

Forecasts of Asia-Pacific Economic Activity to 1998

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This section of the Review reports regular forecasts of macroeconomic activity for a selection of Asia-Pacific nations. In this issue we provide quarterly *ex ante* forecasts for the USA, Japan, Korea, Australia, and New Zealand for the period through to the fourth quarter of 1998. Our coverage of the region will continue to expand in future issues as we obtain better access to national economic data bases.

As explained in the inaugural issue of the Review², the forecasts given here are all based on time series models that make extensive use of automated model selection procedures. The judgemental elements in making these forecasts are minimal and are confined to the choice of variables, the selection of the model classes to be used, and the setting of certain maximal parameters like maximal lag order in an autoregression or vector autoregression. Depending on data availability, the choice of variables is very similar for the countries we consider and includes real gross domestic product, real private consumption expenditure, real fixed investment, real exports, a short run interest rate, the M1 money stock, and the unemployment rate. This choice leads to comparable small scale time series models of the RUMPY variety for each country.

The in-house models used to generate forecasts are all linear (in variables) time series models. The models are either classical or Bayesian versions of vector autoregressions (VAR's, & BVAR's), reduced rank regressions (RRR's), error correction models (ECM's) or univariate versions of these models. For the USA we also report forecasts obtained from Ray Fair's (1994) structural econometric model of the US economy. Comparison of these forecasts helps to reveal how much of the uncertainty

in macroeconomic forecasting is due to model specification.

In this issue the forecasts are generated using the following models³.

BAR(opt): single equation Bayesian autoregression (BAR) with pre-set trend degree $t = 0$ (*i.e.* an intercept is included), uniform prior on the intercept, and Minnesota prior on the AR coefficients with data-determined (denoted by "opt") settings for the tightness hyperparameter.

BVAR(opt): BVAR model with pre-set trend degree $t = 0$, uniform prior on the intercept, and a symmetric Minnesota prior on the matrices of AR coefficients using data-determined (again denoted by "opt") settings for the tightness hyperparameters.

RRR: a VAR model in which the lag-one coefficient matrix is possibly of reduced rank(r) to allow for cointegration among the variables. Lag length(p), trend degree(t) and cointegrating rank(r) are all data-determined.

ECM: a VAR model formulated in differences with a specific coefficient matrix on the lag-one levels variable that allows for some variables to be cointegrated or co-moving in certain equations and some equations to have unit autoregressive roots.

Within each of these model classes, the modeling approach is to select the "best" model for the data and use this model for forecasting. The model determination procedure is an asymptotic form of predictive odds and uses the PIC criterion⁴.

Data

The final sample observations that were available at the time these forecasts were generated were as follows: USA, 1995:2; Japan, 1995:1; Korea, 1994:4; Australia, 1995:2;

¹ All computations and graphics were performed on a P5 PC using programs written in GAUSS. My thanks are due to Ray Fair for permission to reproduce here the *ex ante* forecasts of the US economy from his structural econometric model - see Fair(1994). Thanks also go to Ray Fair, Colin Hargreaves, the Bank of Korea, and the Reserve Bank of New Zealand for supplying the data.

² See Phillips (1995).

³ All models allow for the presence of deterministic trends. See the inaugural issue for a complete description.

⁴ See Phillips and Ploberger(1994, 1995) and Phillips(1996). The criterion is used here to determine lag length, trend degree, the presence of autoregressive unit roots, and cointegrating rank. The resulting forecasting models are then models that are "PIC'ed" within their given individual class.

New Zealand, 1995:1. The initialisation's of the data sets were selected on the basis of the quarterly data that was available for all of the series to ensure a balanced data set for each country. All variables are transformed to natural logarithms except for the interest rate.

USA

Real gross domestic product (1987\$bil., SA)
 Real personal consumption expenditure (1987\$bil., SA)
 Real fixed investment (1987\$bil., SA)
 Price deflator of GDP
 3-month Treasury Bill rate (percentage points)
 M1-Money stock, end of quarter (\$bil., SA)
 Unemployment rate, all workers 16 and over (percentage points, SA)

Sample Period: 1954:1 - 1995:2
 Source: National Income and Product Accounts
 Forecast Period: 1995:3 - 1998:4 (14 quarters)

Japan

Real gross domestic product (1985Ybil., SA)
 Real personal consumption expenditure (1985Ybil., SA)
 Real fixed investment (1985Ybil., SA)
 Price deflator of GDP
 M1-Money stock, end of quarter (Y100mil., SA)
 Unemployment rate (percentage points, SA)

Sample Period: 1965:1 - 1995:1
 Source: Nikkei Database
 Forecast period: 1995:2 - 1998:4 (15 quarters)

