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An empirical examination of Bloomberg's macroeconomic forecasts of the G-7 nations.

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ABSTRACT

An Empirical Examination of the accuracy of macro economic forecasts in the G-7 countries

Emmanuel Alister Noel

Market participants expend considerable resources on forecasting services to improve their decision-making processes. One of the more popular sources of these services is that of Bloomberg. In recent years Bloomberg has regularly polled reputable experts on macroeconomic forecasts in many countries. This study aims to test the accuracy of Bloomberg's forecasts. Specifically we test whether the surveyed experts' median opinions are statistically similar to the announced figures from U.S.A., Japan, Canada, United Kingdom, Germany, France and Italy. The results provide an indirect test of the Rational expectation hypothesis. The forecasts and announced figures are first analyzed to discern unit roots and cointegration before inferences are made from the accuracy regression. This research shows that for the most part Bloomberg's forecasts surveys are unbiased and rational predictors of macro economic indicators for most countries. A somewhat longer time series of forecasts is available for the U.S. The earlier part of the sample indicates that forecasters of most of the macroeconomic variables appeared to be biased/not consistent with rational expectations. However over the latter part of the sample, forecasts accuracy for the U.S. seems to have improved significantly and compares favorably with forecasts produced for the other G7 countries.

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SUMMARY OF TABLES

I. Introduction

Market participants expend considerable resources on macroeconomic forecasting services in order to improve their decision-making processes. The objective of this study is to determine the accuracy of forecasts provided by one of the most widely used services in the industry, the Bloomberg survey of scheduled macroeconomics announcements. It is the intent of this study to see if the value placed on the Bloomberg's "experts" opinions are well founded. Specifically, we test whether or not the Bloomberg surveys are consistent with rational expectation framework. This study is the first that we are aware of to rigorously test the forecasts performance of the Bloomberg's survey.

An alternative approach to forecasting macroeconomic variables is to look at the pricing of futures contracts (e.g. Switzer & Park 1997). However, many key economic indicators such as the unemployment rate and future CPI levels cannot be simply observed by futures prices.

Previous work that has studied the performance of macroeconomic survey forecasts has focused primarily on the United States. This study is the first that we are aware of that investigates survey forecasts outside the U.S.A. This study examines Bloomberg's forecasts for the G-7 countries: the U.S.A., Japan, Germany, the United Kingdom, Canada, France and Italy. An attempt was made to comprehensively examine a common group of macroeconomic indicators across countries as well as the forecasting performance of variables deemed to be relevant to the particular countries.

The remainder of the paper is organized as follows. In the next section a brief review of the literature is provided. In the third section the data set is described and the fourth section the research methodology is outlined. This is followed in section five by the discussion of the results country by country. The final section provides a brief summary and conclusions.

II. Literature Review

The starting point for most studies of market forecasting is the rational expectations hypothesis (REH) initially developed by John F. Muth (1961). This has become a standard assumption in macroeconomic analysis and policy. Muth had distinct views on the interaction of expectation and reality. He suggested (p 316) that, "expectations, since they are informed predictions of future events, are essentially the same as predictions of the relevant economic theory." In its simplest form REH assumes that economic agents are rational and take all available information into consideration when making a decision, in our case making forecasts.

The econometric literature on empirically testing REH is varied since there are a number of tests that have been employed. They can be summarised into four areas 1) Unbiasedness 2) Efficiency 3) Forecast-error unpredictability and 4) Consistency.

Unbiasedness. The survey of forecasts should be an unbiased predictor of the variable. The following regression should yield coefficient estimates $\alpha = 0$ and $\beta = 1$:

$$Y_t = \alpha + \beta \; {}_{t-k}Y_t^e + \varepsilon_t \qquad (1)$$

where ${}_{t-k}Y_t^e$ is the expectation reported in the survey for variable Y_t made at time t-k; and ε_t is a random error term

Efficiency. The survey expectation should use information about past history about the variable. For

$${}_{t-1}Y_t^e = a_1 Y_{t-1} + a_2 Y_{t-2} + \ldots + a_n Y_{t-n} + \varepsilon_t \qquad (2)$$

and

$$Y_t = b_1 Y_{t-1} + b_2 Y_{t-2} + \ldots + b_n Y_{t-n} + u_t \qquad (3)$$

it must be true for that $a_i = b_i$ for all i , where ε_t and u_t are uncorrelated random error terms associated with regression of expectations as well as of actual values of the variable on past announcements of variables respectively.

Forecasting–error unpredictability. The forecasting error (the difference between the forecast and announced variable) should be uncorrelated with any information at the time of forecasts. This concept can be written in the following equations:

$E\,(Y_t - {}_{t-1}Y_t^e \mid \Phi_{t-1}) = 0$,

where Φ_{t-1} is the set of information available at time t-1

Consistency. When forecasts are given at different times the relationship with the past announcements should be consistent.

For example, in the regressions

$$_{t-2}Y_t^e = c_{1\ t-2}Y_{t-1}^e + c_2 Y_{t-2} \ldots + c_n Y_{t-n} + \varepsilon_{1t} \quad (4)$$

and

$$_{t-1}Y_t^e = a_1 Y_{t-1} + a_2 Y_{t-2} + \ldots + a_n Y_{t-n} + \varepsilon_{2t} \quad (5)$$

Consistency requires that $a_i = c_i$ for all i, where $\varepsilon_{2t}$and ε_{2t} are random error terms. The approach we take in this study extends these tests for rational expectations to take explicit account of the properties of the time series under investigation, as will be discussed further.

An alternative way of determining the importance of an announcement or its relationship to its expectations is to look at the announcement's market impact. Ederington and Lee (1993) looked at several scheduled macroeconomic announcements expected to affect the volatility in the interest rate and foreign exchange futures markets. They found that some announcements affected the volatility of the three futures markets examined (Treasury Bond, Eurodollar and Deutsche Mark) for up to five minutes subsequent to certain scheduled monthly news announcements. They found that announcements that had the greatest impact (in order of decreasing impact) on interest rates futures were the unemployment report, the Producers' Price Index (PPI), the Consumer Price Index (CPI) and durable goods orders. The announcements that had greatest impact on the futures dollar/DM exchange rate were the unemployment rate, the merchandise trade deficit, the PPI, durable goods orders, GNP and retail sales

Leng (1996) focused on the impact of the eighteen scheduled macroeconomic announcements studied by Ederington and Lee (1993). He differentiated announcement data into major and minor announcements according to their impact on the foreign exchange futures price. Major announcements are defined as those that have a significant immediate or subsequent impact on the transactions' price. Leng (1996) showed that the impact of the seven major American announcements on four key statistics (the number of price changes; price ranges; absolute price change and first order autocorrelation of log price changes) lasts for at least an hour while the minor eleven announcements were short lived (**APPENDIX I & II**). The average absolute value of price changes is a measure of liquidity costs. Leng (1996) observed that after one hour of trading, the heightened transaction costs caused by a major announcement vanished. However Ederington and Lee (1993) and Leng (1996) did not distinguish whether the announcements themselves were important as opposed to divergences of the announcements from their expectations. It may be that the variables that Ederington and Lee (1993) and Leng (1996) found to be insignificant were insignificant because the announcements were fully expected by market participants.

Switzer & Hughes (2000) looked at bilateral flow of information from both U.S. and Japan on foreign exchange futures price determination. They looked at similar announcements as Ederington and Lee (1993) and Leng (1996). Unlike Ederington and Lee (1993) and Leng (1996), Switzer & Hughes (2000) looked at the announcement effect as well as deviations from market expectation of the variables or their "surprise component." However they do not specifically address the accuracy of the forecasts per

se. They show that macroeconomic announcements from both Japan and the U.S. impact on the Yen futures price.

In an early study of survey forecasts as rational expectations forecasts market expectation Hafer and Hein (1989) compared futures and survey forecasts of near-term Treasury bill rates, specifically of 3-month US treasury rates. They looked at periods three months and six months before the rates. They focused on the unbiased tests embodied in equation 1.Their results showed general support for the survey of professional forecasters' forecast as an unbiased predicator of future rates.

Batchelor and Dua (1998) look at ways to improve the forecasting process. They primarily look at GNP/GDP and corporate profits. They found that the survey forecasts from the Blue Chip Economic Indictors (BCEI) service have forecast errors that are correlated with the U.S. consumer confidence index (CCI) at the time of the forecast. They found that the coefficient (b) in the regression of the forecasting error of GNP as well as corporate profit on the lagged value of the consumer confidence index to be statistically significant. Hence the BCEI fails the forecasting-error unpredictability condition. They then compared simple autoregressive models, of varying lags, with one that included both CCI and the survey forecast. The results indicated that the survey forecast augmented with CCI had better forecasting performance than the simple autoregressive models. In sum their results suggests that the BCEI's forecasters do not follow REH. They however would not proclaim that the model that included CCI and the survey as a superior model since it was not as powerful in the out of sample tests. While their model would have helped forecasters predict the 1990 U.S. recession it did not

predict the recession of 1981-1982. There might be a case of data mining here since the superior results could not be duplicated in out of sample data.

Some scholars have suggested reasons for non-rationality of survey forecasts, such as the BCEI forecasts. Glassman (1997) proposes that economic agents are not rational optimizers. Any successful forecast may be due to chance, to the extent that the underlying variables behave as a random walk. Ghosh and Dutt (2000) specifically addressed the "random walk" property of macroeconomic variables. They looked at the stability over time of GDP and Corporate Profits using a Hansen (1992) procedure. The Hansen test has the advantage of testing the parameter stability over time and also examines the cointegration properties of the actual and forecast series using the null of cointegration approach. They examined ASA-NBER forecasts survey. They looked at the consistency and rationality of the expectation process. Consistency in the expectation formation process exists when the agents' expectations at different forecast horizons lead to equivalent forecasts. This point is illustrated in equations (4) and (5). They did not however find any conclusive evidence that analysts' predictions of GDP had been consistent over the period 1968-1997. They suggested that the data set included a period where of major structural changes reflected in prolonged economic expansion and a bullish stock market over the later part of the sample.

The irrationality of forecast approach suggest that there is less impetus for forecasters to be correct because the gains from being accurate on macroeconomic indicators may be outweighed by the costs of deviating from consensus views. Hence, there may be "herding" of forecasters. Graham (2000) developed a "reputational herding" model that examines the incentives investment advisors face when deciding whether to

herd. He used data from Value Line Investment Survey (a well-respected service whose recommendations are extensively studied by academics) and 237 newsletter strategies over the period 1980-1992. He specifically investigates whether economic conditions and agent's individual characteristics affect their likelihood of herding. Graham found that analysts were more likely to give an opinion similar to Value Line if they were highly regarded or their "reputations" were high. The initial reputations of analysts were obtained from the Hubert Financial Digest, a publication that evaluates and ranks the investments newsletters by reputations. His model updates the reputation parameter according to the newsletters subsequent performance. The reputation parameter is not however updated in the months that the newsletter's equilibrium behaviour is to herd regardless of their private information. He also found that analysts with "low ability" were more likely to mimic Value Line. Ability in this context is basically viewed as the analyst's Investment letters track record, that is the proportion of "correct" recommendations.

Signal correlation is the correlation of private information with analysts' action. Graham's (2000) model looked at the degree to which informative signals are positively correlated. Given that the excess return on T-bills is one of the instruments that can be used in predicting the one-month–ahead market return, it is reasonable to assume that analysts incorporate T-bill forecasts as part of their private information about the likely market movement. Graham (2000) uses the Federal Reserve Bank of Philadelphia Treasury bill forecast as a proxy for private information. He looked at the correlation of the Fed's T-bill forecasts and analysts' recommendations. He found when the signal correlation was high there was an increased likelihood of herding. He interpreted this as

smarter analysts viewed and incorporated this piece of information (T-bill forecasts) in their recommendations and published their recommendations. Other analyst observing these leaders mimicked their recommendations.

Aggarwal et al (1995) provided a fairly comprehensive analysis of the survey forecast of Money Market Service (MMS) from 1983-1992. Eleven macro economic variables were analyzed. They first tested both forecasted figures and announced figures for stationary with the Dickey Fuller and Augmented Dickey –Fuller tests. They checked the cointegration for the series that follow random walk processes. They tested the unbiasedness of the survey of forecasters (equation 1) and whether the time series are invariant with the passage of time (stationary). They found that Housing Starts, the Employment rate and Trade balance were non-stationary variables and rational forecasts. Among the stationary series only CPI and personal income are consistent with rational expectations. Similar to Batchelor (1996) and Lupoletti (1986) they attempted to improve upon the forecasting process for the remaining series by adding an autoregressive predictor (with optimum lags) to the survey forecasts. More specifically they regressed the macroeconomic variable announcements on the survey forecasts and the fitted forecasts obtained from an autoregressive model. They found that the history of the variable added in some cases to the accuracy of the forecasts, since β_2 was found to be significant in the following regression equation.

$$Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$$

where ε_t is a random error term

The results indicate that the survey forecasts could have been improved upon by using information in forecasts based on the autoregressive model. Out of the rational variables Retail sales and Industrial Production Index could have been significant while the consumer price index, personal income, unemployment rates, trade balance, and housing starts showed only marginal improvement in forecasting accuracy.

They proceeded to use an error correcting model to derive the corrected β_1 from the equation unbiased test regression equation for the non-stationary variables. This gives the true parameter ($\hat{\beta}_1$) for the non-stationary time series of the following regression.

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

where ε_t is a random error term

The model used was the Engle and Yoo (1987) three-step error correction model and improvement on the two-step Engle and Granger (1987) approach. This is the improvement of the research design compared to earlier work. The authors not only seek to determine if the macroeconomic series that follow a random walk process are cointegrated but they also seek to determine if the cointegration factor $\beta_1$is unity. This higher criterion is to test REH. The cointegration factor should be one and the forecast error should resemble white noise under REH. In their samples the three variables that were non-stationary at levels, housing starts, trade balance and unemployment could not reject REH at the 5% level.

A more recent study Almeida et al (1998) suggests, in contrast to Aggarwal et al (1995), that the MMS survey is unbiased for the time period 1992 to 1994 for the U.S. and Germany.

III. Data

Our study looks at monthly forecasts and the actual announcements of key economic indicators from the G-7 countries. No allowance is made for revision after the announcement is made at scheduled time. The data were extracted from Bloomberg survey of analysts in the field. The Bloomberg service surveys a number of leading analysts/economists for forecasts on various macroeconomic variables. The number of economists polled varies from variable to variable and also from month to month. **APPENDIX III** illustrates the type of institutions and in some cases economists that participate in the Bloomberg's survey. The forecasted figure reported by Bloomberg is the median of the survey. The scheduled announcements are collected from various government agencies and bureaus. The periods looked at were as follows:

Japan: January 1996 - June 2000

US: January1995 – June 2000

United Kingdom: January1998 - June 2000

Germany: January1998 - June 2000

France: January1998 - June 2000

Italy: January1998 - June 2000.

The data points were limited by the availability of both the forecasted variable and announced variable at a particular month. We focused on economic indicators either examined in the previous literature or used in macroeconomic event studies. Since little recent work in this area has been done in countries other than Japan and U.S. allowances were made to include specific variables that were deemed particularly relevant to certain

countries by Bloomberg (For example Bank of England rate in the U.K. and raw material production in the Canadian).

Most of the data points were monthly, except in the case of Gross National Product, which is a quarterly statistic. Gross National Product however has quarterly, advanced, preliminary announcements, which are made in successive months. Care was taking to distinguish between some announcements for variables with different time horizons. For example the percentage change from year to year (YoY) in CPI, Retail Advance sales, Industrial Production etc. and the percentage change from month to month (MoM) were treated separately.

