01)		
	3	.89		-.30	.36	21
		(.00)		(.01)		
429	0	.95			.82	14
		(.00)				
	0	1.10	.24		.81	11
		(.00)	(.08)			
	1	.98			.56	14
		(.00)				
	1	1.37	.50		.76	10
		(.00)	(.05)			
	2	.96			.38	14
		(.01)				
	2	1.56	.74		.75	11
		(.01)	(.02)			
	3	.87			.20	14
		(.06)				
	3	1.74	.96		.71	11
		(.01)	(.02)			
431	0	1.04			.89	16
		(.00)				

Table A-2 Implicit Price Deflator (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size

	1	1.17 (.00)			.82	16
	2	1.28 (.00)			.78	16
	3	1.27 (.00)			.29	16
433	0	1.10 (.00)		-.11 (.02)	.81	25
	1	1.14 (.00)		-.20 (.02)	.64	25
	2	1.03 (.00)		-.28 (.01)	.44	25
	3	.85 (.01)		-.36 (.01)	.24	25
439	0	1.11 (.00)		-.10 (.05)	.85	19
	1	1.17 (.00)			.66	19
	2	1.30 (.00)			.59	19
	3	1.27 (.00)			.36	19
442	0	1.21 (.00)			.81	13
	1	1.27 (.00)			.60	13
	2	1.45 (.01)			.47	13
	3	1.46 (.03)			.68	13
446	0	1.01 (.00)			.95	17
	1	1.08 (.00)			.92	17
	2	1.17 (.00)			.82	17
	3	1.23 (.00)			.69	17
456	0	1.01 (.00)			.71	11
	1	1.04 (.00)		-.23 (.09)	.60	11
	2	1.09 (.01)		-.35	.45	11
	3	1.12 (.04)			.31	11
463	0	1.14 (.00)		-.15 (.00)	.96	13
	1	1.13 (.00)		-.22 (.00)	.89	13
	2	1.17 (.00)		-.25 (.00)	.78	13
	3	1.14 (.00)		-.35 (.00)	.67	13

Table A-2 Implicit Price Deflator (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
469	0	1.07 (.02)			.42	11

472	0	1.30 (.00)	.88	13
	1	1.41 (.00)	.78	13
	2	1.59 (.00)	.76	13
	3	1.76 (.00)	.73	13
475	0	1.18 (.00)	.85	11
	1	1.32 (.00)	.68	11
	2	1.47 (.01)	.51	11
	3	1.53 (.02)	.40	11
481	0	1.23 (.00)	.98	8
	1	1.43 (.00)	.93	8
	2	1.74 (.00)	.30	8
	3	1.97	.85	8

The figures in parentheses are significance levels. Coefficients with p levels greater than .10 are not shown.

Table A-3 Gross Domestic Product

Coefficients and significance levels for current and lagged innovations
Dependent variable is forecast revisions.

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
40	0	.96 (.00)			.92	17
	1	1.03 (.00)			.85	17
	2	1.08 (.00)			.77	17
	3	1.15 (.00)			.75	17
65	0	1.05 (.00)			.87	26
	0	1.05 (.00)	.16 (.06)		.88	25
	1	1.18 (.00)			.67	27
	1	1.48 (.00)	.51 (.06)		.70	17
	2	1.34 (.00)			.53	26
	2	1.74 (.00)	-.86 (.05)		.58	17
	3	1.53 (.00)			.48	23
84	0	.92 (.00)			.74	25
	1	.88 (.00)			.74	25
	2	.91 (.00)			.63	24
	2	.89 (.00)	.20 (.10)		.71	23
	3	.86 (.00)			.48	19
	3	.73 (.00)	.40 (.06)		.64	18
94	0	1.04 (.00)			.78	21
	0	1.04 (.00)	.25 (.03)	-12.32 (.06)	.83	18
	1	.89 (.00)			.46	20
	1	.86 (.00)	.39 (.05)		.56	17
	2	.93 (.00)			.39	19
	3	.81 (.01)			.29	19
99	0	.46 (.05)			.36	9
	1	.59 (.05)			.37	9
	3	1.44 (.08)			.29	9
404	0	1.06 (.00)		-12.79 (.00)	.90	24