Korea

Real gross national product (1990Wbil., SA)
 Real personal consumption expenditure (1990Wbil., SA)
 Real exports (1990Wbil., SA)
 Consumer price index
 M1-Money stock, end of quarter (Wbil., SA)

Sample Period: 1970:1 - 1994:4
 Source: Bank of Korea
 Forecast period: 1995:1 - 1998:4 (16 quarters)

Australia

Real gross domestic product (1989/90\$mil., SA)
 Real personal consumption exp. (1989/90\$mil., SA)

Real fixed investment (1989/90\$mil., SA)
 Price deflator of GDP
 M1-Money stock, end of quarter (currency + demand deposits, \$mil., SA)
 90-day Money market rate (percentage points)

Sample Period: 1975:1 - 1995:2
 Source: Australian Bureau of Statistics
 Forecast period: 1995:3 - 1998:4 (14 quarters)

New Zealand

Real gross domestic product (production based) (1989/90\$mil., SA)
 Real private consumption expenditure (1989/90\$mil., SA)
 Real fixed investment (1989/90\$mil., SA)
 Price deflator of production GDP
 M1-Money stock, end of quarter (currency + demand deposits, \$mil., SA)
 90-day RBNZ Bill yield (percentage points)

Sample Period: 1982:1 - 1995:1
 Source: Reserve Bank of New Zealand
 Forecast period: 1995:2 - 1998:4 (15 quarters)

Results

Tables 1-5 give the forecast results for the main variables included in each model. Figures 1-5 graph the forecasts over the forecast horizon and also show the latest historical data. In these tables and graphs we show growth rates for the main macroeconomic aggregates and level forecasts for interest rates in the case of the USA. The growth rates are computed on an annual basis for Australia and New Zealand.

USA

The ECM and BAR models show a pick-up in real GDP growth in the third quarter of 1995 to an annual rate of around 2%, increasing to 3% in 1996. In contrast, the BVAR and RRR models show a continuing slowdown in growth in the third quarter of 1995 with the pick-up in growth occurring during the fourth quarter 1995 rather than immediately. The latter models also show growth during 1996 to be around 2%, somewhat lower than the rate predicted by the ECM and BAR models. The FAIR model forecasts are closest to those of the ECM model and the forecasts from these

models are very close for the third quarter 1995.

There are some important differences in the inflation forecasts. Again, the ECM and Fair model forecasts are closest, with the ECM model predicting that inflation will steadily increase from its present level to 2.2% in the third quarter 1995 and rise slowly to just over 3% during 1997. The RRR and BVAR models forecast inflation rising to just over 4% during 1997.

The BVAR model predicts a slow decline in the 90 day T bill rate from its present level of 5.5% to just over 5% by 1997. The RRR model predicts a greater decline, to around 4% by 1997. The ECM model and the BAR model predict increases in the rate. Thus, there is disparity in the direction of forecasts for interest rates.

All models predict a decline in real investment growth during the rest of 1995, some (RRR, BVAR) being more severe than others (Fair, BAR) with a pick up in growth during 1996. The long term forecasts to 1998 are all fairly similar and indicate a leveling off of investment growth rates during 1997 and 1998.

Japan

There is a wide inter-model dispersion of forecasts for real GDP growth, repeating our experience in the previous set of forecasts from 1994:4 reported in the Vol. 1, No.1. issue of APER. The results indicate that there is a good deal of uncertainty about the longer range forecasts, in particular, where forecasted growth ranges from a low of 0.6% (BVAR) to 5% (ECM) by 1998. The BVAR and RRR model forecasts of real GDP growth are consistently lower than those of the ECM and BAR models. The BVAR and RRR models also forecast higher inflation than the other models from 1996.

Korea

In contrast to Japan, the multivariate models all give similar projections for the pattern of real GDP growth, indicating a leveling off in the growth rate during 1995 in the 8–9% range, followed by a fall-off in the growth rate during 1996 to below 6%, with the growth rate then rising more slowly during 1997 and 1998. The univariate BAR model gives a different pattern of future growth and does not predict a fall off in the growth rate during 1996. The results also show some important inter-model differences in the inflation forecasts, with the multivariate models predicting an increase in the inflation rate over 1995-1996, but no such increase is predicted by the univariate BAR model.

Australia

With the exception of the RRR model, all models give a similar pattern of projection for real GDP growth: the growth rate declines from its present level to below 3% in the third quarter 1995, recovers by mid 1996 and increases slowly over the following period through 1998. The RRR model forecasts a downturn in growth and a recession starting in the fourth quarter 1995 with a recovery during 1997. Inflation is predicted to remain below 3% for the period through 1998, and all of the forecasts except those of the ECM model indicate some deflation towards the end of the period.