The variables used are as shown in **APPENDIX IV.** Eighteen variables were tested for the U.S. while twelve variables were tested for Japan. The variables job-to-applicant (JAR) and diffusion index (DI) were unique to Japan in this study. Ten variables were examined in the case of Canada, with new vehicle sales and raw material price index specific to Canada. For the United Kingdom twenty-one series were tested with the Bank of England rate announcement the only U.K. specific variable investigated. In the cases of Germany and France thirteen series were tested while only nine series were tested for Italy.

IV. Methodology

The basic approach of this paper extends that of Aggarwal et al (1995). Our testable hypothesis is that the Bloomberg's surveys are consistent with REH. The announced variable was regressed on the forecasted figure in the following regression.

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t \qquad (6)$$

where Y_t= announced economic figure ; Y_t^e = forecasted economic figure and ε_t is the random error term.

The following hypothesis was tested and test statistic F* compared to $F_{n,2}$

H_0: $\beta_0 = 0$ & $\beta_1 = 1$

H_1: not H_0

Following Aggarwal et al (1995), we tested to see if both the macroeconomic announced variable and forecasts time series revert to a long-run trend (stationary over time) or follow a random walk. This is important because if the variables are not stationary the results from equation (6) can lead to spurious inferences. Similar to Aggarwal et al (1995) we employed the Dickey –Fuller test. Phillips-Perron tests were also used to corroborate the results.

In the case of the Dickey Fuller Test (DF) we run a OLS regression

$$Y_t - Y_{t-1} = \alpha + \beta t + (\rho - 1)Y_{t-1} + \varepsilon_t \qquad (7a)$$

H_0: $\rho = 1$

H_1: $\rho \neq 1$

We use a t-statistic as the test statistic and the critical values are obtained from the Dickey Fuller Table.

In the case of augmented Dickey-Fuller unit root test the following equation is assumed.

$$Y_t - Y_{t-1} = \alpha + \beta t + (\rho - 1)Y_{t-1} + \sum_{j=1}^{p} \lambda_j \Delta Y_{t-j} + \varepsilon_t \qquad (7b)$$

where ε_t is the random error term.

In the cases where the series had unit roots, the unit root tests were done on the first difference of the respective series. If the first differences (ΔY_t & ΔY_t^e) of the initial series (Y_t & Y_t^e) are both stationary they may still be related in some linear combination like equation (6). Economic theory tells us that the forecasted figures and the announced figures should have this link. We actually test the cointegration of the survey forecasts and announcements by testing the residuals (e_t) of equation (6) for stationarity.

For the series that were non-stationary and cointegration, the cointegration factor was corrected and its unity hypothesis tested. If the null hypothesis (that the cointegration factor is equal to one) is rejected the forecast survey was deemed to be non-rational. The parameter β_1 from equation (6) of non-stationary time series (at levels) was corrected using the Engle-Yoo three step error-correcting model. The process is as follows:

Step1. The cointegration regression is estimated from the following equation:

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t.$$

Step 2. Estimate γ from the following regression equation:

$$\Delta Y_t = \gamma(Y_t - \hat{\beta}_0 - \hat{\beta}_1 Y_t^e) + \beta_1 \Delta Y_t^e + \beta_2 \Delta Y_{t-1} + \beta_3 \Delta Y_{t-1}^e + \varepsilon_t$$

with

$$\hat{\varepsilon}_t = \delta_0 + \delta_1 (-\hat{\gamma} * Y^e_{t-1}) + \mu_t,$$

Step 3. The correct estimate of cointegration regression coefficient (β_1) is given as

$$\beta_1 = \hat{\beta}_1 + \hat{\delta}_1.$$

where μ_t and ε_t are random error terms and where the studentized coefficient is given by

$$t = \frac{\beta_1}{studentized(\delta_1)}.$$

To determine if the survey forecast can be improved by past data on the variable we employ the following regression.

$$Y_t = \beta_0 + \beta_1 Y^e_t + \beta_2 Y^{AR}_t + \varepsilon_t \qquad (8)$$

where ε_t is a random error term.

Y^{AR}_t is the predictor obtained from an autoregressive model.We employ a naïve autoregressive model that included a lag as shown in equation (8). Calculating optimum lags was prohibitive with the relatively small size of the sample as compared to Aggarwal et al (1995)

$$Y^{AR}_t = \beta_0 + \beta_1 Y_{t-1} \qquad (9)$$

where ε_t is a random error term.

The significance of the betas in equation (8) was determined. If only β_2 were found to be significant, we would conclude that the forecasts did not fully utilize all the past announcements. If both β_1 and β_2 were significant, we infer that both models (AR and forecast survey) contribute to explaining the announced value. Finally if both betas (β_1

β_2) were found to be insignificant we would conclude that each forecast contains similar information.

V. Empirical Results

5.1 Rationality Survey Forecasts

5.1.1 U.S.A.

The summary of descriptive statistics of the U.S. total sample is presented in **TABLE 1.** In contrast to Aggarwal et al (1995) for the MMS, announced variables are more volatile than the Bloomberg's survey forecasts. This observed volatility may be, attributable to herding behaviour of Bloomberg's forecasters. Before estimating equation (6), the stationarity of variables (Y_t & Y_t^e) is evaluated using the Dickey-Fuller and Phillips-Perron tests with and without trends. The t-statistics are obtained and compared with the 5 percent confident interval critical values of $|3.37|$ in case where there is no trend and $|3.80|$ in the case of a trend. The results are reported in **TABLE 2.** If the unit root was not rejected at the 5% level, the tests were performed on the first-difference of the series. Except for three variables HS, EMP and MTD the unit root hypothesis can be rejected at the 5% level. As stated earlier, the traditional interpretation of equation (6) regression results can lead to spurious inferences for these three variables.

These three variables were then examined for cointegration of the forecasts and the announcements and these results are summarized in **TABLE 3.** They show that the null hypothesis of no cointegration can be rejected at the 5% level. This is evidence that there is a long-run dynamic relationship between the announced values and their forecasts of housing starts, and merchandise trade deficit and unemployment rate.

The Engle and Yoo three-step error correction model was implemented to estimate the cointegration factor of the announced variable and the forecast survey for the

non-stationary series. In **TABLE 4** we present the corrected cointegration factor. These results show that the null hypothesis $\beta_1 = 1$ cannot be rejected at the 5% level for the U.S. The forecasting error however did not resemble white noise in case of the unemployment rate with significant Q-statistics at lags 8,12 and 16. This follows that HS, and MTD survey forecasts are rational estimates of the respective announcements and support REH.

Test of the unbiasedness of the fifteen stationary variables are reported in **TABLE 5**. These results indicate that the unbiasedness hypothesis can be rejected at the 5% level for less than half of these variables. In the case of GDP, IP, CU and PI tended to be over predicted in the survey. RS and PPI tended to be under predicted by forecasters. However, the joint hypothesis that: $\beta_0 = 0$ and $\beta_1 = 1.0$ for the remaining seven series is not rejected. These results are similar to Aggarwal (1995) with respect to CS, PPI and RS, with the respect to their biasedness, though PPI was overestimated by the MMS survey. Thus the Bloomberg's provide estimates that are consistent with REH for ten of the eighteen macroeconomic announcements.

5.1.2 Japan

Summary statistics for Japan is shown in **TABLE 6.** These results are similar to those of the US showing a lower volatility in the forecasts relative to the announced time series. The unit root tests were performed on both the announced and forecasted series for Japan. The results of the unit root tests of Japan are presented in **TABLE 7**. These results indicate for eight out of the twelve variables examined the unit root hypothesis could not

be rejected at the 5% level. In all cases these non-stationary variables were found to be cointegrated as can be seen in **TABLE 8**. The corrected estimates of the cointegration factor of the non-stationary time series are reported in **TABLE 9**.The hypothesis of unity cointegration factor cannot be rejected for all of the variables. There was however some significant autocorrelation in the unemployment rate forecasting error, with significant Q-statistics with four lags. This means that the remaining series CPI, DI, HS, HSPEND, JAR, MS and WPI are rational and support REH.

The survey forecast is statistically unbiased in the stationary time series except M0. In the case of M0 the slope coefficient (β_1) was significantly greater than one **(TABLE 10).** In summary the nine out of the twelve variables are consistent with REH. However in contrast with the U.S. for example Industrial Production is unbiased in Japan and biased in the U.S. The unemployment rate forecasting errors were significantly correlated in the case of U.S. but unemployment rate is rational in the case of Japan.

5.1.3 Canada

Descriptive statistics are summarized for **TABLE 11.** These results are similar to those of the previous countries showing a lower volatility in the forecasts relative to the announced time series. The Canadian data was tested for unit roots and results reported in **TABLE 12**. The unit root hypothesis cannot be rejected for five of the ten variables (ITRDE, RAW, IPP LABS and NCAR) at the 5% significance level. The first difference of the series were however stationary. In all cases these non-stationary variables were

found to be cointegrated as shown in **TABLE 13**. The cointegration factor unity null hypothesis was then tested and results are seen in **TABLE 14.** This shows that all but New Car Sales rejected the null. This means that the remaining four non-stationary variables were rational and support REH.

The stationary series CPI, GDP, RS, MAN and WT were checked for biasedness (**TABLE 15**) they were all supported the null of $\beta_0 = 0$ and $\beta_1 = 1.0$. In sum nine out of the ten series were consistent with REH.

5.1.4 United Kingdom

Descriptive statistics are summarized in **TABLE 16** the results following are consistent with those of the other countries with respect to the volatility. The variables were tested for unit roots and results are reported in **TABLE 17**. The unit root hypothesis cannot be rejected for fifteen of twenty-one of the variables (EMP, GDP_Q, GDP_Y, IP_M, IP_M, RATE, RPI_Y, PPI_M, PPI_Y, $M0_Y$, $M4_Y$, $MANPROD_M$, $MANPROD_Y$, RS_Y and AVGIN) at the 5% level. The first difference of these series were however stationary. We then went on to look at the cointegration of these series; the results are reported in **TABLE 18**. We found that the announcements and the forecasts to be cointegrated with the exception of the trade balance (TBAL) announcements and forecasts. Therefore TBAL did not support REH. The cointegration factor unity null was tested on the remaining fourteen series that follow random walk processes. They all seem to support REH as seen in **TABLE 19** with cointegration factor of one and forecasting errors resembling white noise.

The stationary series BUD and $M0_M$ are biased predictors of the macroeconomic variables with β_1 significantly greater than one. $M4_M$ is the only unbiased predictor among the stationary series as seen in **TABLE 20**. In summary, eighteen of the twenty-one series support REH. In particular it will seem that the Bloomberg's forecasters had particular difficulty in forecasting the U.K. budget since the forecasts time series were not cointegrated with the announcements time series.

5.1.5 Germany

The German data descriptive statistics are summarized in **TABLE 21**. The German data was tested for unit roots and results reported in **TABLE 22**. The unit root hypothesis cannot be rejected for seven of the thirteen variables (CPI_M, CPI_Y, EMP, IP_Y, PPI_M, PPI_Y, and $MANO_Y$) at the 5% confidence level. The first differences of these non-stationary series were however stationary. We then went on to look at the cointegration of these non-stationary variables and found all of the series to be cointegrated as shown in **TABLE 23**. The non-stationary series were tested for unity cointegration factors; the results are summarized in **TABLE 24.** They all cannot reject the null hypothesis that the cointegration factor is one. In the case of unemployment rate however the forecasting errors are significantly correlated with a significant Q-statistic of 4 lags. This means that of the non-stationary variables CPI_M, CPI_Y, IP_Y, PPI_M, PPI_Y, and $MANO_Y$ are rational and support REH.

The stationary series RS_M, RS_Y, IP_M, TBAL, CA and $MANO_M$ are unbiased predictors of the respective macroeconomic series (**TABLE 25**). This is seen by the fact that $\beta_0=0$ and $\beta_1=1$ joint hypothesis could not be rejected at the 5% or better level. In summary, twelve of the thirteen variables are consistent with REH.

5.1.6 France

In the case of France the descriptive data follows the rest of the European countries with reduced volatility in the forecast survey compared to announcement series as reported in **TABLE 26.** The unit root hypothesis was not rejected at the levels for eight of the thirteen variables ($HOUSEC_Y$, CPI_Y, EMP, GDP_Q, GDP_Y, IP_Y, TBAL and $MANPROD_Y$) as reported in **TABLE 27**. They however all showed that the announced and forecasted figures were cointegrated in **TABLE 28**. These non-stationary series were tested for unity of the cointegration factor and correlated forecasting errors and the results are seen in **TABLE 29**. The unity hypothesis could not be rejected for any of the variables. The change in yearly household consumption ($HOUSEC_Y$) however showed significant correlation of the forecasting error, with a significant Q-statistics with four, eight and twelve lags. This means that of the thirteen non-stationary variables CPI_Y, EMP, GDP_Q, GDP_Y, IP_Y, TBAL and $MANPROD_Y$ are rational and support REH.

When it comes to biasedness test in the stationary (**TABLE 30**) $HOUSEC_M$, and CA are biased predictors since the F statistic rejected the jointed hypothesis ($\beta_0 =0$ & $\beta_1 = 0$) at the 5 percent level. In the case of CA β_0 is significantly greater than zero and in the

case of $HOUSEC_M$ β_1 is greater than one. $MANPROD_M$, IP_M and CPI_M were however unbiased predictors of the series among the stationary variables. In summary eleven of the thirteen variables were consistent with the REH. The Bloomberg's forecasters had difficulty forecasting the household consumption with the stationary variable ($HOUSEC_M$) being over predicted and the non-stationary variable ($HOUSEC_Y$) not being rational.

5.1.7. Italy

Due to the limitations on the data, the variables analyzed in the case of Italy were in smaller sample than the other countries and their descriptive statistics are listed in **TABLE 31**. The series were tested for unit roots and the results are summarized in **TABLE 32.** This table shows that CPI_M, TBAL and IP_M were the only variables that unit roots were not detected. This means six of the nine variables follow random walk processes. The forecasts and the announced series were later found to be cointegrated as seen in **TABLE 33**. The cointegration factor was tested for unity and the forecasting error correlation. The results are reported in **TABLE 34**. The unity hypothesis was not rejected for any of the variables and the forecasting errors resembled white noise. This means that CPI_Y, IO_Y, IP_Y, PPI_M, PPI_Y and RS_Y are rational and support REH.

All three stationary variables (CPI_M, IP_M and TBAL) were found to be unbiased predictors of the announced figures as shown in **TABLE 35.** This means that all nine variables forecasting are consistent with REH.

5.1.8 U.S. Subset

A subset of the U.S. sample was analyzed to determine if the below average forecast accuracy improved in the latter part of the data series. Most of the other countries had a common time span of January 1998 to June 2000. We investigated unit roots of the eighteen variables over the shorter time horizon and found that nine of the variables (CS, EMP, GDP, HS, LI, MTD, NAPM, NHS and PPI) to be non-stationary as seen in **TABLE 44**. We found that all the announcements and forecast surveys were cointegrated except in the case of construction spending as seen in **TABLE 45**. All but one of the seven remaining non-stationary variables also passed the higher criteria of REH of unity cointegration factor and non-correlated forecasting errors. NAPM had significantly correlated forecasting errors with lags four and eight. These results are reported in **TABLE 46**. The nine stationary time series BI, BUD, CPI, CU, DGO, IP, PI, RS and WI were deemed to be unbiased predictors except capital utilization as seen in **TABLE 47**.

In summary, the latter U.S. period (1998-2000) indicates that fifteen out of the eighteen variables support REH. To conclude, the REH has held up fairly well for most countries. **TABLE 48** provides a summary across countries.