Table A-3 Gross Domestic Product (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
	1	1.13 (.00)		-14.26 (.01)	.85	24
	2	1.20 (.00)		-14.76 (.01)	.84	24
	3	1.32 (.00)		-15.04 (.08)	.76	24
405	0	1.00 (.00)			.90	9
	1	.92 (.00)			.73	9
	2	.70 (.03)			.53	8
	3	.61 (.06)			.39	8
407	0	1.31 (.00)		-19.62 (.01)	.84	23
	1	1.45 (.00)		-7.98 (.09)	.81	23
	2	1.62 (.00)			.635	23
	3	1.76 (.00)			.48	23
411	0	1.04 (.00)		-18.06 (.08)	.41	23
411	0	1.02 (.00)	-.54 (.05)		.49	20
	1	1.74 (.00)		-17.08 (.08)	.70	23
	2	.97 (.00)			.54	23
	2	.93 (.00)	.30 (.08)	-12.86 (.10)	.64	20
	3	.98 (.00)			.45	23
	3	.93 (.00)	.50 (.03)		.69	14
414	0	1.17 (.00)			.89	22
	1	1.25 (.00)			.77	25
	2	1.21 (.00)			.64	22
	3	1.16 (.00)			.58	22
	3	1.12 (.00)	.47 (.09)		.72	14
420	0	1.03 (.00)			.81	22
	1	1.00 (.00)			.65	22
	2	1.06 (.00)			.53	22
	3	1.17 (.00)			.43	22

Table A-3 Gross Domestic Product (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
421	0	1.14 (.00)			.85	27
	0	1.13 (.00)	.21 (.02)		.88	26
	1	1.19 (.00)			.73	27
	1	1.19 (.00)	.27 (.05)	-13.70 (.05)	.76	26
	2	1.27 (.00)			.692	27
	2	1.26 (.00)	.36 (.06)	-20.76 (.03)	.66	20
	3	1.28 (.00)			.51	27
	3	1.27 (.00)	.46 (.04)	-24.74 (.04)	.58	26
423	0	1.34 (.00)		-16.08 (.06)	.76	11
	1	1.33 (.00)			.78	11
	2	1.46 (.00)		-17.42 (.09)	.71	11
	3	1.53 (.00)			.62	11
426	0	1.08 (.00)			.84	27
	1	1.13 (.00)			.77	27
	2	1.16 (.00)			.65	27
	3	1.17 (.00)			.58	27
428	0	.77 (.00)			.59	25
	1	.70 (.00)			.41	25
	2	.61 (.01)			.26	25
	3	.56 (.02)			.18	25
429	0	1.20 (.00)			.63	25
	0	1.12 (.00)	.42 (.02)	-19.37 (.02)	.70	23
	1	1.34 (.00)			.48	25
429	1	1.22 (.00)	.59 (.03)	-26.79 (.04)	.56	23
	2	1.38 (.00)			.38	25
	2	1.26 (.00)	.71 (.05)	-34.35 (.04)	.47	23
	3	1.43 (.00)			.32	25

Table A-3 Gross Domestic Product (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size

	3	1.36 (.00)	.73 (.09)	-40.77 (.04)	.39	23
431	0	.94 (.00)			.75	18
	1	.88 (.00)			.60	18
	2	.88 (.00)			.57	18
	3	.87 (.00)			.52	18
433	0	.97 (.00)			.83	29
	1	1.00 (.00)			.69	29
	2	1.01 (.00)			.59	29
	3	1.00 (.00)			.49	29
439	0	1.03 (.00)			.79	23
	1	1.11 (.00)			.70	23
	2	1.15 (.00)			.66	23
	3	1.20 (.00)			.65	23
	3	1.47 (.00)	-.48 (.09)		.69	16
442	0	.90 (.00)			.82	15
442	0	.82 (.00)	.26 (.02)		.90	12
	1	.85 (.00)			.67	15
	1	.74 (.00)	.38 (.02)		.81	12
	2	.86 (.01)			.54	15
	2	.71 (.00)	.51 (.01)		.77	12
	3	.75 (.01)			.32	14
	3	.66 (.01)	.67 (.01)		.71	12
446	0	.95 (.00)			.86	17
	1	1.01 (.00)			.74	17
	2	1.00 (.00)			.75	17
	2	1.50 (.00)	.33 (.09)		.90	9
	3	.98 (.00)			.71	17

Table A-3 Gross Domestic Product (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
452	0	1.02			.44	15

		(.00)				
456	0	1.08			.79	15
		(.00)				
	0	1.01	.48	-19.25	.94	13
		(.00)	(.00)	(.00)		
	1	.99			.65	15
		(.00)				
	1	.88	.64	-23.08	.89	13
		(.00)	(.00)	(.01)		
	2	.96			.54	15
		(.00)				
	2	.87	.62	-30.89	.75	13
		(.00)	(.01)	(.02)		
	3	1.04			.43	15
		(.01)				
	3	.94	.67	-.34.20	.59	13
		(.01)	(.06)	(.08)		
463	0	1.03			.85	11
		(.00)				
	1	.83			.68	11
		(.00)				
	2	.67			.47	11
		(.01)				
	2	.79	.53		.72	8
		(.04)	(.08)			
	3	.66			.43	11
		(.02)				
	3		.56		.60	8
			(.10)			
469	0	.88		12.99	.84	13
		(.00)		(.08)		
	1	.77		22.23	.56	13
		(.00)		(.09)		
472	0	.94			.92	13
		(.00)				
	1	.98			.84	14
		(.00)				
	2	.97			.75	14
		(.00)				
	3	.91			.62	14
		(.00)				
475	0	.98			.75	13
		(.00)				
	1	1.00			.63	13
		(.00)				
	2	1.08			.55	13
		(.00)				
	3	1.30			.58	13
		(.00)				

The figures in parentheses are significance levels. Coefficients with p levels greater than .10 are not shown. All IDs occurring at least fifteen times in the survey are included.