New Zealand

The ECM, BVAR, and BAR models all predict a continuation of robust growth over the period through 1998. The ECM model indicates some slow down during the remainder of 1995 over recent historical growth rates with a levelling off in growth rates around 4.5%. Only the RRR model predicts a substantial slow down in growth rates from current level around 5% to around 2% during 1998. All of the models forecast that inflation, as measured by the GDP production deflator, will stay below 2%, the upper limit of the 0–2% band that presently guides the monetary policy of the Reserve Bank of New Zealand.

Forecasting Record

Table 6 reports the forecasting record of our in-house models and the Fair structural econometric model of the US economy over the period 1995:1 – 1995:2. The table shows predicted and actual values of real GDP growth and inflation. For both variables the Fair model has lower root mean squared error of forecast than the automated time series models. The BVAR(opt) model produced the best forecast of real GDP growth two periods ahead, and came closest to capturing the downturn in second quarter growth in 1995.

Tables 7 and 8 give the forecasting record of the time series models for real GDP growth in Japan and Australia. The ECM model performed best for Australia for the two first quarters of 1995. The univariate BAR model gave the best forecasts for Japan for the period 1994:4 – 1995:1, but none of the models caught the downturn in the fourth quarter in 1994 in Japan.

Table 1: USA Forecasts

(a) Real GDP: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR	Fair Model
1995:3	2.07	0.19	0.17	2.72	2.33
1995:4	2.60	0.38	0.55	3.28	2.45
1996:1	3.06	1.34	1.00	3.60	2.27
1996:2	3.22	1.77	1.30	3.64	2.35
1996:3	3.39	2.03	1.62	3.64	2.44
1996:4	3.47	2.05	1.66	3.62	2.45
1997:1	3.43	1.96	1.65	3.60	2.47
1997:2	3.42	1.82	1.58	3.57	2.47
1997:3	3.37	1.68	1.51	3.55	2.49
1997:4	3.31	1.55	1.43	3.53	2.51
1998:1	3.24	1.46	1.35	3.51	2.53
1998:2	3.18	1.39	1.29	3.49	2.51
1998:3	3.13	1.35	1.25	3.47	2.54
1998:4	3.08	1.33	1.21	3.45	2.61

(c) Inflation – GDP deflator (% annual rate)

	ECM	RRR	BVAR	BAR	Fair Model
1995:3	2.26	2.63	2.54	2.64	2.12
1995:4	2.48	3.46	2.78	2.98	2.20
1996:1	2.47	3.93	2.83	3.12	2.31
1996:2	2.64	4.17	3.03	3.45	2.44
1996:3	2.76	4.27	3.15	3.70	2.47
1996:4	2.86	4.30	3.23	3.92	2.50
1997:1	2.97	4.28	3.30	4.13	2.55
1997:2	3.06	4.25	3.35	4.32	2.62
1997:3	3.14	4.21	3.39	4.49	2.67
1997:4	3.22	4.17	3.41	4.65	2.72
1998:1	3.29	4.13	3.43	4.79	2.77
1998:2	3.36	4.10	3.43	4.91	2.83
1998:3	3.42	4.06	3.43	5.03	2.88
1998:4	3.48	4.02	3.42	5.12	2.92

(b) Real Investment: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR	Fair Model
1995:3	2.62	-3.39	-0.86	8.46	2.12
1995:4	0.54	-3.89	-3.65	6.54	1.99
1996:1	-0.59	-2.50	-4.56	5.45	0.81
1996:2	-1.27	-0.35	-4.11	4.79	0.97
1996:3	-0.88	1.10	-2.84	4.41	1.63
1996:4	-0.31	1.94	-1.56	4.19	1.52
1997:1	0.24	2.22	-0.54	4.07	1.54
1997:2	0.81	2.19	0.21	4.00	1.56
1997:3	1.31	1.98	0.66	3.97	1.53
1997:4	1.73	1.73	0.89	3.96	1.51
1998:1	2.08	1.49	0.97	3.97	1.49
1998:2	2.35	1.29	0.97	3.97	1.45
1998:3	2.58	1.16	0.92	3.99	1.44
1998:4	2.77	1.08	0.85	4.00	1.49

(d) 3-Month Treasury Bill Rate

	ECM	RRR	BVAR	BAR	Fair Model
1995:3	5.64	5.07	5.49	5.73	5.30
1995:4	5.80	4.62	5.41	6.01	5.32
1996:1	5.82	4.32	5.30	6.15	5.41
1996:2	5.80	4.17	5.20	6.25	5.42
1996:3	5.85	4.10	5.14	6.40	5.40
1996:4	5.90	4.07	5.11	6.54	5.39
1997:1	5.94	4.06	5.08	6.65	5.41
1997:2	5.99	4.05	5.07	6.76	5.42
1997:3	6.05	4.03	5.07	6.86	5.42
1997:4	6.11	3.99	5.06	6.96	5.43
1998:1	6.16	3.95	5.06	7.05	5.44
1998:2	6.23	3.91	5.06	7.14	5.45
1998:3	6.29	3.86	5.06	7.22	5.46
1998:4	6.35	3.81	5.05	7.29	5.48