5.2. Improvements of Survey Forecasts

The survey forecasts were combined with predicted values (generated from the naïve autoregressive model shown in equation (9)) and they were regressed on the announced series. The results of this are reported in **TABLEs 36 - 42**. The U.S. time series showed that Industrial Production forecast could be improved by adding the information from past announcements. Both coefficients (survey and autoregressive predictor) are significant. Forecasters could have used information from past time series better in the case of Construction Spending, where β_2 alone is significant. The autoregressive model did not improve the survey forecasts for Japan, Italy and the United Kingdom. In the case of Canada, only the Labour Survey indicated that the autoregressive models could have improved the forecasting (both betas were significant). In the case of Germany, only the Manufacturing Orders ($MANO_M$) indicated that the autoregressive models could have improved the forecasting (both betas were significant). Manufacturing Production ($MANPROD_M$) could have been improved by combining the autoregressive model in the case of France (both betas were significant).

VI. Summary and Conclusion

This paper examined the relationship between analyst' forecasts and major and minor macroeconomic announcements. A conspicuous difference between Aggarwal et al (1995) data and this study is that the surveys of forecasts seem to be less volatile for all the seven countries. This may be an indication of the herding hypothesis. The forecasters, especially for macroeconomic variables, seem to be hovering around the mean more closely.

For the most part the Bloomberg's survey forecasts seem to support the Rational Expectation Hypothesis. Most variables seemed to be unbiased and rational. The only country that macroeconomic announcements seemed to be contrary to this rule is the United States. There were seven U.S. variables that were found to biased predictors (Construction Spending, Capacity Utilization, Gross Domestic Product, New Home Sales, Personal Income, Producers Price Income and Retail Sales). In addition the unemployment rate forecasting error seemed to be significantly correlated. This is one of the few variables Aggarwal et al (1995) found to be rational. Germany had similar results with its unemployment rate forecasting errors significantly correlated.

There were a number of variables with significantly correlated forecasting errors. They were Household Consumption ($HOUSEC_Y$) in France; New Car sales (NCAR) in Canada; and Housing Starts (HS) in Japan. The fact that these show significant correlation might not be a bad thing in the sense that if a pattern can be recognised the forecasts can be adjusted for this correlation.

Another commonality was the predicting of money supply in the Japan and United Kingdom. In the case of Japan M2 plus cash deposits and United Kingdom M0. They were proved to be biased predictors with both over predicting the actual money supply.

Though this study uses more U.S. variables (eighteen) than Aggarwal et al (1995), the Bloomberg US forecasts seem comparable to the MMS, where five out of eleven variables seemed to be rational. This low success rate is not seen in the other countries. To investigate if this has something to do with the time frame a subset of the U.S. variables was tested. We looked at the eighteen variables from January 1998 to June 2000, which is similar to most of the other countries. For the period 1998-2000 we see that the accuracy of the survey forecasts were improved. For the non-stationary variables EMP, CS, GDP, HS, LI, MTD, NHS and PPI we found that all the announcements and forecast surveys were cointegrated except in the case of construction spending. The non-stationary variables also passed the higher criteria of unity cointegration factor and non-correlated forecasting errors. The stationary time series BI, BUD, CPI, CU, DGO, IP, PI, RS and WI were deemed to be unbiased predictors except capital utilization. This study therefore shows that the accuracy of the macroeconomic indictors has improved since 1998. This fact is especially highlighted with the U.S. data where we observed a marked improvement in accuracy.

The survey forecasts showed like past studies that they outperform VAR forecasting models. The predicted value from the autoregressive model added little to the accuracy of forecasts. This is however a weak comparison since we only use naïve autoregressive model. The naïve model was used because it is an inexpensive way for a

practitioner to improve his forecasting and the ease of use given a relatively small sample of the European countries.

Bibliography

Aggarwal, Raj, Sunil Mohanty and Frank Song, "Are Survey Forecasts Of Macroeconomic Variables Rational?" *The Journal of Business*, 1995, Vol.68, No.1, p 99-119.

Almeida, Avaro, Charles Goodhart and Richard Payne, "The Effects of Macroeconomic News on High Frequency Exchange rate Behavior," *Journal of Financial and Quantitative Analysis*, 1998, Vol 33, No. 3 September, p 383-408

Batchelor, Roy and Pami Dua, "Improving Macro-Economic Forecast," *International Journal of Forecasting*, 1998, Vol 14 March, p 71-81

Ederington, Louis H. and Jae Ha Lee, "How Markets Process Information: New Releases and Volatility," *The Journal of Finance*, September 1993,Vol XLVIII p 1161-1191.

Engle, R.F. and Granger, C. W., "Cointegration ands error correction: representation, estimation, and testing", *Econometrica,* 1987, Vol 55 p 987-1,007

Engle, R.F. and B.S. Yoo, "Forecasting and Testing in cointegrated systems", *Journal of Econometrics,* 1987, Vol 35 p 143-159

Ghosh, Dipak and Swarna D. Dutt, "Macroeconomic Forecasts: An Empirical Test Of Rationality and Parameter Stability," *Applied Economic Letters*, 2000,Vol 7 January, p 49-52.

Glassman K James, "The Golden Age of Forecasting", *Economic Outlook*, 1997, April, (www.oecd.org/eco/out/eo.htm)

Graham, John R "Herding Among Investment Newsletter: Theory and Evidence," *Journal of Financial Economics,* Forthcoming

Hafer, R and Hein, S., "Comparing futures and survey forecasts of near-term Treasury bill rates," *Review-Federal Reserve Bank of St. Louis*, May/June 1989,Vol 71 p 33-44.

Hansen, Bruce E., "Test for Parameter Instability in Regression with I (1) Processes," *Review-Federal Reserve Bank of St. Louis*, July 1992, Vol.10 p 321-335.

Leng, Hsiaohua. "Announcement Versus Non-announcement: Study of Intraday Transaction Price Paths of Deutsche Mark and Japanese Yen Futures," *Journal of Futures Markets*, (1996) Vol 17 No.7 p 829-857

Lupoletti, W.M and Webb, R.H. " Defining and improving the accuracy of macroeconomic forecasts: Contribution from a VAR model," *Journal of Business*, 1986,Vol 59 p 263-385

Muth, John F., "Rational expectations and the theory of price movements," *Econometrica,* 1961, July Vol. 29 No.3, p 315-335

Phillips, P.C.B. and Ouliaris, S., "Asymptotic properties of residual based tests for cointegration," *Econometrica,* 1988, Vol 58 p• 165-194

Sheffrin, M. Steven, *Rational Expectations*, 2rnd. Edition, Cambridge University Press, 1996, p 1-21.

Switzer, Lorne, and Hughes, Brent, "Bilateral Information Flows and Intraday Foreign Exchange Futures Price determination: The U.S. vs. Japan," *Working Paper*, (2000).

Switzer, Lorne, and Park, Tae H., "Forecasting Interest Rate and Yield Spreads: The Information content of implied Futures Yields and Best-Fitting Forward Rate Models," *Journal of Forecasting*, (1997), Vol 16, p 209-224.

APPENDIX I
U.S. Macroeconomic announcements

Major Announcements

CPI – Consumer Price Index

DGO - Durable Goods Orders

EMP - Unemployment Rate

GDP - Gross Domestic Product

MTD - Merchandise Trade Deficit

PPI -Producers Price Index

RS -Advance Retail Sales

Minor Announcements

HS -Housing Start

LI -Leading Indicators

CU -Capacity Utilization

CS -Construction spending

WI -Wholesale Inventories

NAPM -National Association of Purchasing Managers' Survey

NHS -New Home sales

PI -Personal Income

BUD -Federal Budget

BI -Business Inventories

APPENDIX II

Japanese Macroeconomic announcements

TAN	-Tankan Survey
WPI	-Wholesale Price Index
MS	-Money Supply (M2+CD)
CPI	- Consumer Price Index
JAR	-Job-to –Applicant Ratio
EMP	-Unemployment Rate
IP	-Industrial Production
HS	-Housing Starts
MO	-Machinery Orders
DI	-Diffusion Index (leading)
MTB	-Merchandise Trade Balance
CA	-Current Account
HSPEND	-Household Spending

APPENDIX IIIa

Sample of the Companies/Economists surveyed by Bloomberg.

Indicator		**BN survey**		**Actual**
U.S.A CPI		**2.9%**		**3.1%**
Economist	**Firm Name**	**Estimate**		
Steven Ricchiutio	ABN Amro Inc.	2.9%	Median	2.9%
Richard Yamarone	Argus Research Corp.	3.0%	Average	2.9%
	Greenwich Capital Markets	3.0%	High	3.0%
	I.D.E.A.	2.9%	Low	2.6%
	J.P. Morgan	2.6%	Number	10
Francois Dupuis	Mouvement Desjardins	2.8%		
	Nesbitt Burns	2.9%		
	Optima Investment Research	2.9%		
	Scotiabank Group	3.0%		
Robert Palombi	Standard & Poor's MMS	3.0%		

Indicator		**BN survey**		**Actual**
Japan CPI (MoM)		**-0.1%**		**0.0%**
Economist	**Firm Name**	**Estimate**		
	Daiwa Research Institute	-0.1%	Median	-0.1%
	Deutsche Bank Securities	-0.1%	Average	0.0%
	NLI Research Institute	0.1%	High	0.2%
	Kokusai Securities	-0.1%	Low	-0.1%
	Nippon Credit bank Research	0.0%	Number	6
	Nomura Research Institute	0.2%		

Indicator		**BN survey**		**Actual**
Canada CPI (YoY)		**2.9%**		**2.5%**
Economist	**Firm Name**	**Estimate**		
Craig Alexander	CIBC World Markets	2.8%	Median	2.9%
Jonathan Basile	Donaldson, Lufkin & Jenrette	2.9%	Average	2.9%
	Greenwich Capital Markets	3.0%	High	3.0%
	I.D.E.A.	2.9%	Low	2.6%
	J.P. Morgan	2.6%	Number	10
Francois Dupuis	Mouvement Desjardins	2.8%		
	Nesbitt Burns	2.9%		
	Optima Investment Research	2.9%		
	Scotiabank Group	3.0%		
Robert Palombi	Standard & Poor's MMS	3.0%		

APPENDIX IIIb

Sample of the Companies/Economists surveyed by Bloomberg.

Indicator		**BN survey**		**Actual**
Italy CPI (NIC incl tobacco)		**2.6%**		**2.6%**
Economist	**Firm Name**	**Estimate**		
	Banca Commerciale Italiana	2.6%	Median	2.6%
	Cabota Holding	2.6%	Average	2.6%
	Deutsche Bank	2.6%	High	2.7%
	Fortis Bank	2.7%	Low	2.6%
	Goldman Sachs	2.7%	Number	9
	Lenman Brothers	2.6%		
	Merill Lynch	2.7%		
	Paine Webber International	2.6%		
	San Paolo IMI	2.6%		

Indicator		**BN survey**		**Actual**
Germany CPI (MoM)		**0.1%**		**0.4%**
Economist	**Firm Name**	**Estimate**		
	BHF Bank	0.3%	Median	0.1%
	Bankgesellschaft Berlin	0.0%	Average	0.2%
	Commerzbank	0.1%	High	0.4%
	BFG Bank	0.1%	Low	-0.1%
	Deutsche BK Global Mkt Research	0.1%	Number	11
	Hypotheken Bank In Essen	0.4%		
	Invesco Asset Management	0.1%		
	Salomon Smith Barney	-0.1%		
	Siemens AG	0.2%		
	Standard & Poor's MMS	0.1%		

Indicator		**BN survey**		**Actual**
France CPI (YoY)		**1.7%**		**1.7%**
Economist	**Firm Name**	**Estimate**		
	ABN Amro Bank	1.7%	Median	1.7%
	Dresdner Kleinwort Benson	2.9%	Average	1.7%
	Nomura International	3.0%	High	1.7%
			Low	1.7%
			Number	3

APPENDIX IIIc

Sample of the Companies/Economists surveyed by Bloomberg.

Indicator		**BN survey**		**Actual**
U.K. RPI (MoM)		**0.2%**		**0.0%**
Economist	**Firm Name**	**Estimate**		
	ABN Amro Bank	0.2%	Median	0.2%
	Bank of America	0.2%	Average	0.2%
	Banque Paribas	0.4%	High	0.4%
	CS First Boston	0.2%	Low	0.0%
	Chase Manhattan	0.3%	Number	16
	Credit Lyonnais	0.2%		
	Deutsche Bank Securities	0.1%		
	Dresdner Kleinwort Benson	0.2%		
	HSBC Markets	0.1%		
	Investec	0.0%		
	Lehman Brothers	0.2%		
	Merrill Lynch	0.1%		
	Morgan Stanley & Co.	0.2%		
	Nomura International	0.3%		
	Royal Bank of Scotland	0.3%		
Mark Ramsden	Stone & McCarthy Research	0.2%		

APPENDIX IV

U.S.A.: January1995 – June 2000

Consumer Price Index (CPI)

the percentage change in Durable Goods Orders (DGO)

the percentage change in Unemployment rate (EMP)

the percentage change in Gross Domestic Product (GDP)

Merchandise Trade Deficit in billions of U.S. dollars (MTD)

the percentage change in Producers Price Index (PPI)

the percentage change in Retail Sales (RS)

the percentage change in Housing Start (HS)

the percentage change in Leading Indicator Index (LI)

Percentage of Capacity Utilization (CU)

the percentage change in Industrial Production (IP)

the percentage change in Construction in spending (CS)

the percentage change in Wholesale Inventories (WI)

National Association Purchasing Managers' Survey (NAPM)

New Home Sales (NHS)

the percentage change in Personal Income(PI);

Federal Budget in billions (BUD

the percentage change Business Inventories (BI).

Note all variables are MOM if not otherwise stated

APPENDIX IV (cont'd)

Japan: January 1996 - June 2000

Wholesale Price Index (WPI)

the percentage change in Money Supply (i.e.M2+CD) (MS)

the percentage change in Consumer Price Index (CPI)

Job-to –Applicant Ratio (JAR)

Unemployment Rate (EMP)

the percentage change in Industrial Production (IP)

the percentage change in Housing Starts (HS)

the percentage change in Machinery Orders (MO)

Diffusion Index (leading) (DI)

Merchandise Trade Balance in billions of yen (MTB)

the Current Account in billions of yen (CA)

the percentage change in Household Spending (HSPEND).