Table A-4 Interest Rate

Coefficients and significance levels for current and lagged innovations
Dependent variable is forecast revisions.

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
20	0	.89 (.00)			.77	16
	1	1.00 (.00)			.82	16
	2	.98 (.00)			.74	16
	3	1.08 (.00)			.77	15
40	0	1.41 (.00)			.26	17
	0	.99 (.00)	.49 (.08)		.75	11
	1	1.57 (.00)			.48	17
	1	1.04 (.01)	.71 (.04)		.75	11
	2	1.58 (.00)			.45	17
	2	1.12 (.01)	.67 (.05)		.75	11
	3	1.58 (.01)			.38	17
	3	1.11 (.01)	.74 (.04)		.76	11
65	0	1.96 (.00)			.40	29
	0	1.97 (.00)	.83 (.08)		.44	29
	1	1.99 (.00)			.25	29
	2	1.83 (.01)			.21	29
	2	1.86 (.01)	1.19 (.08)		.27	29
	3	1.95 (.02)			.17	27
94	0	1.68 (.00)			.32	21
	1	1.36 (.00)			.11	20
99	0	3.60 (.07)			.39	9
	0	4.85 (.01)	5.14 (.03)		.32	9
	1	4.80 (.02)	6.06 (.03)		.85	6
	2	3.49 (.07)			.31	9
	2	4.75 (.01)	6.34 (.02)		.88	6
	3	3.39 (.06)			.35	9
	3	4.94 (.03)	5.43 (.07)		.73	6
404	0	1.87			.32	24

Table A-4 Interest Rate (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size
		(.00)				
	1	1.71 (.05)			.12	24
	2	1.83 (.09)			.09	24
405	2	.99 (.02)		.16 (.06)	.55	8
407	0	1.80 (.00)			.42	25
	1	1.83 (.01)			.22	25
	2	1.70 (.02)			.19	25
	3	1.75 (.01)			.25	25
411	0	2.68 (.00)			.66	23
	1	2.95 (.00)			.62	23
	2	1.87 (.03)			.45	23
	3	2.31 (.00)			.30	23
414	0	1.38 (.00)			.53	20
	0	1.42 (.00)	.74 (.02)		.166	17
414	1	1.34 (.00)			.37	21
	1	1.39 (.00)	.85 (.02)		.54	18
	2	1.21 (.02)			.20	21
421	0	2.32 (.00)			.44	25
	1	2.48 (.01)			.23	25
421	1		-2.64 (.07)		.28	18
	2	2.36 (.05)			.13	25
	3	2.51 (.06)			.11	25
423	0	1.60 (.00)			.19	11
	1	1.49 (.00)			.89	11
	2	1.36 (.00)			.85	11
	3	1.20 (.00)			.70	11
426	0	2.26 (.00)			.54	27
	1	2.15 (.03)			.36	27

Table A-4 Interest Rate (continued)

ID	Horizon	Innovation	Lagged Innovation	Constant	Adjusted R^2	Sample Size

	2	1.79		.22	27
		(.01)			
	3	1.39		.14	27
		(.03)			
428	0	2.35		.57	25
		(.00)			
	1	2.22		.29	25
		(.00)			
	2	1.93		.13	25
		(.04)			
	3	1.70		.10	25
		(.07)			
429	0	2.94		.59	25
		(.00)			
	1	3.54		.37	25
		(.00)			
	2	3.13		.19	25
		(.02)			
	3	3.21		.30	18
		(.01)			
431	0	1.80		.39	19
		(.00)			
	1	2.27		.38	19
		(.00)			
	2	1.99	.15	.27	19
		(.01)	(.05)		
433	0	2.09	-.11	.77	29
		(.00)	(.01)		
	1	2.51	-.11	.66	29
		(.00)	(.06)		
	2	2.67		.61	29
		(.00)			
	3	2.76		.54	29
		(.00)			
442	0	1.92		.24	17
		(.03)			
446	0	2.05		.34	19
		(.01)			
	1	1.86		.18	19
		(.04)			
	2	1.93		.17	19
		(.05)			
463	0	1.76		.41	15
		(.01)		.23	15
	1	1.85			
		(.04)			
469	0	.48		.37	13
		(.02)			
472	0	1.74		.23	15
		(.01)			
	1	1.68		.15	15
		(.08)			

The figures in parentheses are significance levels. Coefficients with p levels greater than .10 are not shown. All IDs occurring at least fifteen times for one or more series are included.