Table 2: Japan Forecasts

(a) Real GDP: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	2.03	2.20	2.05	3.04
1995:3	2.67	2.49	2.03	3.03
1995:4	3.30	2.64	1.71	3.03
1996:1	4.00	2.52	1.35	3.03
1996:2	4.18	2.49	1.18	3.01
1996:3	4.50	2.05	0.75	3.00
1996:4	4.63	1.97	0.65	2.99
1997:1	4.77	1.79	0.54	2.98
1997:2	4.84	1.66	0.45	2.97
1997:3	4.92	1.60	0.47	2.96
1997:4	4.95	1.55	0.48	2.95
1998:1	4.99	1.52	0.50	2.94
1998:2	5.01	1.51	0.56	2.93
1998:3	5.02	1.52	0.60	2.92
1998:4	5.03	1.53	0.64	2.92

(c) Inflation – GDP deflator (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	0.15	0.44	1.93	0.04
1995:3	0.97	0.57	2.49	0.18
1995:4	0.73	1.37	3.93	0.14
1996:1	1.26	2.19	4.34	0.14
1996:2	1.20	2.63	4.79	0.12
1996:3	1.41	3.27	4.94	0.10
1996:4	1.44	3.53	4.68	0.07
1997:1	1.54	3.73	4.52	0.04
1997:2	1.56	3.84	4.20	0.00
1997:3	1.64	3.84	3.86	-0.03
1997:4	1.66	3.79	3.55	-0.06
1998:1	1.71	3.70	3.26	-0.10
1998:2	1.74	3.57	2.99	-0.14
1998:3	1.78	3.42	2.77	-0.17
1998:4	1.82	3.25	2.57	-0.21

Table 2 cont: Japan Forecasts
(b) Real Investment: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	0.61	2.18	4.90	2.81
1995:3	3.81	4.20	6.15	3.01
1995:4	4.43	6.23	5.52	3.41
1996:1	5.95	4.96	3.46	3.74
1996:2	7.50	4.94	3.30	3.77
1996:3	7.70	3.94	1.68	3.78
1996:4	8.42	3.17	0.70	3.76
1997:1	8.81	2.43	0.12	3.73
1997:2	8.92	1.91	-0.44	3.69
1997:3	9.09	1.41	-0.85	3.65
1997:4	9.15	1.08	-0.94	3.62
1998:1	9.11	0.88	-1.09	3.58
1998:2	9.08	0.73	-1.09	3.55
1998:3	9.01	0.68	-1.03	3.52
1998:4	8.91	0.69	-0.96	3.49

(d) M1 growth (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	7.71	13.33	8.43	4.15
1995:3	4.46	6.53	1.80	2.46
1995:4	7.76	11.26	7.17	3.47
1996:1	6.02	8.68	2.61	3.03
1996:2	7.04	8.99	4.42	3.23
1996:3	6.57	8.62	3.26	3.09
1996:4	6.79	8.03	3.59	3.10
1997:1	6.61	7.68	2.87	3.04
1997:2	6.71	7.11	3.17	3.01
1997:3	6.60	6.61	2.73	2.96
1997:4	6.63	6.08	2.83	2.92
1998:1	6.58	5.61	2.69	2.88
1998:2	6.57	5.19	2.68	2.84
1998:3	6.54	4.80	2.60	2.80
1998:4	6.52	4.49	2.58	2.76

Table 3: Korea Forecasts
(a) Real GDP: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR
1995:1	8.79	9.26	8.50	7.65
1995:2	9.27	9.85	9.13	8.31
1995:3	8.82	9.42	8.69	8.37
1995:4	8.47	9.20	8.12	8.12
1996:1	6.62	6.86	6.68	8.13
1996:2	6.12	6.25	6.06	8.10
1996:3	6.16	6.31	5.91	8.09
1996:4	5.48	5.54	5.55	8.08
1997:1	5.58	5.79	5.47	8.07
1997:2	5.68	6.09	5.47	8.06
1997:3	5.46	6.09	5.51	8.05
1997:4	5.63	6.60	5.63	8.04
1998:1	5.65	6.93	5.77	8.03
1998:2	5.55	7.11	5.93	8.02
1998:3	5.64	7.45	6.11	8.02
1998:4	5.61	7.58	6.28	8.01

(c) Inflation – GDP deflator (% annual rate)