Canada: January1998 - June 2000

the percentage change in Consumer Price Index (CPI)

the percentage change in Raw Material Price Index (RAW)

the percentage change in Labour Force Survey (LABS)

the percentage change in the Composite Index (CI)

the percentage change in Manufacturing (MAN)

the percentage change in Gross Domestic Product (GDP)

Note: all variables are MOM if not otherwise stated

Canada (cont'd)

International Trade in millions of Canadian dollar (ITRDE)

the percentage change in Industrial Product Price (IPP)

the percentage change in Advance Retail Sales (RS)

the percentage change in New Motor vehicle sales (NCAR)

United Kingdom: January1998 - June 2000

the percentage change in the Unemployment Rate (EMP)

the percentage change in Gross Domestic Product from the previous quarter (GDP_Q)

the percentage change in Gross Domestic Product from the previous twelve months (GDP_Y)

Bank of England Rate announcement (RATE)

the percentage change in Average Earnings (AVGIN)

the percentage change in M0 defined money supply from the previous month ($M0_M$)

the percentage change in M0 defined money supply from the previous twelve months ($M0_Y$)

the percentage change in M4 definition of money supply from the previous month ($M4_M$)

the percentage change in M4 defined money supply from the previous twelve months ($M4_Y$)

the percentage change from the previous month in Retail Price Index (RPI_M)

the percentage change from the previous twelve months in Retail Price Index (RPI_Y)

Note: all variables are MOM if not otherwise stated

APPENDIX IV (cont'd)

U.K. (cont'd)

the percentage change from the previous twelve months in Retail Sales (RS_Y)

the percentage change from the previous month in Retail Sales (RS_M)

National Budget in billions of sterling pounds (BUD)

the percentage change from the previous month in Industrial Production (IP_M)

the percentage change from the previous twelve months in Industrial Production (IP_Y)

the percentage change from the previous month in Producers' Price Index Output (PPI_M);

the percentage change from the previous twelve months in Producers Prices Index Output (PPI_Y)

the percentage change from the previous month in Manufacturing Production ($MANPROD_M$)

the percentage change from the previous twelve months in Manufacturing Production ($MANPROD_Y$)

Germany: January1998 - June 2000

the percentage change from the previous month in Consumer Price Index (CPI_M)

the percentage change from the previous twelve months in Consumer Price Index (CPI_Y)

the percentage change from the previous month in Producers' Price Index Output (PPI_M)

Note: all variables are MOM if not otherwise stated

Germany (cont'd)

the percentage change from the previous twelve months in Producers Prices Index Output (PPI_Y)

the percentage change from the previous month in Retail Sales (RS_M)

the percentage change from the previous twelve months in Retail Sales (RS_Y)

the percentage change from the previous month in Industrial Production (IP_M)

the percentage change from the previous twelve months in Industrial Production (IP_Y)

the percentage change in the Unemployment Rate (EMP)

Current account in billions of Marks (CA)

the percentage change from the previous month in Manufacturing Orders ($MANO_M$)

the percentage change from the previous twelve months in Manufacturing Orders ($MANO_Y$)

France: January1998 - June 2000

the percentage change from the previous month in Consumer Price Index (CPI_M)

the percentage change from the previous twelve months in Consumer Price Index (CPI_Y);

the percentage change in Gross Domestic Product from the previous quarter (GDP_Q)

the percentage change in Gross Domestic Product from the previous twelve months (GDP_Y)

Note: all variables are MOM if not otherwise stated

APPENDIX IV (cont'd)

France (cont'd)

Trade Balance in billions of Francs (TBAL)

the percentage change from the previous month in Producers' Price Index Output (PPI_M);

the percentage change from the previous month in Industrial Production (IP_M)

the percentage change from the previous twelve months in Industrial Production (IP_Y)

Unemployment Rate (EMP)

Current Account in billions of francs (CA)

the percentage change from the previous month in Manufacturing Production ($MANPROD_M$)

the percentage change from the previous twelve months in Manufacturing Production ($MANPROD_Y$)

the percentage change from the previous month in Household Consumption ($HOUSEC_M$)

the percentage change from the previous twelve months in Household Consumption ($HOUSEC_Y$)

Note: all variables are MOM if not otherwise stated

Italy: January1998 - June 2000

the percentage change from the previous month in Consumer Price Index (CPI_M)

the percentage change from the previous twelve months in Consumer Price Index (CPI_Y)

Trade Balance in trillion of liras (TBAL);

the percentage change from the previous month in Producers' Price Index Output (PPI_M)

the percentage change from the previous twelve months in Producers Prices Index Output (PPI_Y)

the percentage change from the previous twelve months in Retail Sales (RS_Y)

the percentage change from the previous month in Industrial Production (IP_M)

the percentage change from the previous twelve months in Industrial Production

the percentage change from the previous month in Industrial Orders (IO_M)

the percentage changes from the previous twelve months in Industrial Production (IP_Y)

the percentage change in the Unemployment Rate (EMP).

TABLE 1:U.S.A Summary Statistics for Macroeconomic Forecast and Announcements

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observation
BI	0.321	0.298	0.072	0.049	62
BUD	3.143	-0.254	2,518.308	2,352.816	57
CPI	0.209	0.232	0.020	0.008	66
CS	0.463	0.198	1.555	0.200	59
CU	81.402	81.384	128.212	125.118	56
DGO	0.384	0.152	9.277	1.329	61
EMP	4.867	4.879	0.352	0.360	64
GDP	3.85	3.585	3.036	2.571	62
HS	777.176	770.644	685,998.488	672,451.311	59
IP	0.298	0.216	0.241	0.138	61
LI	0.136	0.105	0.126	0.062	61
MTD	-14.758	-14.304	53.074	49.461	63
NAPM	52.114	52.252	13.136	11.071	63
NHS	1.823	-0.960	45.567	12.642	30
PI	0.479	0.411	0.065	0.048	64
PPI	0.111	0.165	0.106	0.037	66
RS	0.302	0.391	0.199	0.136	64
WI	0.433	0.372	0.632	0.632	51

TABLE 2. Unit Root tests for US series

	Levels				First Difference			
Series Announced Forecast	DF	DFT	PP	PPT	DF	DFT	PP	PPT
BI	-7.219	-7.175	-7.219	-7.175	—	—	—	—
	-6.364	-6.302	-6.364	-6.302	—	—	—	—
BUD	-7.597	-8.263	-7.597	-8.263	—	—	—	—
	-7.003	-7.503	-7.003	-7.503	—	—	—	—
CPI	-6.748	-6.735	-6.748	-6.735	—	—	—	—
	-5.234	-5.274	-5.234	-5.274	—	—	—	—
CS	-5.920	-5.902	-5.920	-5.902	—	—	—	—
	-4.558	-4.570	-4.558	-4.570	—	—	—	—
CU	-7.022	-7.449	-7.022	-7.449	—	—	—	—
	-6.993	-7.417	-6.993	-7.417	—	—	—	—
DGO	-8.568	-8.471	-8.568	-8.471	—	—	—	—
	-8.763	-8.688	-8.763	-8.688	—	—	—	—
EMP	-0.757	-5.419	-0.757	-5.419	-33.223	-32.190	-33.223	-32.190
	-0.505	-3.574	-0.505	-3.574	-52.958	-51.615	-52.958	-51.615
GDP	-3.488	-4.259	-3.488	-4.259	—	—	—	—
	-3.525	-4.343	-3.525	-4.343	—	—	—	—
HS	-0.858	-1.783	-0.858	-1.783	-7.145	-7.081	-7.145	-7.081
	-0.873	-1.897	-0.873	-1.897	-7.829	-7.758	-7.829	-7.758
IP	-8.896	-8.880	-8.896	-8.880	—	—	—	—
	-7.902	-8.188	-7.902	-8.188	—	—	—	—
LI	-6.323	-6.701	-6.323	-6.701	—	—	—	—
	-6.320	-6.427	-6.320	-6.427	—	—	—	—
MTD	-0.393	-2.492	-0.393	-2.492	-13.034	-13.126	-13.034	-13.126
	-0.649	-2.686	-0.649	-2.686	-12.273	-12.313	-12.273	-12.313
NAPM	-2.518	-3.025	-2.518	-3.025	—	—	—	—
	-2.557	-3.347	-2.557	-3.347	—	—	—	—
NHS	-6.455	-6.460	-6.455	-6.460	—	—	—	—
	-4.176	-4.542	-4.176	-4.542	—	—	—	—
PI	-9.441	-9.520	-9.441	-9.520	—	—	—	—
	-9.305	-9.311	-9.305	-9.311	—	—	—	—
PPI	-6.914	-6.936	-6.914	-6.936	—	—	—	—
	-5.701	-5.673	-5.701	-5.673	—	—	—	—
RS	-8.034	-8.688	-8.034	-8.688	—	—	—	—
	-9.078	-9.385	-9.078	-9.385	—	—	—	—
WI	-7.958	-8.651	-7.958	-8.651	—	—	—	—
	-7.278	-7.515	-7.278	-7.515	—	—	—	—
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller (Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger (1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 3 U.S.A. Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
EMP	-10.128	-10.245	-10.128	-10.245
HS	-8.366	-8.290	-8.366	-8.290
MTD	-8.833	-8.998	-8.833	-8.998
95% critical value	-3.37	-3.80	-3.37	-3.80

TABLE 4 U.S.A. Test for Cointegration factor (H_0: $\beta_1=1$)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Variable	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics	$(Y_t - Y_t^e)$		
			Q(4)	Q(8)	Q(12)	Q(16)
EMP	0.960 (31.915)	0.975 (0.582)	5.631	20.489*	27.763*	29.424*
HS	1.01 (117.264)	1.011 (1.686)	1.421	3.384	16.479	17.898
MTD	1.012 (35.396)	1.024 (1.235)	1.320	6.882	9.130	14.893

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity * Correlation significant at 5% level or better

TABLE 5 **U.S.A. Test for Unbiasedness of survey Forecasts**

$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
BI	0.041	0.937	0.588	0.172	2.309	0.734
	(1.122)	(9.382)				
BUD	3.392	0.977	0.891	16.578	2.175	1.318
	(1.544)	(21.403)				
CPI	-0.017	0.977	0.385	0.111	2.231	1.382
	(-0.464)	(6.461)				
CS	0.424*	0.196**	-0.012	1.255	1.491	3.694***
	(2.368)	(0.534)				
CU	-0.950*	1.012**	0.999	0.322	2.252	4.764***
	(-2.977)	(260.497)				
DGO	-0.178	1.346	0.2467	2.643	1.762	0.915
	(0.341)	(4.546)				
EMP[a]	0.182	0.960	0.942	0.143	2.468	1.124***
	(1.233)	(31.915)				
GDP	0.26	1.001	0.847	0.682	2.076	4.658***
	(1.215)	(18.377)				
HS[a]	0.416	1.008	0.996	53.679	2.221	0.863
	(0.043)	(117.264)				
IP	0.053	1.134	0.730	0.255	2.231	4.285***
	(1.399)	(12.787)				
LI	0.022	1.088	0.577	0.231	1.987	0.831
	(0.681)	(9.110)				
MTD[a]	-0.289	1.012	0.953	1.583	2.259	2.677
	(-0.636)	(35.396)				
NAPM	4.346	0.914	0.699	1.986	2.143	0.793
	(1.095)	(12.506)				
NHS	2.287	0.483	0.031	6.643	2.146	3.741***
	(1.818)	(1.393)				
PI	0.104*	0.913	0.599	0.162	2.087	6.136***
	(2.399)	(9.755)				
PPI	-0.094*	1.241	0.535	0.222	1.899	3.409***
	(-2.611)	(8.699)				
RS	-0.041	0.878	0.518	0.310	1.984	3.305***
	(-0.731)	(8.286)				
WI	0.091	0.919	0.483	0.571	2.278	0.474
	(0.966)	(6.915)				

CPI – Consumer Price Index
DGO - Durable Goods Orders
EMP - Unemployment Rate
GDP - Gross Domestic Product
MTD - Merchandise Trade Deficit
PPI -Producers Price Index
RS -Advance Retail Sales
NHS -New Home sales
BUD -Federal Budget T-statistics in parenthesis
** β_1 is significantly different from one
D.W. – Durbin Watson
HS -Housing Starts
LI -Leading Indicators
CU -Capacity Utilization
BI -Business Inventories
CS -Construction spending
WI -Wholesale Inventories
NAPM -NAPM Survey
PI -Personal Income
***F-value is significant at the 5% level or better
*β_0 is significantly different from zero
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 6 Japan Summary Statistics for Macroeconomic Forecast and Announcements

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observations
CA	985.300	996.638	134,875.87	126,358.522	47
CPI	0.097	0.076	0.257	0.193	46
DI	47.119	45.914	582.922	490.453	37
EMPLY	3.922	3.924	0.368	0.385	51
HS	-3.491	-3.249	157.506	118.092	53
HSPEND	-1.116	-1.084	6.346	3.881	32
IP	-0.213	-0.073	6.071	4.433	79
JAR	0.614	0.608	0.012	0.012	49
MO	1.222	-0.367	133.924	47.260	45
MS	3.427	3.396	0.365	0.291	52
MTB	884.653	886.993	155,356.325	161,979.647	54
WPI	0.338	0.342	0.832	0.447	45

TABLE 7. Unit Root tests for Japan series

	Levels				First Difference			
Series Announced Forecast	DF	DFT	PP	PPT	DF	DFT	PP	PPT
CA	-5.725	-4.954	-5.725	-4.954	—	—	—	—
	-4.736	-5.725	-4.736	-5.725	—	—	—	—
CPI	-4.100	-4.206	-4.100	-4.206	—	—	—	—
	-3.540	-3.665	-3.540	-3.665	—	-6.104	—	-6.104
DI	-3.645	-3.856	-3.645	-3.856	—	—	—	—
	-3.626	-3.525	-3.626	-3.525	—	-9.288	—	-9.288
EMPLY	-0.284	-2.407	-0.284	-2.407	-26.544	-25.728	-26.544	-25.728
	0.124	-2.144	0.124	-2.144	-27.424	-26.462	-27.424	-26.462
HS	-2.683	-2.612	-2.683	-2.612	-12.627	-12.568	-12.627	-12.568
	-2.393	-2.304	-2.393	-2.304	-12.050	-11.988	-12.050	-11.988
HSPEND	-4.586	-4.735	-4.586	-4.735	—	—	—	—
	-3.168	-3.383	-3.168	-3.383	-7.049	-6.938	-7.049	-6.938
IP	-8.651	-8.615	-8.651	-8.615	—	—	—	—
	-7.645	-7.642	-7.645	-7.642	—	—	—	—
JAR	-2.189	-3.832	-2.189	-3.832	-13.469	—	-13.469	—
	-0.532	-1.785	-0.532	-1.785	-27.424	-26.269	-27.424	-26.269
MO	-10.917	-10.836	-10.917	-10.836	—	—	—	—
	-9.387	-9.429	-9.387	-9.429	—	—	—	—
MS	-1.443	-1.369	-1.443	-1.369	-10.818	-10.410	-10.818	-10.410
	-2.247	-2.206	-2.247	-2.206	-14.029	-13.732	-14.029	-13.732
MTB	-4.464	-5.978	-4.464	-5.978	—	—	—	—
	-4.695	-5.991	-4.695	-5.991	—	—	—	—
WPI	-2.861	-3.299	-2.861	-3.299	-6.676	-6.612	-6.676	-6.612
	-2.397	-3.154	-2.397	-3.154	-6.753	-6.723	-6.753	-6.723
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller (Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger (1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 8 Japan Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
CPI	-8.249	-8.168	-8.249	-8.168
DI	-5.780	-6.050	-5.780	-6.050
EMP	-5.787	-5.803	-5.787	-5.803
HS	-8.728	-8.640	-8.728	-8.640
HSPEND	-5.756	-5.613	-5.756	-5.613
JAR	-7.010	-6.989	-7.010	-6.989
MS	-6.062	-5.995	-6.062	-5.995
WPI	-4.978	-5.203	-4.978	-5.203

TABLE 9 Japan Test for Cointegration factor (H_0: $\beta_1=1$)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics $(Y_t - Y_t^e)$			
			Q(4)	**Q(8)**	**Q(12)**	**Q(16)**
CPI	1.097 (20.289)	1.076 (14.044)	4.697	6.932	8.237	15.357
DI	1.014 (14.977)	1.050 (1.441)	0.724	1.859	2.145	7.088
EMP	0.957 (33.845)	0.968 (0.849)	9.795	12.530	36.823	44.876
HS	1.055 (16.05)	1.108 (0.776)	9.795*	12.530	36.823	44.876
HSPEND	0.934 (5.850)	0.926 (11.188)	2.047	5.466	13.261	15.378
JAR	0.896 (14.188)	0.907 (3.169)	0.255	0.395	1.794	2.316
MS	0.967 (12.111)	1.062 (0.338)	5.132	6.671	8.162	13.010
WPI	1.294** (19.604)	1.226 (0.919)	6.932	7.314	9.149	11.089

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity * Correlation significant at 5% level or better