Table A-5
Gross Domestic Product Regressions of Revised Predictions on Innovations and Revised Innovations.

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
20	1		.78 (.02)	.38	15
	2		.79 (.02)	.39	15
	3		.85 (.03)	.35	15
40	0	1.02 (.00)		.92	16
	1	.97 (.00)		.86	16
	2	.89 (.02)		.80	16
	3	.91 (.03)		.78	16
65	0	1.40 (.00)	-.43 (.00)	.91	25
	1	1.85 (.00)	-.82 (.00)	.77	25
	2	2.29 (.00)	-1.04 (.02)	.62	25
	3*	2.56 (.00)	-1.25 (.04)	.56	22
84	0	.73 (.00)		.75	24
	1	.89 (.00)		.74	24
	2	1.12 (.00)		.64	23
94	0	1.16 (.00)		.79	20
	1	1.22 (.00)		.54	19
	2	1.63 (.00)	-.81 (.07)	.48	18
404	0	1.18 (.00)	-.20 (.07)	.94	23
	1*	1.20 (.00)		.87	23
	2*	1.25 (.00)		.86	23
	3	1.45 (.00)		.78	23
405	0	.99 (.00)		.88	8
	1	.96 (.06)		.68	8
407	0	1.42 (.00)		.86	22
	1	1.76 (.00)	-.51 (.03)	.84	22
	2	2.23 (.00)	-1.02 (.01)	.74	22
	3	2.58 (.00)	-1.37 (.03)	.58	22

Table A-5 (continued)

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
411	0	.99 (.01)		.37	22
	1*	1.21 (.00)	.98 (.00)	.81	22
	2	1.05 (.00)		.60	22
	3	1.09 (.00)		.50	22
414	0	1.16 (.00)		.88	21
	1	1.18 (.00)		.75	21
	2	1.07 (.00)		.64	21
	3	1.11 (.00)		.56	21
420	0	1.37 (.00)	-.38 (.09)	.83	21
	1	1.21 (.00)		.70	21
	2	1.20 (.01)		.58	21
	3	1.15 (.05)		.47	21
421	0	1.36 (.00)	-.35 (.00)	.91	26
	1	1.51 (.00)	-.48 (.01)	.81	26
	2	1.75 (.00)	-.70 (.01)	.72	26
	3	1.86 (.00)	-.82 (.01)	.61	26
423	0*	1.17 (.00)		.78	10
	1	1.33 (.00)		.74	10
	2	1.42 (.00)		.65	10
	3	1.50 (.02)		.53	10
426	0	.99 (.00)		.87	26
	1	.96 (.00)		.82	26
	2	.96 (.00)		.70	26
	3	1.01 (.00)		.60	26
428	0	.85 (.00)		.63	24
	1	.86 (.00)		.42	24
	2	.79 (.01)		.27	24
	3	.70 (.03)		.16	24

Table A-5 (continued)

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size

429	0	1.41 (.00)		.67	24
	1	1.56 (.00)		.51	24
	2	1.62 (.00)		.39	24
	3	1.75 (.00)		.32	24
431	0	1.19 (.00)		.77	18
	1	1.16 (.00)		.62	18
	2	1.18 (.00)		.60	18
	3	1.19 (.00)		.55	18
433	0	1.26 (.00)	-.38 (.01)	.87	28
	1	1.32 (.00)	-.42 (.07)	.71	28
	2	1.23 (.00)		.60	28
	3	1.07 (.00)		.50	28
439	0	1.18 (.00)		.79	22
	1	1.14 (.01)		.68	22
	2	1.38 (.01)		.66	22
	3	1.72 (.00)		.66	22
442	0	1.17 (.00)		.85	15
	1	1.26 (.00)	-.51 (.09)	.72	15
	2	1.36 (.00)		.60	15
	3	1.19 (.02)		.39	14
446	0	1.37 (.00)	-.47 (.00)	.95	17
	1	1.54 (.00)	-.59 (.01)	.85	17
	2	1.52 (.00)	-.59 (.01)	.85	17
	3	1.59 (.00)	-.69 (.00)	.86	17
452	0	.83 (.06)		.41	15
456	0	1.17 (.00)		.78	15
	1	1.18 (.00)		.64	15

Table A-5 (continued)

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
	2	1.13		.52	15

		(.01)			
	3	1.21		.39	15
		(.02)			
463	0	1.04		.84	11
		(.00)			
	1	.83		.63	11
		(.00)			
	2	.67		.40	11
		(.02)			
	3	.68		.37	11
		(.02)			
469	0	1.20		.85	13
		(.00)			
	1	1.21		.61	13
		(.01)			
	2*	1.20	-1.02	.32	13
		(.02)	(.06)		
	3*	1.33	-1.43	.33	13
		(.02)	(.02)		
472	0	1.21	-.31	.95	13
		(.00)	(.02)		
	1	1.27	-.33	.88	14
		(.00)	(.05)		
	2	1.42	-.53	.85	14
		(.00)	(.01)		
	3	1.41	-.59	.73	14
		(.00)	(.04)		
475	0	.94		.72	13
		(.00)			
	1	1.09		.60	13
		(.01)			
	2	1.21		.52	13
		(.02)			
	3	1.45		.54	13
		(.01)			

Figures in parentheses are p-values. Equations marked by * have constants significantly different from zero at a .10 level.