	ECM	RRR	BVAR	BAR
1995:1	4.57	5.11	5.22	4.76
1995:2	5.44	6.71	6.51	5.08
1995:3	5.74	7.90	7.18	4.55
1995:4	6.78	10.23	9.08	5.14
1996:1	7.99	12.35	10.39	5.42
1996:2	8.44	13.49	11.00	5.50
1996:3	8.49	14.09	11.32	5.61
1996:4	9.07	14.76	11.43	5.69
1997:1	9.39	14.73	11.18	5.73
1997:2	9.45	14.29	10.76	5.76
1997:3	9.78	13.89	10.27	5.77
1997:4	9.92	13.19	9.71	5.78
1998:1	9.99	12.51	9.12	5.77
1998:2	0.17	12.01	8.54	5.76
1998:3	0.23	11.48	7.96	5.75
1998:4	0.30	11.09	7.42	5.73

(b) Real Exports: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR
1995:1	14.55	16.08	16.83	18.00
1995:2	11.56	15.24	13.92	16.43
1995:3	10.82	16.46	13.87	17.52
1995:4	2.05	9.25	7.02	12.13
1996:1	3.10	10.39	6.18	11.56
1996:2	2.25	9.21	5.99	11.33
1996:3	1.35	8.17	5.44	10.90
1996:4	3.05	10.28	5.72	10.83
1997:1	3.03	10.78	6.11	10.81
1997:2	3.25	11.47	6.47	10.79
1997:3	3.95	12.81	6.90	10.80
1997:4	3.86	13.25	7.29	10.82
1998:1	3.97	13.70	7.63	10.84
1998:2	4.16	14.08	7.90	10.86
1998:3	4.07	13.93	8.12	10.88
1998:4	4.13	13.78	8.28	10.89

(d) M1 growth (% annual rate)

	ECM	RRR	BVAR	BAR
1995:1	22.07	22.45	20.59	20.3
1995:2	20.34	20.85	18.83	18.5
1995:3	17.94	18.92	15.25	15.0
1995:4	10.49	12.38	8.74	8.65
1996:1	8.86	11.12	8.76	9.15
1996:2	8.15	10.92	7.92	8.80
1996:3	5.34	8.40	7.03	8.45
1996:4	6.22	9.19	6.87	8.80
1997:1	6.11	9.27	6.54	8.98
1997:2	5.58	9.13	6.31	9.16
1997:3	6.47	10.45	6.25	9.40
1997:4	6.40	10.83	6.22	9.59
1998:1	6.38	11.26	6.27	9.76
1998:2	6.76	12.01	6.39	9.92
1998:3	6.65	12.16	6.55	10.06
1998:4	6.68	12.33	6.75	10.19

Table 4: Australia Forecasts**(a) Real GDP: growth rate (% annual rate)**

	ECM	RRR	BVAR	BAR
1995:3	2.46	1.23	2.16	2.71
1995:4	2.19	-0.43	1.57	2.65
1996:1	2.34	-1.18	1.61	3.01
1996:2	1.82	-2.53	1.06	2.70
1996:3	1.82	-2.08	1.41	2.67
1996:4	1.86	-1.39	1.89	2.72
1997:1	1.88	-1.11	2.19	2.74
1997:2	1.92	-0.71	2.47	2.77
1997:3	1.97	-0.27	2.71	2.82
1997:4	2.01	0.18	2.90	2.85
1998:1	2.04	0.57	3.04	2.88
1998:2	2.06	0.79	3.12	2.91
1998:3	2.07	0.93	3.17	2.93
1998:4	2.07	0.98	3.19	2.94

(c) Inflation – GDP deflator (% annual rate)

	ECM	RRR	BVAR	BAR
1995:3	2.50	2.31	2.32	2.10
1995:4	2.79	2.39	2.39	2.02
1996:1	2.66	1.87	1.94	1.37
1996:2	2.42	1.27	1.34	0.56
1996:3	2.42	0.95	1.08	0.32
1996:4	2.33	0.57	0.73	-0.11
1997:1	2.29	0.37	0.50	-0.40
1997:2	2.29	0.13	0.28	-0.69
1997:3	2.29	0.03	0.12	-0.97
1997:4	2.30	-0.06	-0.02	-1.23
1998:1	2.33	-0.10	-0.13	-1.51
1998:2	2.35	-0.09	-0.21	-1.78
1998:3	2.38	-0.07	-0.28	-2.06
1998:4	2.41	-0.05	-0.34	-2.34

(b) Real Investment: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR
1995:3	-2.43	-2.43	-2.14	-1.97
1995:4	-5.24	-6.99	-4.88	-3.76
1996:1	-5.26	-8.47	-4.74	-2.57
1996:2	-4.00	-8.04	-3.20	-0.07
1996:3	-3.82	-9.22	-2.98	0.93
1996:4	-3.04	-7.40	-1.83	1.85
1997:1	-2.40	-6.03	-0.89	2.34
1997:2	-1.84	-4.97	-0.08	2.62
1997:3	-1.30	-3.16	0.70	2.73
1997:4	-0.90	-1.99	1.29	2.73
1998:1	-0.59	-0.76	1.78	2.67
1998:2	-0.36	0.04	2.12	2.58
1998:3	-0.21	0.50	2.33	2.47
1998:4	-0.11	0.71	2.44	2.38