TABLE 10 JAPAN Tests of Unbiasedness of Survey Forecasts

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
CA	1.713	1.3385**	0.624	7.099	1.916	0.922
	(1.616)	(12.125)				
CPI [a]	0.014	1.097	0.901	0.159	2.450	2.017
	(0.595)	(20.289)				
DI [a]	0.564	1.014	0.861	8.996	1.979	0.353
	(0.164)	(14.977)				
EMP [a]	0.167	0.957	0.957	0.124	1.654	1.162
	(1.485)	(33.845)				
HS [a]	-0.062	1.055	0.832	5.152	2.414	0.410
	(-0.084)	(16.05)				
HSPEND [a]	-0.103	0.934	0.517	1.750	1.967	0.092
	(-0.291)	(5.850)				
IP	-0.138	1.022	0.760	1.208	1.896	0.582
	(-1.012)	(15.730)				
JAR [a]	0.069	0.896	0.807	0.048	2.061	1.778
	(1.782)	(14.188)				
MO	1.713	1.339**	0.624	7.099	1.916	3.491***
	(1.616)	(8.598)				
MS [a]	0.144	0.967	0.741	0.308	1.695	0.347
	(0.523)	(12.111)				
MTB	62.975	0.926	0.893	129.104	2.253	1.405
	(1.469)	(21.024)				
WPI [a]	-0.105*	1.294**	0.897	0.293	1.470	9.950***
	(-2.140)	(19.604)				

WPI -Wholesale Price Index
MS -Money Supply (M2+CD) **CPI - Consumer Price Index**
JAR -Job-to –Applicant Ratio **EMP-Unemployment Rate**
IP -Industrial Production **HS -Housing Starts**
MO -Machinery Orders **DI -Diffusion Index (leading)**
MTB -Merchandise Trade Balance **CA -Current Account**

T-statistics in parenthesis ***F-value is significant at the 5% level or better
** β_1 is significantly different from one *β_0 is significantly different from zero
D-W. – Durbin Watson
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 11 Canada **Summary Statistics for Macroeconomic Forecast and Announcements**

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observations
CPI	0.454	0.482	0.649	0.625	33
GDP	0.554	0.592	1.100	0.797	26
IPP	0.117	0.183	0.255	0.101	23
ITRDE	2.396	2.232	0.771	0.718	28
LABS	7.842	7.842	1.105	1.688	24
MAN	0.183	0.797	5.209	0.640	29
NCAR	0.996	2.537	54.448	24.885	27
RAW	0.633	0.433	8.564	1.820	24
RS	0.321	0.557	1.335	0.245	28
WT	0.474	0.437	1.217	0.334	27

TABLE 12. Unit Root tests for Canada series

	Levels				First Difference			
Series								
Announced	DF	DFT	PP	PPT	DF	DFT	PP	PPT
Forecast								
CPI	-4.462	-5.910	-4.462	-5.910	—	—	—	—
	-3.779	-5.931	-3.779	-5.931	—	—	—	—
GDP	-5.812	-5.902	-5.812	-5.902	—	—	—	—
	-5.439	-5.514	-5.439	-5.514	—	—	—	—
IPP	-3.770	-4.394	-3.770	-4.394	—	—	—	—
	-2.837	-3.380	-2.837	-3.380	-5.071	-4.907	-5.071	-4.907
ITRDE	-1.729	-4.470	-1.729	-4.470	-7.458	—	-7.458	—
	-0.800	-3.542	-0.800	-3.542	-6.558	-6.400	-6.558	-6.400
LABS	2.570	1.913	2.570	1.913	-11.679	-12.246	-11.679	-12.246
	2.605	1.999	2.605	1.999	-7.406	-7.871	-7.406	-7.871
MAN	-4.682	-4.974	-4.682	-4.974	—	—	—	—
	-6.854	-6.945	-6.854	-6.945	—	—	—	—
NCAR	-7.116	-6.956	-7.116	-6.956	-7.116	-6.956	-7.116	-6.956
	-3.428	-4.244	-3.428	-4.244	-3.428	-4.244	-3.428	-4.244
RAW	-3.942	-4.817	-3.942	-4.817	—	—	—	—
	-1.959	-1.986	-1.959	-1.986	-5.788	-5.785	-5.788	-5.785
RS	-8.883	-8.708	-8.883	-8.708	—	—	—	—
	-7.484	-7.500	-7.484	-7.500	—	—	—	—
WT	-5.685	-5.611	-5.685	-5.611	—	—	—	—
	-5.480	-6.245	-5.480	-6.245	—	—	—	—
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller(Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger(1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 13 Canada Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
IPP	-5.151	-5.387	-5.151	-5.387
ITRDE	-5.491	-5.591	-5.491	-5.591
LABS	-3.703	-4.374	-3.703	-4.374
NCAR	-7.106	-6.954	-7.106	-6.954
RAW	-6.217	-6.166	-6.217	-6.166
95% critical value	-3.37	-3.80	-3.37	-3.80

TABLE 14 Canada Test for Cointegration factor (H_0: β_1=1)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics $(Y_t - Y_t^e)$			
			Q(4)	**Q(8)**	**Q(12)**	**Q(16)**
IPP	0.876 (3.040)	1.103 (0.757)	2.847	4.096	12.461	17.728
ITRDE	0.852 (.381)	0.956 (0.314)	6.783	15.390	26.618	29.650
LABS	0.791** (21.476)	1.013 (0.289)	2.637	8.533	8.669	9.951
NCAR	0.061** (0.207)	-0.042** (0.042)	0.582	0.701	1.510	1.547
RAW	1.193 (3.087)	1.455 (1.174)	1.726	7.734	16.756	18.392

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity * Correlation significant at 5% level or better

TABLE 15 Canada Tests of Unbiasedness of Survey Forecasts

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
CPI	-0.011	0.967	0.6997	0.259	1.638	0.343
	(-0.216)	(16.678))				
GDP	-0.097	1.099	0.869	0.379	2.263	0.814
	(-1.082)	(12.944)				
IPP[a]	-0.043	0.876	0.272	0.431	2.249	0.355
	(-0.409)	(3.040)				
ITRDE[a]	0.493	0.852	0.664	0.508	2.184	2.277
	(1.793)	(7.381)				
LABS[a]	1.642*	0.791**	0.952	0.229	1.326	16.184***
	(5.616)	(21.476)				
MAN	-0.554	0.925	0.072	2.199	2.010	1.140
	(-0.953)	(1.781)				
NCAR[a]	0.841	0.061**	-0.038	7.518	2.688	5.609***
	(0.516)	(0.208)				
RAW[a]	0.116	1.193	0.270	2.499	2.475	0.201
	(0.217)	(3.087)				
RS	-0.575*	1.609	0.455	0.853	2.419	2.754
	(-2.344)	(4.849)				
WT	0.252	0.507	0.033	1.084	2.086	0.912
	(0.958)	(1.379)				

CPI – Consumer Price Index
LABS - Labour Force Survey
MAN -Manufacturing
ITRDE - International Trade
RS -Advance Retail Sales
RAW -Raw Material Price Index
CI -Composite Index
GDP - Gross Domestic Product
IPP -Industrial Product Price
NCAR -New Motor vehicle sales

T-statistics parenthesis
***F-value is significant at the 5% level or better
** β_1 is significantly different from one
*β_0 is significantly different from zero
D-W. – Durbin Watson
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 16 **UK Summary Statistics for Macroeconomic Forecast and Announcements**

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observation
AVGIN	4.854	4.826	0.197	0.222	22
BUD	-1.987	-1.403	55.683	32.651	18
EMP	4.457	4.490	0.124	0.11	30
GDP_Q	0.490	0.486	0.070	0.066	29
GDP_Y	2.176	2.141	0.753	0.798	29
IP_M	-0.265	0.48	1.510	0.059	29
IP_Y	0.537	0.453	1.093	1.311	30
$M0_M$	0.638	0.441	1.339	0.764	29
$M0_Y$	7.067	6.896	3.024	2.670	28
$M4_M$	0.547	0.517	0.164	0.130	36
$M4_Y$	6.983	6.900	7.021	6.829	36
$MANPROD_M$	-0.086	0.032	0.094	0.056	28
$MANPROD_Y$	0.138	0.176	1.360	1.88	29
PPI_M	0.121	0.065	0.047	0.016	29
PPI_Y	1.110	1.086	0.665	0.674	29
RATE	6.208	6.231	0.828	0.832	30
RPI_M	0.190	0.174	0.132	0.123	31
RPI_Y	2.597	2.590	0.936	0.888	31
RS_M	0.214	0.221	0.647	0.195	29
RS_Y	3.362	3.344	3.704	3.630	29
TBAL	-1,743.172	-1,909.652	1,363,729.148	539,940.692	29

TABLE 17. Unit Root tests for UK series

	Levels				First Difference			
Series Announced **Forecast**	DF	DFT	PP	PPT	DF	DFT	PP	PPT
AVGIN	-1.980	-2.012	-1.980	-2.012	-12.492	-11.600	-12.492	-11.600
	-1.942	-1.900	-1.942	-1.900	-11.306	-10.474	-11.306	-10.474
BUD	-4.632	-4.553	-4.632	-4.553	—	—	—	—
	-5.014	-4.957	-5.014	-4.957	—	—	—	—
EMP	0.389	-1.687	0.389	-1.687	-97.496	-91.272	-97.496	-91.272
	-1.60	-2.304	-1.60	-2.304	-74.414	-70.107	-74.414	-70.107
GDP_Q	-1.342	-1.766	-1.342	-1.766	-5.747	-5.505	-5.747	-5.505
	-1.222	-1.662	-1.222	-1.662	-5.973	-5.752	-5.973	-5.752
GDP_Y	-1.011	-0.675	-1.011	-0.675	-10.157	-10.408	-10.157	-10.408
	-1.098	-0.561	-1.098	-0.561	-11.842	-12.668	-11.842	-12.668
IP_M	-5.831	-5.985	-5.831	-5.985	—	—	—	—
	-2.370	-2.370	-2.370	-2.370	-8.569	-8.473	-8.569	-8.473
IP_Y	-1.870	-2.394	-1.870	-2.394	-7.378	-7.682	-7.378	-7.682
	-1.882	-2.329	-1.882	-2.329	-6.425	-6.479	-6.425	-6.479
$M0_M$	-4.684	-4.613	-4.684	-4.613	—	—	—	—
	-4.647	-4.557	-4.647	-4.557	—	—	—	—
$M0_Y$	-1.646	-2.077	-1.646	-2.077	-7.220	-6.850	-7.220	-6.850
	-1.470	-1.920	-1.470	-1.920	-7.610	-7.195	-7.610	-7.195
$M4_M$	-5.299	-5.374	-5.299	-5.374	—	—	—	—
	-7.063	-7.306	-7.063	-7.306	—	—	—	—
$M4_Y$	-1.533	-1.224	-1.533	-1.224	-12.418	-11.902	-12.418	-11.902
	-1.496	-1.521	-1.496	-1.521	-12.664	-12.128	-12.664	-12.128
$MANPROD_M$	-3.986	-4.042	-3.986	-4.042	—	—	—	—
	-1.402	-1.645	-1.402	-1.645	-6.111	-5.976	-6.111	-5.976
$MANPROD_Y$	-1.133	-1.844	-1.133	-1.844	-6.332	-6.938	-6.332	-6.938
	1.519	-2.069	1.519	-2.069	-6.716	-6.343	-6.716	-6.343
PPI_M	-3.312	-3.647	-3.312	-3.647	-6.529	-6.451	-6.529	-6.451
	-3.664	-3.983	-3.664	-3.983	—	—	—	—
PPI_Y	1.051	-0.878	1.051	-0.878	-5.804	-6.639	-5.804	-6.639
	0.368	-1.048	0.368	-1.048	-5.117	-5.483	-5.117	-5.483
RATE	-1.131	-0.223	-1.131	-0.223	-33.223	-32.339	-33.223	-32.339
	-1.095	-0.202	-1.095	-0.202	-34.154	-33.245	-34.154	-33.245
RPI_M	-4.485	-4.410	-4.485	-4.410	—	—	—	—
	-4.236	-4.163	-4.236	-4.163	—	—	—	—
RPI_Y	-0.956	0.674	-0.956	0.674	-13.424	-13.693	-13.424	-13.693
	-1.116	0.440	-1.116	0.440	-13.612	-13.903	-13.612	-13.903
RS_M	-8.196	-8.038	-8.196	-8.038	—	—	—	—
	-6.658	-6.928	-6.658	-6.928	—	—	—	—
RS_Y	-3.25	-3.176	-3.25	-3.176	-7.920	-7.731	-7.920	-7.731
	-3.172	-3.268	-3.172	-3.268	-8.414	-8.231	-8.414	-8.231
TBAL	-3.255	-3.266	-3.255	-3.266	-6.016	-5.892	-6.016	-5.892
	-4.215	-6.080	-4.215	-6.080	—	—	—	—
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller (Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger (1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 18 U.K. Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
AVGIN	-4.227	-4.416	-4.227	-4.416
EMP	-5.773	-5.766	-5.773	-5.766
GDP_Q	5.554	-5.73	5.554	-5.73
GDP_Y	-3.554	-3.598	-3.554	-3.598
IP_M	-5.841	-5.983	-5.841	-5.983
IP_Y	-4.727	-4.683	-4.727	-4.683
$M0_Y$	-4.330	-4.250	-4.330	-4.250
$M4_Y$	-5.255	-5.146	-5.255	-5.146
$MANPROD_M$	-4.751	-4.627	-4.751	-4.627
$MANPROD_Y$	-4.500	-4.613	-4.500	-4.613
PPI_M	-4.438	-4.452	-4.438	-4.452
PPI_Y	-4.670	-5.018	-4.670	-5.018
RATE	-3.426	-3.363	-3.426	-3.363
RPI_Y	-6.725	-6.606	-6.725	-6.606
RS_Y	-5.676	-5.567	-5.676	-5.567
TBAL	**-3.175**	**-3.114**	**-3.175**	**-3.114**
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**

TABLE 19 United Kingdom Test for Cointegration factor (H_0: β_1=1)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics	$(Y_t - Y_t^e)$		
			Q(4)	**Q(8)**	**Q(12)**	**Q(16)**
AVGIN	0.797 (7.079)	0.881 (0.565)	0.366	3.188	5.472	7.551
EMP	1.044 (31.187)	1.047 (5.792)	8.023	12.196	14.468	17.195
GDP_Q	0.974 (15.095)	1.009 (0.653)	1.812	6.047	10.574	13.291
GDP_Y	0.950 (23.937)	0.971 (1.342)	7.852	17.579	27.040	32.017
IP_M	-0.053 (-0.055)	0.232 (0.271)	0.372	0.532	0.691	1.178
IP_Y	0.800** (9.610)	0.824 (1.645)	2.781	6.642	10.094	11.240
$M0_Y$	1.033 (20.516)	1.039 (2.573)	6.581	10.607	17.994	20.015
$M4_Y$	1.004 (41.824)	1.018 (0.852)	11.482	13.647	15.678	16.099
$MANPROD_M$	0.550** (2.403)	0.641 (1.224)	1.792	4.865	7.944	12.306
$MANPROD_Y$	0.815** (17.264)	0.837 (0.908)	3.358	4.594	6.322	9.526
PPI_M	1.012 (3.758)	1.230 (1.127)	1.157	5.020	9.070	10.651
PPI_Y	0.970 (23.392)	0.938 (0.455)	1.119	2.804	8.829	11.344
RATE	0.988 (39.134)	1.012 (0.454)	7.422	13.908	18.950	20.041
RS_Y	0.916 (12.672)	0.958 (1.087)	1.511	4.198	8.218	12.707
RPI_Y	1.019 (44.309)	1.029 (1.171)	6.821	10.002	14.169	19.650

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity *Correlation significant at 5% level or better