Table A-6
Gross Domestic Product Regressions of Revised Predictions on Current Innovations, Lagged Innovations and Revised Innovations

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
20	0		1.02 (.03)	.41	10
	1		.97 (.06)	.34	10
	2		.92 (.09)	.29	10
	3		1.05 (.09)	.26	10
40	0	1.56 (.01)		.93	11
	1	1.49 (.05)		.86	11
65	0	1.36 (.00)	-.38 (.01)	.91	24
	1	1.84 (.00)	.81 (.01)	.76	24
	2	2.20 (.00)	-1.06 (.03)	.60	24
	3	2.48 (.00)	-1.13 (.09)	.54	21
84	0	.94 (.00)		.80	22
	1	.91 (.00)		.75	22
	2	.99 (.00)		.71	22
	3	.95 (.01)		.63	17
94	0	1.11 (.00)	.23 (.07)	.82	17
	1	1.13 (.02)	.36 (.09)	.52	16
	2	1.72 (.01)		.49	15
404	0	1.11 (.00)		.92	21
	1	1.07 (.00)		.87	21
	2	1.14 (.00)		.86	21
	3	1.28 (.00)		.80	21
407	0	1.40 (.00)		.87	20
	1	1.70 (.00)		.86	20
	2	2.09 (.00)	.-77 (.06)	.75	20
	3	2.32 (.00)		.62	20
409	1		.72 (.07)	.99	8
	2		1.14 (.05)	.97	8
	3		1.63	.94	8

Table A-6 (continued)

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
			(.06)		
411	0	1.14	-.61	.47	20
		(.00)	(.05)		
	1	1.20	1.03	.80	20
		(.00)	(.01)		
	2	.98		.62	20
		(.00)			
	3	1.01		.50	20
		(.00)			
414	0	1.09		.87	19
		(.00)			
	1	1.05		.75	19
		(.00)			
	2	.96		.62	19
		(.01)			
	3	1.03		.56	19
		(.01)			
420	0	1.31		.80	18
		(.00)			
	1	1.13		.65	18
		(.01)			
	2	1.09		.51	18
		(.04)			
421	0	1.34	-.31	.92	25
		(.00)	(.01)		
	1	1.45	-.44	.81	25
		(.00)	(.02)		
	2	1.70	-.64	.72	25
		(.00)	(.01)		
	3	1.78	-.71	.63	25
		(.00)	(.03)		
423	0		3.04	.87	8
			(.04)		
	1		2.41	.83	8
			(.02)		
	2		3.81	.83	8
			(.01)		
	3		5.14	.80	8
			(.01)		
424	1	1.71		.85	7
		(.04)			
426	0	.96		.87	25
		(.00)			
	1	.93	.32	.81	25
		(.00)	(.08)		
	2	.93		.69	25
		(.00)			
	3	1.01		.58	25
		(.00)			
427	1		1.27	.46	7
			(.07)		
	2		1.32	.45	7
			(.07)		
	3		1.28	.42	7
			(.08)		

Table A-6 (continued)

ID	Horizon	Innovation	Revised	Adjusted	Sample Size

			Innovation	R^2	
428	0	.84		.61	23
		(.00)			
	1	.79		.40	23
		(.00)			
	2	.74		.25	23
		(.02)			
	3	.66		.13	23
		(.06)			
429	0	1.23		.68	
		(.00)			
1		1.32		.52	22
		(.00)			
	2	1.32		.42	22
		(.01)			
	3	1.43		.34	22
		(.03)			
431	0	1.15		.75	13
		(.00)			
	1	1.13		.60	13
		(.01)			
	2	1.13		.55	13
		(.01)			
	3	1.16		.49	13
		(.02)			
432	1	1.42		.76	10
		(.00)			
	2	1.06		.73	9
		(.01)			
	3	1.98	-1.49	.87	6
		(.03)	(.09)		
433	0	1.23		.86	28
		(.00)			
	1	1.28		.70	28
		(.00)			
	2	1.19		.59	28
		(.00)			
	3	1.02		.49	28
		(.01)			
439	0	1.33		.83	20
		(.00)			
	1	1.17		.68	20
		(.02)			
	2	1.50		.66	20
		(.00)			
	3	1.80		.71	20
		(.00)			
442	0	.84	.25	.89	12
		(.00)	(.06)		
	1	.79	.36	.78	12
		(.03)	(.06)		
	2		.55	.75	12
			(.02)		
443		.77		.70	12
			(.01)		
444	1	.72		.89	6