(d) M1 growth (% annual rate)

	ECM	RRR	BVAR	BAR
1995:3	0.95	1.09	1.29	2.53
1995:4	0.00	0.68	0.93	3.06
1996:1	1.53	2.13	2.80	6.16
1996:2	2.59	2.75	4.11	8.73
1996:3	3.64	3.56	5.04	9.56
1996:4	4.65	3.76	5.58	10.32
1997:1	5.53	4.53	6.21	10.75
1997:2	6.26	5.53	6.71	10.96
1997:3	6.79	6.01	7.02	11.09
1997:4	7.20	6.49	7.28	11.14
1998:1	7.49	6.73	7.40	11.16
1998:2	7.66	6.75	7.41	11.15
1998:3	7.76	6.61	7.34	11.13
1998:4	7.79	6.33	7.19	11.11

Table 5: New Zealand Forecasts**(a) Real GDP: growth rate (% annual rate)**

	ECM	RRR	BVAR	BAR
1995:2	5.38	5.22	5.31	5.00
1995:3	4.82	5.15	5.02	4.48
1995:4	4.76	4.81	5.40	4.72
1996:1	4.92	4.73	6.02	5.25
1996:2	4.52	4.01	5.93	5.42
1996:3	4.48	3.08	5.87	5.59
1996:4	4.53	2.80	5.87	5.77
1997:1	4.66	2.62	5.87	5.94
1997:2	4.66	2.53	5.88	6.12
1997:3	4.57	2.23	5.89	6.29
1997:4	4.64	2.19	5.91	6.46
1998:1	4.66	2.10	5.92	6.64
1998:2	4.65	1.98	5.94	6.81
1998:3	4.68	1.86	5.96	6.99
1998:4	4.69	1.74	5.97	7.16

(c) Inflation – GDP deflator (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	1.11	1.13	0.91	0.69
1995:3	0.75	0.47	0.63	0.29
1995:4	0.49	0.26	0.69	0.27
1996:1	0.78	0.50	0.87	0.29
1996:2	0.57	0.56	0.88	0.34
1996:3	0.60	0.75	0.92	0.31
1996:4	0.75	0.68	0.98	0.28
1997:1	0.55	0.47	0.99	0.26
1997:2	0.57	0.14	0.98	0.25
1997:3	0.56	0.09	0.99	0.24
1997:4	0.70	0.27	1.00	0.24
1998:1	0.76	0.33	1.02	0.23
1998:2	0.69	0.20	1.03	0.22
1998:3	0.73	0.19	1.04	0.21
1998:4	0.77	0.23	1.05	0.21

Table 5 cont: New Zealand Forecasts

(b) Real Investment: growth rate (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	14.78	16.48	16.71	14.94
1995:3	13.47	17.74	17.83	14.46
1995:4	16.03	20.83	23.59	18.51
1996:1	12.66	19.13	22.55	15.67
1996:2	13.01	15.82	22.78	16.22
1996:3	11.87	11.13	22.90	16.77
1996:4	12.38	10.35	22.82	17.31
1997:1	12.63	8.19	22.58	17.86
1997:2	11.79	7.95	22.55	18.41
1997:3	12.94	8.22	22.68	18.95
1997:4	12.75	8.17	22.78	19.50
1998:1	12.44	7.34	22.87	20.04
1998:2	12.62	6.86	22.96	20.59
1998:3	12.60	6.84	23.05	21.14
1998:4	13.07	6.25	23.13	21.68

(d) M1 growth (% annual rate)

	ECM	RRR	BVAR	BAR
1995:2	-0.60	0.83	-1.55	-5.03
1995:3	2.99	3.26	3.92	-1.58
1995:4	5.57	5.79	9.14	2.35
1996:1	5.51	8.32	11.18	3.09
1996:2	2.49	4.66	9.10	3.12
1996:3	1.53	4.13	8.48	3.19
1996:4	3.59	4.02	8.57	3.25
1997:1	4.55	3.36	8.64	3.30
1997:2	4.14	1.21	8.63	3.34
1997:3	4.51	0.94	8.65	3.37
1997:4	4.02	1.92	8.67	3.39
1998:1	4.48	2.03	8.71	3.41
1998:2	4.24	1.81	8.75	3.43
1998:3	4.78	2.48	8.80	3.44
1998:4	4.91	2.64	8.85	3.45

Table 6: Forecast Record: USA

Predicted & Actual Values of Real GDP Growth

Date:	94:4	95:1	95:2	Model	RMSE
Actual Value:	4.5	1.43	0.53		
Forecast from:					
94:4		2.61	0.64*	BVAR(opt)	1.19
		3.77	2.59	ECM	3.12
		3.23	1.43	RRR	2.01
		1.21*	1.53	Fair Model	1.02

* Closest forecast to actual value.