TABLE 20 UK Tests of Unbiasedness of Survey Forecasts

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
AVGIN[a]	1.010	0.797	0.700	0.243	1.905	1.787
	(1.852)	(7.079)				
BUD	-0.209	1.267**	0.938	1.84	2.376	6.575***
	(1.267)	(16.014)				
EMP[a]	-0.229	1.044	0.971	0.060	2.205	5.492***
	(-1.552)	(31.188)				
GDP_Q[a]	0.016	0.974	0.890	0.088	2.068	0.105
	(0.458)	(15.095)				
GDP_Y[a]	0.142	0.950	0.953	0.187	1.252	1.291
	(1.547)	(23.937)				
IP_M[a]	-0.263	-0.053	-0.037	1.251	2.260	1.497
	(-1.109)	(-0.055)				
IP_Y[a]	0.174	0.800**	0.759	0.513	1.789	3.287
	(1.723)	(9.610)				
$M0_M$	0.071	1.285**	0.940	0.284	1.261	17.433***
	(1.195)	(20.945)				
$M0_Y$[a]	-0.056	1.033	0.9396	0.427	1.715	2.437
	(-0.158)	(20.516)				
$M4_M$	0.067	0.930	0.678	0.230	1.907	0.529
	(0.988)	(8.636)				
$M4_Y$[a]	0.054	1.004	0.980	0.371	1.839	0.923
	(0.303)	(41.824)				
$MANPROD_M$[a]	-0.103	0.550**	0.150	0.282	1.811	4.366***
	(-1.919)	(2.403)				
$MANPROD_Y$[a]	-0.005	0.815**	0.914	0.342	1.768	7.890***
	(-0.083)	(17.264)				
PPI_M[a]	0.054	1.012	0.319	0.180	1.694	1.368
	(1.442)	(3.758)				
PPI_Y[a]	0.057	0.970	0.951	0.180	1.832	0.526
	(1.015)	(23.392)				
RATE[a]	0.050	0.988	0.981	0.124	1.207	0.623
	(0.315)	(39.134)				
RPI_M	0.021	0.971	0.870	0.131	2.572	0.325
	(0.803)	(14.200)				
RPI_Y[a]	-0.043	1.019	0.985	0.119	2.348	0.394
	(-0.684)	(44.309)				
RS_M	-0.105	1.443**	0.615	0.499	1.940	2.161
	(-1.008)	(6.763)				
RS_Y[a]	0.298	0.916	0.851	0.736	2.188	0.685
	(1.075)	(12.672)				
TBAL[a]	-1,005.424	0.386**	0.024	1,153.546	1.131	2.441
	(-1.660)	(1.302)				

EMP - Unemployment Rate
GDP_Q - Gross Domestic Product (QoQ)
RATE -Bank of England Rate announcement
$M0_M$ - Money Supply Final (MoM)
$M4_M$ -Money Supply Final (MoM)
RS_M Retail Sales (MoM)
IP_M Industrial Production (MoM)
PPI_M Producers' Price Index Output (MoM)
BUD -National Budget
$MANPROD_Y$ -Manufacturing Production (YoY)
GDP_Y - Gross Domestic Product (YoY)
AVGIN -Average Earnings
$M0_Y$- Money Supply Final (YoY)
$M4_Y$ Money Supply Final (YoY)
RS_Y Retail Sales (YoY)
IP_Y-Industrial Production (YoY)
RPI_Y Retail Price Index (YoY)
PPI_Y PPI Output (YoY)
$MANPROD_M$ Manufacturing Production (MoM)
RPI_M Retail Price Index (MoM)

T-ratio in parenthesis ($\beta_0=0$; $\beta_1=1$) ***F-value is significant at the 5% level or better
** β_1 is significantly different from one *β_0 is significantly different from zero
D.W. – Durbin Watson
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 21 **GGermany Summary Statistics for Macroeconomic Forecast and Announcements**

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observations
CA	-0.574	-0.011	28.257	7.785	27
CPI_M	0.121	0.103	0.053	0.042	28
CPI_Y	1.041	1.024	0.227	0.229	29
EMP	10.550	10.569	0.425	0.451	52
IP_M	0.506	0.529	3.959	0.915	34
IP_Y	2.245	2.154	8.798	7.903	33
$MANO_M$	0.660	0.243	3.868	0.806	35
$MANO_y$	5.386	5.017	39.681	35.083	36
PPI_M	0.015	0.058	0.076	0.026	26
PPI_Y	-0.158	-0.119	2.530	2.407	26
RS_M	0.057	0.571	6.629	1.509	21
RS_Y	0.320	0.300	12.282	2.666	25
TBAL	11.239	10.796	7.422	1.995	28

TABLE 22 Unit Root tests for German series

	Levels				First Difference			
Series Announced Forecast	DF	DFT	PP	PPT	DF	DFT	PP	PPT
CA	-5.197	-5.365	-5.197	-5.365	—	—	—	—
	-5.049	-5.048	-5.049	-5.048	—	—	—	—
CPI-P_M	-4.221	-4.518	-4.221	-4.518	—	—	—	—
	-3.303	-3.553	-3.303	-3.553	-6.999	-6.944	-6.999	-6.944
CPI-P_Y	-1.399	-1.970	-1.399	-1.970	-9.964	-10.401	-9.964	-10.401
	-1.382	-2.022	-1.382	-2.022	-10.624	-11.273	-10.624	-11.273
EMP	-3.434	-5.699	-3.434	-5.699	-24.675	—	-24.675	—
	-3.016	-4.778	-3.016	-4.778	-24.573	—	-24.573	—
IP_M	-6.666	-6.683	-6.666	-6.683	—	—	—	—
	-5.422	-5.772	-5.422	-5.772	—	—	—	—
IP_Y	-1.987	-1.853	-1.987	-1.853	-8.631	-8.735	-8.631	-8.735
	-1.244	-1.129	-1.244	-1.129	-7.198	-7.364	-7.198	-7.364
$MANO_M$	-5.382	-5.783	-5.382	-5.783	—	—	—	—
	-6.768	-7.174	-6.768	-7.174	—	—	—	—
$MANO_y$	-0.178	-0.909	-0.178	-0.909	-5.670	-5.962	-5.670	-5.962
	-0.163	-0.852	-0.163	-0.852	-6.082	-6.492	-6.082	-6.492
PPI_M	-2.734	-3.791	-2.734	-3.791	-8.846	-8.777	-8.846	-8.777
	-2.048	-3.024	-2.048	-3.024	-7.874	-7.762	-7.874	-7.762
PPI_Y	0.491	-0.144	0.491	-0.144	-3.372	-5.474	-3.372	-5.474
	0.304	-0.198	0.304	-0.198	-3.916	-5.741	-3.916	-5.741
RS_M	-4.957	-5.156	-4.957	-5.156	—	—	—	—
	-3.787	-4.186	-3.787	-4.186	—	—	—	—
RS_Y	-5.176	-5.345	-5.176	-5.345	—	—	—	—
	-5.019	-5.921	-5.019	-5.921	—	—	—	—
TBAL	-6.507	-6.439	-6.507	-6.439	—	—	—	—
	-5.197	-5.143	-5.197	-5.143	—	—	—	—
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller(Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger(1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 23 Germany Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
CPI-P_M	-5.298	-5.191	-5.298	-5.191
CPI-P_Y	-6.483	-6.389	-6.483	-6.389
EMP	-5.092	-5.060	-5.092	-5.060
IP_Y	-6.091	-5.997	-6.091	-5.997
$MANO_y$	-4.939	-5.121	-4.939	-5.121
PPI_M	-9.614	-9.240	-9.614	-9.240
PPI_Y	-7.304	-7.587	-7.304	-7.587
95% critical value	-3.37	-3.80	-3.37	-3.80

TABLE 24 Germany Test for Cointegration factor (H_0: β_1=1)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics	$(Y_t - Y_t^e)$		
			Q(4)	**Q(8)**	**Q(12)**	**Q(16)**
CPI_M	1.060 (13.661)	1.048 (4.962)	4.005	5.484	6.993	10.321
CPI_Y	0.979 (28.961)	0.996 (1.061)	6.907	10.823	11.353	12.837
EMP	0.944 (29.620)	0.938 (6.009)	9.960*	11.400	15.150	24.238
IP_Y	0.906 (9.333)	0.916 (6.889)	3.103	10.456	12.729	17.244
$MANO_y$	1.022 (20.302)	1.030 (2.318)	2.546	4.029	6.545	8.751
PPI_M	1.363 (6.407)	1.460 (0.826)	4.674	6.096	12.157	15.520
PPI_Y	1.017 (38.58)	1.014 (3.286)	7.443	8.106	15.181	16.064

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity * Correlation significant at 5% level or better

TABLE 25 Germany Tests of Unbiasedness of Survey Forecasts

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
CA	-0.563	1.002	0.248	4.611	2.492	0.201
	(-0.634)	(3.091)				
CPI_M[a]	0.012	1.060	0.873	0.082	2.107	0.958
	(0.661)	(13.661)				
CPI_Y[a]	0.038	0.979	0.968	0.086	2.471	0.770
	(1.004)	(28.961)				
EMP[a]	0.574	0.944	0.945	0.153	1.328	1.961
	(1.699)	(29.620)				
IP_M	-0.121	1.184	0.303	1.662	2.685	0.188
	(-0.370)	(3.915)				
IP_Y[a]	0.293	0.906	0.729	1.544	2.206	0.525
	(0.861)	(9.333)				
$MANO_M$	0.364	1.217	0.288	1.659	1.901	1.341
	(1.252)	(3.842)				
$MANO_y$[a]	0.258	1.022	0.922	1.764	1.662	0.886
	(0.666)	(20.302)				
PPI_M[a]	-0.063	1.363	0.616	0.171	3.123	0.127
	(-1.774)	(6.407)				
PPI_Y[a]	-0.036	1.017	0.983	0.204	2.794	0.671
	(-0.905)	(38.58)				
RS_M	-0.640	1.221	0.304	2.147	1.825	0.762
	(-1.234)	(3.123)				
RS_Y	-0.181	1.671**	0.589	2.246	1.709	2.860
	(-0.397)	(5.953)				
TBAL	4.196*	0.652	0.080	2.612	2.303	0.879
	(3.875)	(1.833)				

CPI_M – Consumer Price Index(MoM) **CPI_Y – Consumer Price Index**
TBAL - Trade Balance **MS Money supply**
PPI_M -Producers Price Index (MoM) **PPI_Y -Producers Price Index (YoY)**
RS_M -Advance Retail Sales (MoM) **RS_Y -Advance Retail Sales (YoY)**
IP_M -Industrial Production (MoM) **IP_Y -Industrial Production (YoY)**
EMP - Unemployment Rate **CA -Current account**
$MAN0_M$ .Manufacturing Orders (MoM) **$MAN0_Y$ -Manufacturing Orders (YoY)**

T-statistics parenthesis ***F-value is significant at the 5% level or better
** β_1 is significantly different from one *β_0 is significantly different from zero
D.W. – Durbin Watson
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 26 **France Summary Statistics for Macroeconomic Forecast and Announcements**

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observation
CA	18.261	16.222	26.235	9.813	27
CPI_M	0.093	0.105	0.038	0.021	57
CPI_Y	0.779	0.796	0.189	0.172	57
EMP	11.261	11.296	0.470	0.474	26
GDP_Q	0.685	0.700	0.035	0.052	20
GDP_Y	2.895	2.842	0.143	0.229	19
$HOUSEC_M$	0.443	0.368	4.836	1.131	28
$HOUSEC_Y$	4.982	4.829	3.244	2.289	28
IP_M	0.211	0.354	0.907	0.252	28
IP_Y	3.718	3.915	6.183	6.016	27
$MANPROD_M$	0.337	0.363	1.377	0.255	27
$MANPROD_Y$	4.493	4.574	8.700	8.287	27
TBAL	11.571	12.075	24.529	8.889	28

TABLE 27
Unit Root tests for France series

	Levels				First Difference			
Series Announced Forecast	DF	DFT	PP	PPT	DF	DFT	PP	PPT
CA	-5.092	-11.772.	-5.092	-11.772.	—	—	—	—
	-7.350	-8.242	-7.350	-8.242	—	—	—	—
CPI_M	-4.950	-5.006	-4.950	-5.006	—	—	—	—
	-5.751	-5.701	-5.751	-5.701	—	—	—	—
CPI_Y	-0.415	-1.372	-0.415	-1.372	-11.031	-11.438	-11.031	-11.438
	-0.594	-1.368	-0.594	-1.368	-12.352	-12.805	-12.352	-12.805
EMP	1.142	-0.567	1.142	-0.567	-91.678	-88.851	-91.678	-88.851
	0.778	-0.710	0.778	-0.710	-76.178	-73.483	-76.178	-73.483
GDP_Q	-2.271	-2.361	-2.271	-2.361	-7.507	-7.053	-7.507	-7.053
	-1.659	-1.822	-1.659	-1.822	-7.574	-7.269	-7.574	-7.269
GDP_Y	-1.698	-1.656	-1.698	-1.656	-7.994	-7.087	-7.994	-7.087
	-1.006	-0.881	-1.006	-0.881	-7.868	-7.144	-7.868	-7.144
$HOUSEC_M$	-9.433	-10.031	-9.433	-10.031	—	—	—	—
	-7.580	-7.802	-7.580	-7.802	—	—	—	—
$HOUSEC_Y$	-5.260	-5.231	-5.260	-5.231	—	—	—	—
	-3.515	-3.397	-3.515	-3.397	—	-9.148	—	-9.148
IP_M	-8.949	-8.758	-8.949	-8.758	—	—	—	—
	-7.194	-7.941	-7.194	-7.941	—	—	—	—
IP_Y	-1.741	-1.778	-1.741	-1.778	-6.976	-6.798	-6.976	-6.798
	-1.465	-1.041	-1.465	-1.041	-7.999	-7.891	-7.999	-7.891
$MANPROD_M$	-11.972	-11.772	-11.972	-11.772	—	—	—	—
	-7.350	-8.242	-7.350	-8.242	—	—	—	—
$MANPROD_Y$	-1.694	-1.643	-1.694	-1.643	-6.789	-6.591	-6.789	-6.591
	-1.778	-1.425	-1.778	-1.425	-9.763	-9.576	-9.763	-9.576
TBAL	-4.652	-5.878	-4.652	-5.878	—	—	—	—
	-1.458	-2.490	-1.458	-2.490	-9.656	-9.494	-9.656	-9.494
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

TABLE 28 France. Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
CPI_Y	-7.384	-8.073	-7.384	-8.073
EMP	-5.637	-5.642	-5.637	-5.642
GDP_Q	-4.182	-4.044	-4.182	-4.044
GDP_Y	-3.882	-3.745	-3.882	-3.745
$HOUSEC_Y$	-9.733	-9.563	-9.733	-9.563
IP_Y	-5.732	-6.244	-5.732	-6.244
$MANPROD_Y$	-6.405	-7.714	-6.405	-7.714
TBAL	-5.568	-6.380	-5.568	-6.380

TABLE 29 France Test for Cointegration factor (H_0: $\beta_1=1$)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics $(Y_t - Y_t^e)$			
			Q(4)	Q(8)	Q(12)	Q(16)
CPI_Y	1.005 (24.916)	1.021 (1.087)	1.150	3.218	5.091	5.294
EMP	0.986 (33.975)	1.012 (0.738)	2.464	5.176	9.422	10.023
GDP_Q	0.694** (6.622)	0.725 (1.353)	1.01	8.452	14.952	17.541
GDP_Y	0.728** (9.863)	0.752 (1.382)	3.422	5.354	10.870	15.419
$HOUSEC_Y$	0.810 (4.738)	0.862 (0.837)	14.424*	18.929*	20.934*	22.541
IP_Y	0.957 (14.323)	0.986 (1.632)	4.746	8.096	13.006	20.504
$MANPROD_Y$	0.961 (13.526)	1.038 (0.708)	4.427	8.596	13.329	24.771
TBAL	0.319** (0.999)	0.913 (0.196)	4.039	16.98	21.783	25.403

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity * Correlation significant at 5% level or better