Table A-6 (continued)

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
		(.04)			

446	0	1.41 (.00)	-.52 (.00)	.95	14
	1	1.73 (.00)	-.78 (.01)	.86	14
	2	1.60 (.00)	-.68 (.01)	.86	14
	3	1.73 (.00)	-.84 (.00)	.89	14
452	0	.97 (.06)		.43	13
456	0	1.04 (.00)	.48 (.00)	.94	13
	1	1.03 (.00)	.62 (.00)	.89	13
	2	1.01 (.01)	.60 (.02)	.72	13
	3	1.10 (.03)	.65 (.08)	.55	13
458	1	1.08 (.04)		.83	6
	2	1.07 (.03)	-1.21 (.08)	.88	6
	3	.99 (.06)	-1.84 (.05)	.87	6
463	0	1.17 (.00)		.87	8
	1	.96 (.03)		.74	8
	2	.79 (.07)		.65	8
465	1	.96 (.01)		.80	8
	2	1.43 (.01)	-1.93 (.06)	.75	8
	3	1.54 (.05)	-2.66 (.10)	.54	8
469	0	.93 (.01)		.83	11
	1	.97 (.07)		.57	11
	3	1.62 (.01)	-1.64 (.01)	.68	11
471	1		.65 (.02)	.63	9
	2		.66 (.01)	.68	9
	2		.76 (.02)	.59	9
472	0	1.23 (.00)	-.31 (.08)	.93	11
	1	1.30 (.00)		.85	12
	2	1.40 (.00)		.77	12
	3	1.24		.60	12

Table A-6 (continued)

ID	Horizon	Innovation	Revised Innovation	Adjusted R^2	Sample Size
		9.01)			
475	0	.87 (.02)		.66	12

	1	.94 (.04)	.50	12
	2	1.02 (.06)	.37	12
	3	1.26 (.05)	.41	12
488	1	1.77 (.03)	.64	10
	2	2.25 (.03)	.62	10
	3	2.82 (.06)	.41	8

Figures in parentheses are p-values.

Table A-7
Nominal GDP

ID	Horizon	P-Values for Best Additional Predictor(s) Single	Pair	Three Additional Predictors p-value	Adj R^2	Number of Observations
20	0	i .09	i,p .16	.31	.08	14
	1	u .04	p,u.07	.11	.29	14
	2	u .01	p,u.02	.02	.55	14
	3	u .01	p,u.02	.02	.52	14
40	0	i .07	i,p.11	.26	.90	9
	1	i .10	i,p.23	.44	.70	9
	2	i .09	i,u.16	.38	.55	9
65	0	i .09	i,u.23	.52	.80	22
84	0	i .05	i,u .23	.14	.61	20
94	0	p .05	i,p.15	.28	.78	12
	1	u .08	i,u.17	.19	.54	11
	2	u .09	i,u .09	.19	.56	10
	3	u .03	p,u .05	.07	.61	10
99	0	u .02	g,u.09	.63	.23	7
	1	u.02	g,u.08	.95	-.24	7
	2	u .03	g,u.11	1.00	-.75	7
	3	u .05	g,u.14	.81	-.86	7
404	0	i .03	i,u.10	.36	.94	20
	1	i .03	i,u .05	.14	.88	20
	3	i .08	i,u.22	.57	.67	20
411	2	i .00	i,u.02	.50	.62	21
	3	i .01	i,u.04	.73	.49	21
414	1	p .02	p,u .02	.06	.83	19
	2	p.01	p,u .02	.05	.76	19
	3	p .00	i,p .01	.01	.80	19
420	0	p .01	p,u.06	.14	.76	17
	1	u .03	i,u.10	.51	.50	17
	2	u .03	i,u.08	.49	.34	17
	3	u .03	i,u.10	.46	.23	17
421	0	u .01	i,u.02	.11	.91	21
	1	u .00	p,u .06	.01	.82	21
	2	u .00	i,u .01	.02	.79	21
	3	u .00	p,u .01	.01	.77	21
423	1	i .30	p,u.00	.01	1.00	7
	2	p .25	p,u.04	.17	.99	7
	3	p .29	p,u.05	.20	.97	7
429	1	i .04	i,u.08	.51	.44	14
	2	i .09	i,u.15	.57	.28	14
431	0	i .01	i,u.04	.17	.77	16
	1	i .01	i,u.03	.19	.67	16
	2	i .01	i,u.03	.21	.64	16
	3	i .01	i,u.04	.26	.57	16