Predicted & Actual Values of Inflation

Date:	94:4	95:1	95:2	Model	RMSE
Actual Value:	1.4	3.20	1.42		
Forecast from:					
94:4		2.45	2.61	BVAR(opt)	1.41
		2.41	2.43	ECM	1.28
		2.68*	3.33	RRR	1.98
		2.10	1.91*	Fair Model	1.20

* Closest forecast to actual value.

Table 7: Forecast Record: Australia

Predicted & Actual Values of Real GDP Growth

Date:	94:4	95:1	95:2	Model	RMSE
Actual Value:	5.5	3.67	3.60		
Forecast from:					
94:4		0.73	0.23	BVAR(opt)	3.16
		3.92*	3.21*	ECM	0.33
		1.01	1.00	RRR	2.63
		2.37	3.08	BAR	0.99

* Closest forecast to actual value.

Table 8: Forecast Record: Japan

Predicted & Actual Values of Real GDP Growth

Date:	94:3	94:4	95:1	Model	RMSE
Actual Value:	3.42	-3.99	0.28		
Forecast from:					
94:3		3.67	3.53	BVAR(opt)	5.88
		5.01	4.64	ECM	7.07
		4.90	4.85	RRR	7.07
		3.27*	3.26*	BAR	5.55

* Closest forecast to actual value.