TABLE 30 France Test of Unbiasedness of Survey Forecasts

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
CA	10.168*	0.499	0.057	4.974	2.336	3.564***
	(1.978)	(1.602)				
CPI_M	-0.015	1.028	0.588	0.126	1.855	0.298
	(-0.736)	(8.860)				
CPI_Y [a]	-0.021	1.005	0.917	0.125	1.993	0.567
	(-0.592)	(24.916)				
EMP [a]	0.122	0.986	0.979	0.100	2.120	1.747
	(0.373)	(33.975)				
GDP_Q [a]	0.199*	0.694**	0.693	0.104	1.966	4.477***
	(2.591)	(6.622)				
GDP_Y [a]	0.825*	0.728**	0.842	0.150	1.929	7.956***
	(3.883)	(9.863)				
$HOUSEC_M$	-0.237	1.849**	0.792	1.003	2.044	11.016***
	(-1.181)	(10.186)				
$HOUSEC_Y$ [a]	1.069	0.810	0.443	1.345	3.152	0.796
	(1.237)	(4.738)				
IP_M	-0.200	1.161	0.351	0.767	2.210	0.634
	(-1.119)	(3.947)				
IP_Y [a]	-0.028	0.957	0.887	0.836	2.080	0.950
	(-0.093)	(14.323)				
$MANPROD_M$	-0.257	1.636	0.475	0.850	2.230	1.867
	(-1.266)	(4.953)				
$MANPROD_Y$ [a]	0.097	0.961	0.875	1.043	2.359	0.232
	(0.382)	(13.526)				
TBAL [a]	7.713	0.319**	-0.001	4.953	1.777	2.410
	(1.942)	(0.999)				

CPI_M – Consumer Price Index **CPI_Y – Consumer Price Index**
GDP_Q - Gross Domestic Product **GDP_Y - Gross Domestic Product**
TBAL - Trade Balance
PPI_M -Producers Price Index **PPI_Y -Producers Price Index**
RS_M -Advance Retail Sales **RS_Y -Advance Retail Sales**
IP_M -Industrial Production **IP_Y -Industrial Production**
EMP - Unemployment Rate
$MANPROD_M$ Manufacturing Production (MoM)
$MANPROD_Y$ Manufacturing Production (YoY)
$HOUSEC_M$ Household Consumption (MoM)
$HOUSEC_Y$ Household Consumption (YoY)

t-statistics in parenthesis ***F-value is significant at the 5% level or better
** β_1 is significantly different from one *β_0 is significantly different from zero
D.W. – Durbin Watson
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 31 Italy Summary Statistics for Macroeconomic Forecast and Announcements

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observation
CPI_M	0.156	0.158	0.012	0.011	36
CPI_Y	1.729	1.732	0.054	0.057	36
IO_Y	3.586	3.929	57.064	32.326	21
IP_M	-0.100	.280	2.914	0.552	25
IP_Y	1.663	1.515	17.434	10.291	27
PPI_M	0.139	0.121	0.131	0.039	28
PPI_Y	0.389	0.430	3.056	2.791	27
RS_Y	2.514	2.669	0.905	0.603	29
TBAL	2.688	2.761	3.345	2.020	22

TABLE 32 Unit Root tests for Italy series

	Levels				First Difference			
Series **Announced** **Forecast**	DF	DFT	PP	PPT	DF	DFT	PP	PPT
CPI_M	-3.523	-3.506	-3.523	-3.506	—	—	—	—
	-4.828	-4.897	-4.828	-4.897	—	—	—	—
CPI_Y	-0.941	-1.018	-0.941	-1.018	-12.085	-11.608	-12.085	-11.608
	-0.267	-0.416	-0.267	-0.416	-13.891	-13.362	-13.891	-13.362
IO_Y	-2.724	-2.880	-2.724	-2.880	-7.352	-7.162	-7.352	-7.162
	-1.008	-0.579	-1.008	-0.579	-5.502	-5.817	-5.502	-5.817
IP_M	-4.349	-4.329	-4.349	-4.329	—	—	—	—
	-3.738	-4.384	-3.738	-4.384	—	—	—	—
IP_Y	-3.812	-3.654	-3.812	-3.654	—	-7.300	—	-7.300
	-2.717	-2.508	-2.717	-2.508	-6.121	-6.255	-6.121	-6.255
PPI_M	-2.228	-2.994	-2.228	-2.994	-7.662	-7.671	-7.662	-7.671
	-1.056	-2.391	-1.056	-2.391	-7.648	-7.957	-7.648	-7.957
PPI_Y	0.271	0.272	0.271	0.272	-5.064	-6.297	-5.064	-6.297
	0.201	0.399	0.201	0.399	-5.254	-6.417	-5.254	-6.417
RS_Y	-3.490	-3.455	-3.490	-3.455	-6.968	-6.785	-6.968	-6.785
	-2.693	-2.645	-2.693	-2.645	-5.545	-5.411	-5.545	-5.411
TBAL	-3.862	-3.953	-3.862	-3.953	—	—	—	—
	-4.031	-4.234	-4.031	-4.234	—	—	—	—
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller (Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger (1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 33 Italy. Cointegration Test

Macroeconomic Series	DF	DFT	PP	PPT
CPI_Y	-6.492	-6.444	-6.492	-6.444
IO_Y	-4.916	-5.775	-4.916	-5.775
IP_Y	-5.608	-5.514	-5.608	-5.514
PPI_M	-5.250	-5.153	-5.250	-5.153
PPI_Y	-4.414	-6.00	-4.414	-6.00
RS_Y	-4.032	-4.018	-4.032	-4.018

TABLE 34 Italy Test for Cointegration factor (H_0: $\beta_1=1$)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics $(Y_t - Y_t^e)$			
			Q(4)	**Q(8)**	**Q(12)**	**Q(16)**
CPI_Y	0.918 (15.948)	0.900 (1.665)	3.533	6.744	11.348	12.139
IO_Y	0.860 (3.699)	1.113 (0.520)	3.466	7.828	10.935	15.925
IP_Y	1.057 (6.950)	1.043 (7.998)	1.306	10.315	13.171	18.231
PPI_M	1.458** (6.616)	1.571 (2.073)	3.110	4.069	12.048	16.749
PPI_Y	1.036 (35.454)	1.028 (2.959)	6.014	8.030	10.999	18.421
RS_Y	0.342** (1.513)	0.624 (0.220)	6.708	7.129	9.613	13.955

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity * Correlation significant at 5% level or better

TABLE 35 **Italy Tests of Unbiasedness of Survey Forecasts**

$$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics $-F_{2,n}$
CPI_M	0.018	0.869	0.667	0.063	1.839	0.837
	(0.958)	(8.436)				
CPI_Y[a]	0.139	0.918	0.879	0.081	2.238	1.023
	(1.381)	(15.948)				
IO_Y[a]	0.208	0.860	0.388	5.909	2.058	0.217
	(1.580)	(3.699)				
IP_M	-0.537	1.563	0.440	1.277	2.015	2.390
	(-1.963)	(4.452)				
IP_Y[a]	0.062	1.057	0.645	2.487	2.268	0.117
	(0.118)	(6.950)				
PPI_M[a]	-0.038	1.458**	0.613	0.362	2.084	2.245
	(-0.750)	(6.616)				
PPI_Y[a]	-0.056	1.036	0.980	0.249	1.779	1.132
	(-1.137)	(35.454)				
RS_Y[a]	1.600	0.342**	0.044	0.930	1.541	4.622***
	(2.546)	(1.513)				
TBAL	-0.383	1.112	0.735	0.942	2.572	0.367
	(-0.856)	(7.692)				

CPI_M – Consumer Price Index **CPI_Y – Consumer Price Index**
TBAL - Trade Balance **PPI_M -Producers Price Index**
PPI_Y -Producers Price Index RS_Y -Retail Sales (YoY)
IP_Y -Industrial Production (YoY) **IO_Y -Industrial Orders (YoY)**

T-statistics in parenthesis ***F-value is significant at the 5% level or better
** β_1 is significantly different from one *β_0 is significantly different from zero
D.W. – Durbin Watson
a-These series follow unit root process and are non-stationary in level. They are only reported for comparison

TABLE 36 U.S. Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

	Coefficients Estimates			Mean Squared Error	
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
BI	0.184	0.943*	-0.460	0.030	0.030
	(0.546)	(8.937)	(-0.426)		
BUD	0.717	0.977*	0.846	274.844	281.178
	(0.176)	(21.153)	(0.813)		
CPI	-0.016	0.988*	-0.012	0.012	0.013
	(-0.122)	(6.221)	(0.018)		
CS	-0.298	0.586	1.401*	1.574	1.494
	(-0.817)	(1.468)	(2.246)		
CU	8.411	1.012*	-0.115	0.104	0.103
	(1.006)	(260.97)	(-1.12)		
DGO	0.520	1.703*	-1.121	6.987	6.945
	(1.242)	(4.479)	(-1.493)		
EMP	3.917	0.970*	-0.778	0.020	0.020
	(1.575)	(32.097)	(-1.514)		
GDP	0.294	1.011*	-0.17	0.466	0.481
	(0.929)	(12.844)	(-0.149)		
HS	-2.548	0.940*	0.071	2,881.537	2,800.968
	(-0.261)	(25.692)	(1.907)		
IP	-0.226	1.120*	0.967*	0.065	0.062
	(-1.597)	(12.864)	(2.029)		
LI	-0.016	1.034*	0.339	0.053	0.053
	(-0.381)	(8.169)	(1.394)		
MTD	-0.010	0.842*	0.183*	2.504	2.426
	(-0.021)	(9.319)	(1.981)		
NAPM	2.668	0.804*	0.143	3.947	4.004
	(4.591)	(2.953)	(0.473)		
NHS	1.367	0.379	0.480	44.135	46.822
	(0.525)	(0.875)	(0.457)		
PI	0.127	0.905*	-0.047	0.026	0.027
	(0.580)	(9.252)	(-0.099)		
PPI	-0.117	1.235*	0.216	0.049	0.048
	(-1.373)	(8.458)	(0.293)		
RS	-0.180	0.902*	0.453	0.096	0.091
	(-0.246)	(8.677)	(0.191)		
WI	-0.375	0.923*	1.071	0.326	0.323
	(0.525)	(6.978)	(1.465)		

Note.-T statistics of estimated coefficients are in parenthesis. Y_t = announced value of the macroeconomic series; Y_t^e = expectations data based on market survey; Y_t^{AR} = forecast value calculated from autoregressive model.

* Significant at least at the 5% level

TABLE 37 Japan Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

	Coefficients Estimates			Mean Squared Error	
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
CA	142.496	0.896*	-0.048	30,272.170	33,579.049
	(0.707)	(9.334)	(-0.213)		
CPI	0.034	1.169*	-0.244	0.025	0.024
	(1.310)	(18.106)	(-1.981)		
DI	1.383	1.036*	-0.038	80.928	85.540
	(0.235)	(10.686)	(-0.240)		
EMP	0.115	0.686*	0.284	0.015	0.016
	(0.877)	(2.220)	(0.876)		
HS	-0.109	1.068*	-0.019.	26.539	27.593
	(-0.139)	(8.710)	(-0.140)		
HSPEND	-1.410	1.088*	-1.459	3.063	2.748
	(-1.507)	(6.435)	(-1.646)		
IP	-0.889	1.023*	-3.307	1.459	1.491
	(-0.612)	(15.554)	(-0.516)		
JAR	0.078	0.932*	-0.050	0.002	0.002
	(1.523)	(6.112)	(-0.265)		
MO	1.894	1.445*	-0.190	50.399	51.866
	(1.654)	(6.810)	(-0.726)		
MS	0.323	1.276*	-0.356	0.095	0.094
	(1.029)	(4.848)	(-1.214)		
MTB	-12.737	0.889*	0.122	16,667.818	16,810.566
	(-0.148)	(16.703)	(1.141)		
WPI	-0.119*	1.264*	0.058	0.086	0.088
	(-2.272)	(13.339)	(0.571)		

Note.-T statistics of estimated coefficients are in parenthesis. Y_t = announced value of the macroeconomic series; Y_t^e = expectations data based on market survey; Y_t^{AR} = forecast value calculated from autoregressive model.

* Significant at least at the 5% level

TABLE 38 Canada Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

	Coefficients Estimates			Mean Squared Error	
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
CPI	0.107	0.977*	-0.256	0.067	0.070
	(0.701)	(15.899)	(-0.256)		
GDP	-0322	1.081*	0.423	0.144	0.145
	(-1.263)	(12.508)	(1.021)		
IPP	0.003	0.900*	-0.292	0.186	0.201
	(0.015)	(2.738)	(-0.250)		
ITRDE	0.545	0.879	-0.044	0.259	0.280
	(1.0840	(1.791)	(-0.073)		
LABS	0.899*	0.693*	0.191*	0.053	0.037
	(2.276)	(14.921)	(2.595)		
MAN	-0.913	0.960	1.935	4.834	5.182
	(-0.774)	(1.762)	(0.355)		
NCAR	-0.395	0.145	1.044	56.529	52.656
	(-0.232)	(0.499)	(1.933)		
RAW	0.704	1.234*	-0.581	6.248	6.346
	(0.751)	(2.450)	(-0.540)		
RS	-0.507*	1.393*	0.281	0.728	0.681
	(-2.114)	(3.430)	(0.821)		
WT	-0.069	0.517	0.710	1.176	1.172
	(-0.100)	(1.383)	(0.560)		

TABLE 39 U.K. Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

	Coefficients Estimates			Mean Squared Error	
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
AVGIN	1.985*	1.044*	-0.449	0.059	0.059
	(2.002)	(4.771)	(-1.263)		
BUD	-0.167	1.274*	-0.052	3.475	3.589
	(-0.236)	(15.382)	(-0.179)		
EMP	-0.430	1.010*	0.079	0.004	0.004
	(-1.811)	(22.779)	(1.182)		
GDP_Q	0.048	1.172*	-0.253	0.008	0.007
	(1.182)	(8.069)	(-1.467)		
GDP_Y	0.157	1.039*	-0.091	0.035	0.036
	(1.474)	(7.524)	(-0.602)		
IP_M	0.007	-0.094	1.012	1.566	1.651
	(0.017)	(-0.093)	(0.734)		
IP_Y	0.146	0.748	0.076	0.263	0.277
	(1.205)	(5.016)	(0.337)		
$M0_M$	-0.924*	1.296*	1.576	0.080	0.059
	(-3.053)	(24.575)	(3.3530		
$M0_Y$	0.890*	1.452*	-0.542	0.183	0.083
	(3.063)	(18.123)	(-5.773)		
$M4_M$	0.251	0.929*	-0.348	0.042	0.056
	(0.406)	(8.240)	(-0.299)		
$M4_Y$	0.091	1.046*	-0.047	0.138	0.145
	(0.468)	(13.426)	(-0.569)		
$MANPROD_M$	-0.066	0.501*	0.337	0.080	0.082
	(-0.774)	(1.966)	(0.410)		
$MANPROD_Y$	-0.001	0.848*	0.395	0.117	0.126
	(-0.014)	(2.552)	(0.848)		
PPI_M	0.017	0.825*	0.395	0.032	0.033
	(0.300)	(2.552)	(0.848)		
PPI_Y	0.063	1.080*	-0.116	0.032	0.052
	(0.995)	(3.791)	(-0.389)		
RATE	0.150	1.378*	-0.408	0.015	0.014
	(0.942)	(7.789)	(-2.235)		
RPI_M	-0.024	0.966*	0.248	0.017	0.018
	(-0.295)	(13.565)	(0.599)		
RPI_Y[a]	-0.062	0.967*	0.060	0.014	0.014
	(-0.952)	(11.404)	(0.705)		
RS_M	-0.052	1.638*	-0.330	0.249	0.246
	(-0.465)	(5.802)	(-0.945)		
RS_Y	0.288	0.928*	-0.004	0.542	0.578
	(0.506)	(10.410)	(-0.023)		
TBAL	684.062	0.368*	0.987	1,330,668.091	1,186,866.332
	(0.727)	(1.307)	(2.293)		

Note.-T statistics of estimated coefficients are in parenthesis. Y_t = announced value of the macroeconomic series; Y_t^e = expectations data based on market survey; Y_t^{AR} = forecast value calculated from autoregressive model.* Significant at least at the 5% level

TABLE 40 Germany Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

		Coefficients	Estimates	Mean Squared	Error
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
CA	2.631	1.285*	4.814	21.260	19.227
	(1.369)	(3.804)	(1.947)		
CPI_M	0.048	1.065*	-0.302	0.007	0.007
	(0.416)	(13.106)	(-0.314)		
CPI_Y	0.014	0.928*	0.075	0.007	0.008
	(0.289)	(14.291)	(0.956)		
EMP	0.772	0.941*	-0.016	0.023	0.023
	(1.365)	(21.346)	(-0.224)		
IP_M	-0.614	1.180*	0.971	2.761	2.789
	(-1.212)	(3.880)	(1.296)		
IP_Y	0.341	0.939*	-0.057	2.384	2.541
	(0.818)	(5.221)	(-0.235)		
$MANO_M$	0.117	1.233*	0.421*	2.754	2.825
	(0.048)	(3.833)	(3.438)		
$MANO_Y$	0.277	1.002*	0.023	3.113	3.242
	(0.660)	(2.951)	(0.067)		
PPI_M	-0.067	1.587*	-0.383	0.029	0.030
	(-1.794)	(5.067)	(-1.009)		
PPI_Y	-0.039	1.063*	-0.048	0.042	0.045
	(-0.914)	(9.119)	(-0.408)		
RS_M	-0.697	1.236*	0.185	4.610	5.133
	(-1.180)	(2.800)	(0.134)		
RS_Y	-0.382	1.587*	0.508	5.044	5.308
	(-0.654)	(5.139)	(0.804)		
TBAL	-4.531	0.581	0.844	6.825	6.817
	(-0.569)	(1.616)	(1.256)		

Note.-T statistics of estimated coefficients are in parenthesis. Y_t = announced value of the macroeconomic series; Y_t^e = expectations data based on market survey; Y_t^{AR} = forecast value calculated from autoregressive model.