432	1	u .09	i,u.19	.45	.76	9
442	0	u .08	i,u.05	.36	.82	11
	1	i .07	i,u.07	.33	.69	11
	2	i .05	i,p .07	.24	.59	11
446	0	i .01	i,u .01	.07	.95	15
	1	i .01	i,u .00	.01	.94	15
	2	i .04	i,u.02	.21	.88	15
	3	i .09	i,u.08	.49	.86	15
472	0	p .00	p,u.01	.01	.97	11
	1	p .00	p,u.00	.01	.92	12
	2	p .00	p,u.01	.04	.87	12
	3	p .00	p,u.00	.02	.84	12

No significant coefficients at p-value .10 : 65, 407,411, 420,426,429,433,439

Table A-8
Interest Rates

ID	Horizon	P-Values for Best Additional Predictor(s): Single	Pair	Three Additional Predictors: p-value	Adj R^2	Number of Observations
20	0	g,.01	g,p.02	.01	.92	14
	1	g,.03	g,p.03	.02	.89	14
	2	g,.03	g,p.07	.05	.83	14
	3	g,.03	g,u.05	.04	.83	13
40	0	u .07	g,u.07	.96	.66	9
	1	u .09	g,u.07	.92	.76	9
65	0	u .01	g,u .05	.40	.36	23
	1	u .02	g,u.09	.40	.21	23
	2	u .04	g,u.13	.32	.20	23
84	0	u .06	g,u .10	.61	-.10	20
	2	u .09	g,u.13	.42	-.13	19
	3	u .04	g,u.02	.24	.11	14
94	0	p .04	g,p .13	.27	.31	12
	3	p .07	g,p.20	.40	.10	10
404	0	u .00	g,u .01	.17	.44	20
	1	u .01	g,u .04	.31	.18	20
	2	u .08	g,u.20	.65	.05	20
	3	u .08	g,u.18	.51	.05	20
407	0	p .04	p,u .02	.04	.61	16
	1	u .28	p,u .05	.10	.40	16
411	0	u .01	g,u .03	.11	.68	21
	1	u .02	g,u.06	.27	.55	21
414	1	u .07	p,u .06	.13	.21	19
416	0	i .02	p,u.04	.13	.92	10
	1	p .09	g,u.10	.25	.87	10
	2	p .03	p,u.10	.19	.80	10
	3	p .06	g,p.13	.22	.83	10
420	0	p .08	g,u .16	.38	.02	17
	1	u .09	g,u.17	.87	.00	17
	2	g .06	g,u.05	.18	.15	17
	3	g .09	g,u .09	.35	.01	17
421	0	u .00	g,u.01	.18	.45	21
	1	u .01	g,u .02	.18	.24	21
	2	u .00	g,u .01	.06	.26	21
	3	u .00	g,u .01	.03	.32	21
423	0	p .03	g,p.08	.25	.94	7
	1	p .05	g,p.06	.21	.94	7
	2	p .04	g,p.08	.23	.94	7
	3	p .05	g,p.13	.27	.89	7
426	0	u .11	p,u .09	.16	.46	21
	1	u .08	p,u .10	.18	.27	21

Table A-8 (continued)
Interest Rates

		P-Values for Best Additional Predictor(s)		Three Additional Predictors		Number of
ID	Horizon	Single	Pair	p-value	Adj R^2	Observations
	2	u .07	p,u .11	.21	.18	21
	3	u .08	p,u .19	.33	.06	21
432	1	u .05	g,u.05	.32	.11	9
	2	u .05	g,u.04	.24	.22	9
	3	u .09	g,u.16	.16	.67	7
433	0	g .08	g,p .17	.28	.77	21
446	1	u .08	p,u.07	.22	.25	15
	2	p .06	p,u.03	.11	.34	15
	3	p .02	p,u.01	.06	.40	15
469	0	u .06	g,u.17	.48	.48	11

No significant coefficients at p-value .10: 428,429,431,439,442,446

Table A-9
Unemployment Rates

ID	Horizon	P-Values for Best Additional Predictor(s) Single	Pair	Three Additional Predictors p-value	Adj R^2	Number of Observations
94	0	i .07	g,i.20	.36	.69	12
	1	i .08	i,p .20	.09	.78	11
	2	i .17	g,p .29	.05	.90	10
	3	i .26	g,p.18	.01	.94	10
404	3	g .20	g,p.07	.13	.38	20
411	1	g .04	g,i .05	.13	.51	21
	2	g .01	g,p .01	.02	.55	21
	3	g .00	g,i .00	.01	.52	21
414	0	i .05	i,p .08	.15	.75	17
416	1	i .04	g,i.08	.41	.43	10
	2	i .01	g,i.03	.26	.53	10
	3	i .06	g,i.04	.19	.48	10
428	0	g .55	g,p .09	.13	.73	21
429	0	p .02	i,p .05	.10	.80	14
	1	p .05	g,p .04	.09	.61	14
	2	p .10	g,p .14	.29	.45	14
431	2	i .10	g,i .33	.63	.50	16
	3	i .05	g,i .17	.60	.51	16
439	0	p .04	i,p .09	.14	.50	12
442	0	i .05	g,i .12	.38	.27	11
	1	i .03	g,i .04	.08	.66	11
	2	i .03	g,i .03	.03	.75	11
	3	i .03	g,i .02	.02	.79	10
469	2	g .08	g,i.19	.84	-.44	11
472	0	p .04	i,p.14	.35	.11	12
	1	p .07	g,p.16	.33	.00	12
	2	p .07	i,p.08	.26	.10	12

No significant coefficients at p-value .10 : 65,84,404,407,420,426,433,446

Table A-10
Price Deflator

ID	Horizon	P-Values for Best Additional Predictor(s): Single	Pair	Three Additional Predictors: p-value	$Adj\ R^2$	Number of Observations
40	0	g .09	g,i.00	.01	.98	9
	1	g .07	g,i.00	.00	.98	9
	2	i .11	g,i.00	.00	.99	9
	3	i,.14	i,u.00	.00	.95	9
65	0	i .03	g,i .02	.05	.78	23
	1	g.13	g,i .09	.15	.63	23
	2	i .06	g,i .06	.13	.58	23
	3	i .08	g,i.09	.14	.41	21
407	0	g .08	g,u .04	.08	.91	16
	1	g .13	g,u .06	.11	.74	16
411	3	i, .09	g,i .11	.22	.61	21
416	1	i .01	g,i.03	.09	.77	10
	2	i .01	g,i.04	.13	.58	10
	3	i .07	g,i.09	.19	.39	10
421	2	g .09	g,u .13	.27	.48	21
	3	g .05	g,u .07	.15	.32	21
426	0	g .10	g,u .10	.09	.78	21
431	0	i .05	g,i.16	.32	.89	16
	1	i .08	i,u.22	.40	.83	16
432	2	u .01	i,u.01	.00	.99	8
	3	u .03	i,u.06	.05	1.00	6
439	0	u .06	g,u .07	.12	.79	12
	1	u .06	g,u .07	.13	.66	12
	2	u .04	g,u .06	.12	.60	12
	3	u .07	g,u .08	.13	.54	12
442	1	g .11	g,u .08	.13	.75	11
	2	g .11	g,u .07	.11	.69	11
	3	g .11	g,u .06	.10	.59	11
446	0	i .14	i,u .05	.09	.96	15
475	0	u .09	i,g.07	.07	.93	11
	1	u .08	i,g.10	.08	.81	11
	3	u .17	i,g.03	.04	.75	11

No significant coefficients at p-value .10 : 84,404,420,428,431,433

Table A-11
Sample of raw data for previous quarters from 1993

ID	Quarter of Survey	GDP	Price Deflator	Unemployment Rate	Treasury Bill Rate
60	1	6061.9	121.7	7.3	3.07
65	1	6061.9	121.7	7.3	3.07
94	1	6061.9	121.7	7.3	3.1
99	1	6061.9	121.7	7.3	3.07
404	1	6061.9	121.7	7.3	3.07
407	1	6061.9	121.7	7.3	3.07
411	1	6061.9	121.7	7.3	3.07
414	1	6061.9	121.7	7.3	3.07
416	1	6061.9	121.7	7.3	3.07
417	1	6061.9	121.7	7.3	3.07
421	2	6158.8	122.9	7	
422	2	6158.8	122.9	7	2.96
423	2	6158.8	122.9	7	2.96
424	2	6158.8	122.9	7	2.96
425	2	6158.8	122.9	7	2.96
426	2	6158.8	122.9	7	2.96
427	2	6158.8	122	7	2.96
429	2	6158.8	122.9	7	2.96
431	2	6158.8	122.9	7	2.96
432	2	6158.8	122.9	7	2.96
433	3	6206.9	123.7	7	2.97
435	3	6206.9	123.7	7	
437	3	6206.9	123.7	7	2.97
439	3	6206.9	123.7	7	2.97
440	3	6206.9	123.7	7	2.97
442	3	6206.9	123.7	7	2.97
444	3	6206.9	123.7	7	2.97
447	3	6206.9	123.7	7	2.97
448	3	6206.9	123.7	7	2.97
450	3	6206.9	123.7	7	2.97
20	4	6396.3	124.5	6.7	3
30	4	6396.3	124.5	6.7	3
65	4	6396.3	124.5	6.7	3
84	4	6396.3	124.5	6.7	3
94	4	6396.3	124.5	6.7	3
99	4	6396.3	124.5	6.7	3
404	4	6396.6	124.5	6.7	3
405	4	6396.3	124.5	6.7	3
407	4	6396.3	124.5	6.7	3
411	4	6396.3	124.5	6.7	3

Missing data denoted by "."

Note that as we require consecutive observations for our analysis some forecasters may account for fewer observations for some parts of the analysis.