* Significant at least at the 5% level

TABLE 41 France Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

	Coefficients Estimates			Mean Squared Error	
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
CA	-41.058	0.593	2.704	24.744	25.375
	(-0.783)	(1.736)	(0.993)		
CPI_M	-0.038	0.971*	0.327	0.016	0.016
	(-1.377)	(7.861)	(1.328)		
CPI_Y	-0.024	0.804*	0.211	0.016	0.016
	(-0.672)	(4.328)	(1.127)		
EMP	-0.099	0.774*	0.233	0.010	0.009
	(-0.299)	(4.471)	(1.3380		
GDP_Q	0.244	0.708*	-0.088	0.011	0.012
	(1.461)	(4.253)	(-0.255)		
GDP_Y	1.165	0.800*	-0.187	0.022	0.024
	(2.478)	(6.445)	(-0.789)		
$HOUSEC_M$	-0.187	1.894*	-0.013	1.006	0.976
	(-0.915)	(8.216)	(-0.067		
$HOUSEC_Y$	-36.896*	1.037*	7.415	1.808	1.397
	(-3.008)	(6.202)	(3.100)		
IP_M	-0.136	0.756*	0.463	0.589	0.552
	(-0.722)	(1.987)	(1.0440		
IP_Y	0.196	1.168*	-0.266	0.698	0.595
	(0.597)	(9.210)	(-1.677)		
$MANPROD_M$	-0.180	0.891*	0.617*	0.723	0.550
	(-0.963)	(2.302)	(2.365)		
$MANPROD_Y$	0.144	1.075*	-0.113	1.088	1.059
	(0.336)	(7.017)	(-0.625)		
TBAL	13.170	0.684	-0.785	24.530	20.321
	(0.850)	(1.571)	(-0.499)		

Note.-T statistics of estimated coefficients are in parenthesis. Y_t = announced value of the macroeconomic series; Y_t^e = expectations data based on market survey; Y_t^{AR} = forecast value calculated from autoregressive model.

* Significant at least at the 5% level

TABLE 42 Italy Combined Forecasts Results

Estimated Equation: $Y_t = \beta_0 + \beta_1 Y_t^e + \beta_2 Y_t^{AR} + \varepsilon_t$

		Coefficients	Estimates	Mean Squared	Error
Macroeconomic Series	β_0	β_1	β_2	Survey	Combined
CPI_M	-0.015	0.821*	0.259	0.004	0.004
	(-0.334)	(7.030)	(0.909)		
CPI_Y	0.193	0.969*	-0.082	0.006	0.006
	(1.387)	(8.529)	(-0.547)		
IO_Y	0.446	0.925*	-0.251	34.919	36.418
	(0.234)	(2.518)	(-0.382)		
IP_M	-0.515	1.559*	0.376	1.633	1.765
	(-1.122)	(4.267)	(0.138)		
IP_Y	1.08	1.143*	-0.734	6.184	6.348
	(1.051)	(6.609)	(-1.158)		
PPI_M	-0.049	1.337*	0.163	0.051	0.054
	(-0.900)	(4.286)	(0.573)		
PPI_Y	-0.058	1.074*	-0.050	0.062	0.065
	(-1.119)	(17.172)	(-0.717)		
RS_Y	-0.127	-0.061	1.116	0.865	0.883
	(-0.081)	(-0.151)	(1.199)		
TBAL	-0.509	1.115*	0.048	0.887	0.985
	(-0.2150	(7.101)	(0.052)		

Note.-T statistics of estimated coefficients are in parenthesis. Y_t = announced value of the macroeconomic series; Y_t^e = expectations data based on market survey; Y_t^{AR} = forecast value calculated from autoregressive model.

* Significant at least at the 5% level

TABLE 43:U.S.A subset ('98 – '00)
Summary Statistics for Macroeconomic Forecast and Announcements

Macroeconomic Series	Mean Announced	Mean Forecast	Variance Announced	Variance Forecast	No. of Observation
BI	0.332	0.278	0.046	0.029	28
BUD	13.759	8.122	3,363.337	3,359.779	27
CPI	0.187	0.206	0.025	0.011	32
CS	0.581	0.285	1.523	0.104	27
CU	77.936	77.996	313.977	306.702	22
DGO	0.435	0.055	13.384	1.624	31
EMP	4.310	4.313	0.052	0.061	30
GDP	4.473	4.153	3.055	2.462	30
HS	1659.00	1,644.72	7,231.583	4,134.377	25
IP	0.262	0.234	0.239	0.138	29
LI	0.193	0.124	0.106	0.026	29
MTD	-19.382	-18.754	54.328	51.962	33
NAPM	52.912	53.062	10.069	9.027	32
NHS	894.812	889.00	3,330.802	1,976.322	32
PI	0.499	0.431	0.054	0.026	32
PPI	0.142	0.154	0.135	0.051	33
RS	0.422	0.442	0.211	0.128	31
WI	0.593	0.461	0.683	0.571	31

TABLE 44. U.S.A subset ('98 – '00)
Unit Root tests for US series

	Levels				First Difference			
Series Announced Forecast	DF	DFT	PP	PPT	DF	DFT	PP	PPT
BI	-4.550	-5.192	-4.550	-5.192	—	—	—	—
	-3.749	-4.230	-3.749	-4.230	—	—	—	—
BUD	-4.119	-4.782	-4.119	-4.782	—	—	—	—
	-4.694	-5.269	-4.694	-5.269	—	—	—	—
CPI	-5.045	-5.391	-5.045	-5.391	—	—	—	—
	-3.735	-4.417	-3.735	-4.417	—	—	—	—
CS	-3.048	-3.027	-3.048	-3.027	-5.847	-5.735	-5.847	-5.735
	-3.176	-4.284	-3.176	-4.284	-7.198	-7.021	-7.198	-7.021
CU	-4.501	-4.514	-4.501	-4.514	—	—	—	—
	-4.481	-4.503	-4.481	-4.503	—	—	—	—
DGO	-5.272	-5.199	-5.272	-5.199	—	—	—	—
	-6.381	-6.666	-6.381	-6.666	—	—	—	—
EMP	-1.555	-4.942	-1.555	-4.942	-33.790	-31.511	-33.790	-31.511
	-1.744	-4.685	-1.744	-4.685	-49.239	-45.948	-49.239	-45.948
GDP	-2.395	-2.640	-2.395	-2.640	-5.911	-5.763	-5.911	-5.763
	-2.519	-2.972	-2.519	-2.972	-49.238	-45.948	-49.238	-45.948
HS	-3.308	-3.103	-3.308	-3.103	-16.928	-16.308	-16.928	-16.308
	-2.822	-2.359	-2.822	-2.359	-27.531	-26.616	-27.531	-26.616
IP	-5.959	-6.477	-5.959	-6.477	—	—	—	—
	-5.490	-5.774	-5.490	-5.774	—	—	—	—
LI	-4.490	-4.520	-4.490	-4.520	—	—	—	—
	-3.691	-3.694	-3.691	-3.694	—	-6.331	—	-6.331
MTD	-0.820	-3.139	-0.820	-3.139	—	-9.437	—	-9.437
	-1.158	-4.128	-1.158	-4.128	—	—	—	—
NAPM	-1.622	-1.905	-1.622	-1.905	-30.372	-28.624	-30.372	-28.624
	-1.440	-1.957	-1.440	-1.957	-38.162	-35.993	-38.162	-35.993
NHS	-4.510	-5.019	-4.510	-5.019	-12.883	-12.418	-12.883	-12.418
	-3.307	-3.669	-3.307	-3.669	-19.710	-18.805	-19.710	-18.805
PI	-7.484	-7.620	-7.484	-7.620	—	—	—	—
	-5.391	-6.502	-5.391	-6.502	—	—	—	—
PPI	-5.367	-6.284	-5.367	-6.284	-8.455	-8.250	-8.455	-8.250
	-3.599	-5.499	-3.599	-5.499	-9.437	-9.232	-9.437	-9.232
RS	-5.326	-5.242	-5.326	-5.242	—	—	—	—
	-4.929	-4.914	-4.929	-4.914	—	—	—	—
WI	-6.370	-6.314	-6.370	-6.314	—	—	—	—
	-5.836	-5.782	-5.836	-5.782	—	—	—	—
95% critical value	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**	**-3.37**	**-3.80**

DF (PP) is the Dickey Fuller (Phillips-Perron) t-statistics in an estimated model without a time trend. DFT and PPT are the corresponding t-statistics in the estimated models with a time trend. Critical Values can be found in Engle and Granger (1987) and Phillips and Ouliaris (1990). Differencing is not performed when unit roots are not detected.

TABLE 45 U.S.A subset ('98 – '00)
Cointegration Tests

Macroeconomic Series	DF	DFT	PP	PPT
EMP	-6.296	-6.656	-6.296	-6.656
CS	**-2.959**	**-2.967**	**-2.959**	**-2.967**
GDP	-5.141	-5.034	-5.141	-5.034
HS	-4.725	-4.620	-4.725	-4.620
LI	-5.032	-5.137	-5.032	-5.137
MTD	-5.806	-5.860	-5.806	-5.860
NAPM	-4.823	-4.754	-4.823	-4.754
NHS	-6.550	-6.800	-6.550	-6.800
PPI	-5.659	-5.774	-5.659	-5.774
95% critical value	-3.37	-3.80	-3.37	-3.80

TABLE 46 U.S.A subset ('98 – '00)
Test for Cointegration factor (H_0: β_1=1)

Cointegration regression: $Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Variable	Estimated Coefficient (β_1)	Corrected Coefficient (β_1)	Q-Statistics	$(Y_t - Y_t^e)$		
			Q (4)	**Q (8)**	**Q (12)**	**Q (16)**
EMP	0.798**	0.925	6.769	9.812	12.576	14.660
	(8.858)	(0.228)				
GDP	0.989	1.093	2.531	6.106	7.038	10.023
	(10.196)	(0.723)				
HS	0.650	0.987	1.878	2.854	13.617	15.303
	(2.709)	(0.291)				
LI	0.702	0.739	0.592	0.854	1.202	1.918
	(1.938)	(5.435)				
MTD	0.998	1.028	5.739	9.698	12.856	18.183
	(25.050)	(0.65)				
NAPM	0.913	1.001	12.741*	17.198*	18.734	25.667
	(9.399)	(0.217)				
NHS	0.553**	0.987	1.878	2.854	13.617	15.303
	(2.579)	(0.291)				
PPI	1.346**	1.243	5.782	11.159	14.910	24.688
	(8.125)	(1.144)				

Note.- Estimated coefficient is based on the cointegration regression. Corrected coefficient is based on three-step error correction model suggested by Engle and Yoo (1987). Value of t-value in parentheses.
** Significantly different from unity *significant at 5% level or better

TABLE 47 **U.S.A subset ('98 – '00) Test for Unbiasedness of survey Forecasts**

$Y_t = \beta_0 + \beta_1 Y_t^e + \varepsilon_t$

Macroeconomic Series	β_0	β_1	Adjusted R^2	SE	D-W	H_0: $\beta_0=0$, $\beta_1=1$, F-Statistics ~$F_{2,n}$
BI	0.102 (1.696)	0.825 (4.443)	0.410	0.164	2.142	1.926
BUD	6.229 (1.441)	0.927 (12.319)	0.853	22.243	2.223	1.336
CPI	-0.051 (-1.258)	1.159 (6.527)	0.573	0.103	2.320	0.926
CS[a]	0.497 (1.531)	0.296 (0.388)	-0.034	1.255	1.062	1.180
CU	-0.967* (-2.944)	1.012** (246.078)	0.999	0.330	1.893	4.631***
DGO	0.355 (0.617)	1.458 (3.174)	0.232	3.206	1.403	0.715
EMP[a]	0.878* (2.264)	0.795** (8.857)	0.728	0.119	2.326	2.601
GDP[a]	0.367 (0.854)	0.988 (10.196)	0.780	0.819	1.936	2.294
HS[a]	589.141 (1.491)	0.650 (2.709)	0.209	75.634	1.996	1.505
IP	0.008 (0.1310	1.083 (7.598)	0.669	0.281	2.277	0.736
LI[a]	0.106 (1.450)	0.702 (1.939)	0.090	0.310	1.971	1.055
MTD[a]	-0.662 (-0.828)	0.998 (25.050)	0.951	1.625	2.022	2.460
NAPM[a]	4.490 (0.870)	0.912 (9.399)	0.738	1.624	1.775	0.587
NHS[a]	403.182* (2.112)	0.553** (2.579)	0.154	53.078	2.321	2.364
PI	0.059 (0.692)	1.022 (5.832)	0.400	0.166	2.636	2.712
PPI[a]	-0.066 (-1.466)	1.346** (8.125)	0.670	0.211	1.936	2.239
RS	0.006 (0.070)	0.942 (5.832)	0.524	0.317	1.681	0.123
WI	0.166 (1.759)	0.927 (8.616)	0.709	0.445	2.525	1.592

CPI – Consumer Price Index
DGO - Durable Goods Orders
EMP - Unemployment Rate
GDP - Gross Domestic Product
MTD - Merchandise Trade Deficit
PPI -Producers Price Index
RS -Advance Retail Sales
NHS -New Home sales
BUD -Federal Budget T-statistics in parenthesis
** β_1 is significantly different from one
D.W. – Durbin Watson
HS -Housing Starts
LI -Leading Indicators
CU -Capacity Utilization
BI -Business Inventories
CS -Construction spending
WI -Wholesale Inventories
NAPM -NAPM Survey
PI -Personal Income
***F-value is significant at the 5% level or better
*β_0 is significantly different from zero

a-These series follow unit root process and are non-stationary in level. They are only reported for comparison