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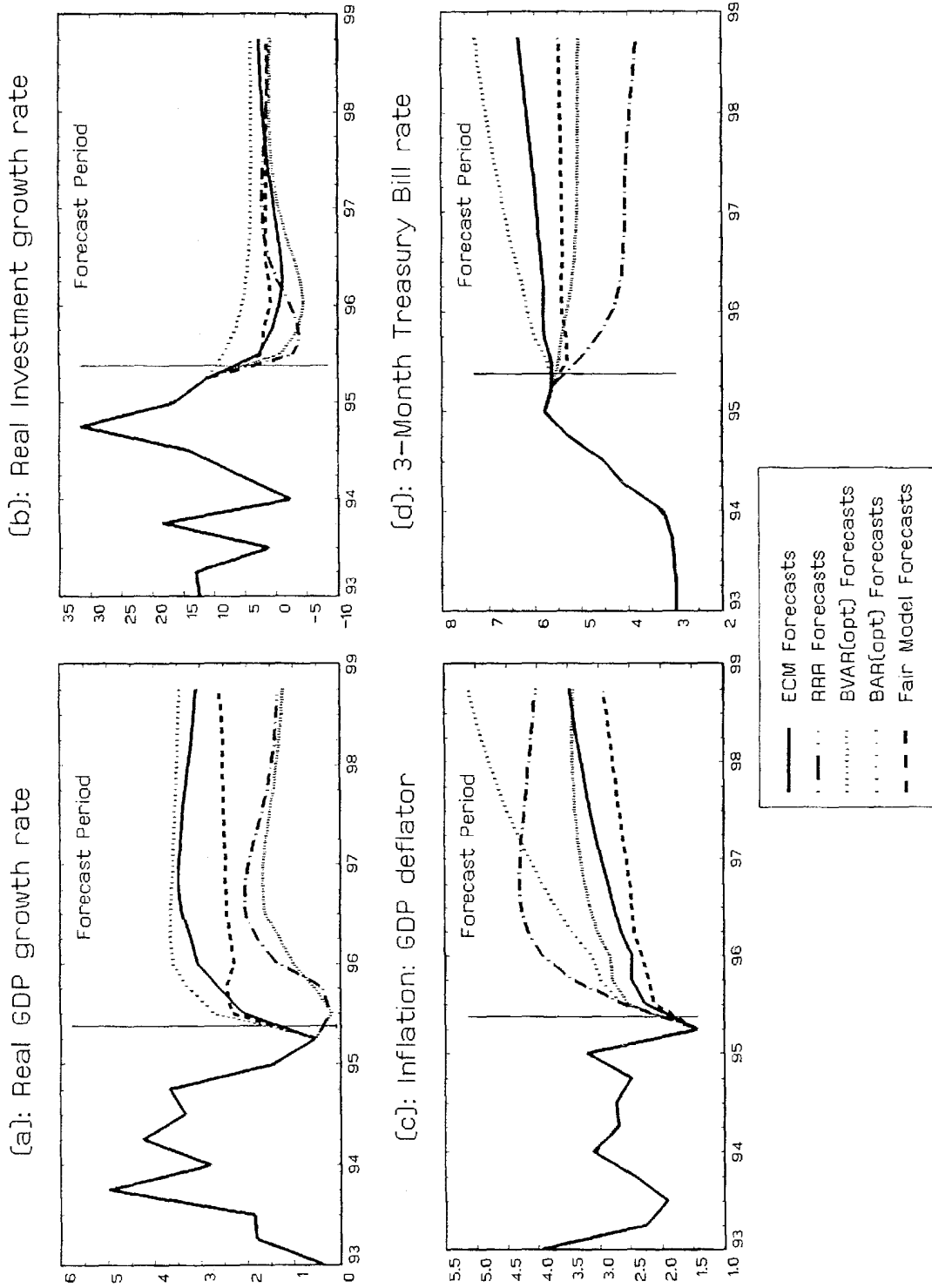
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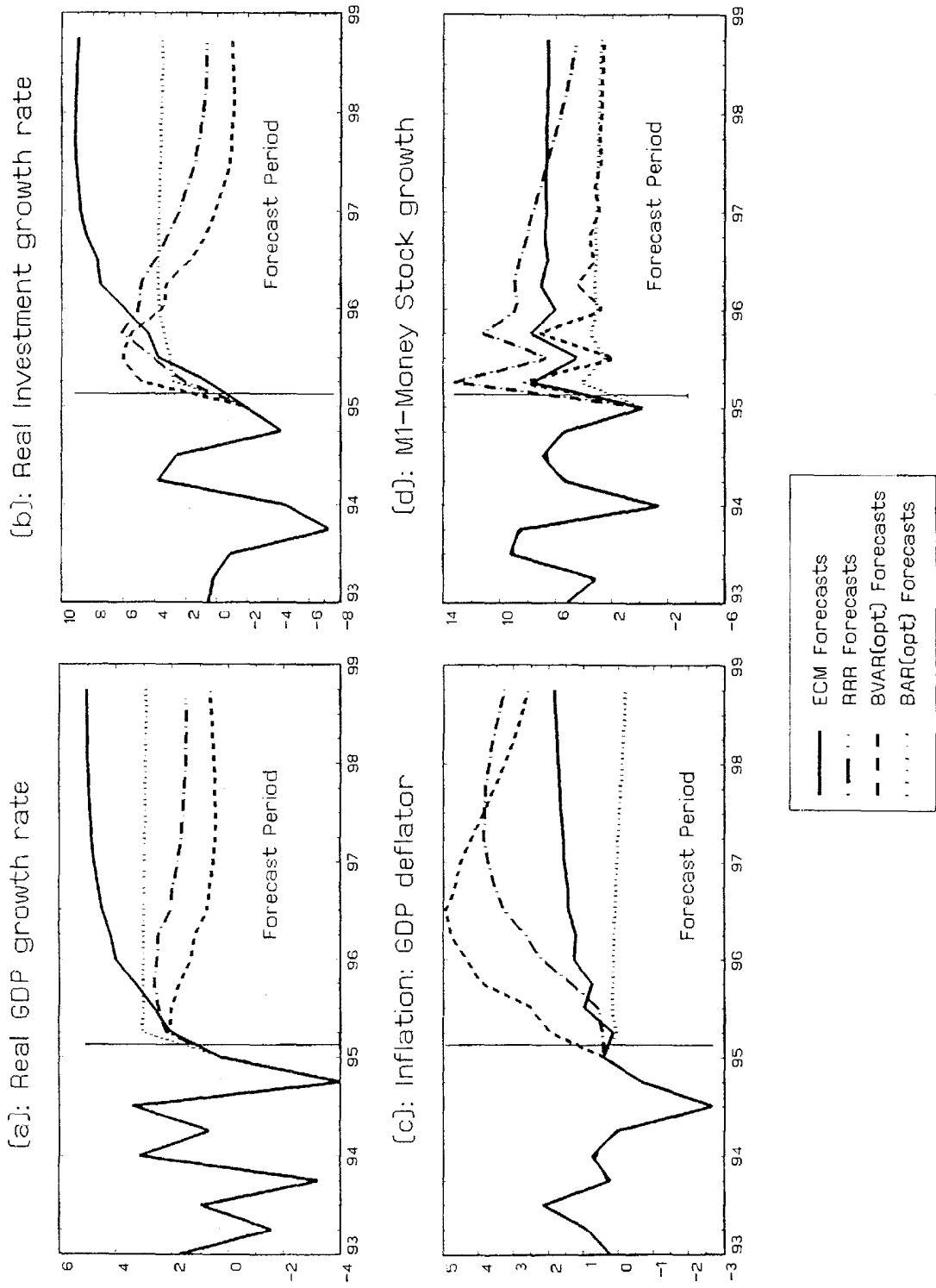
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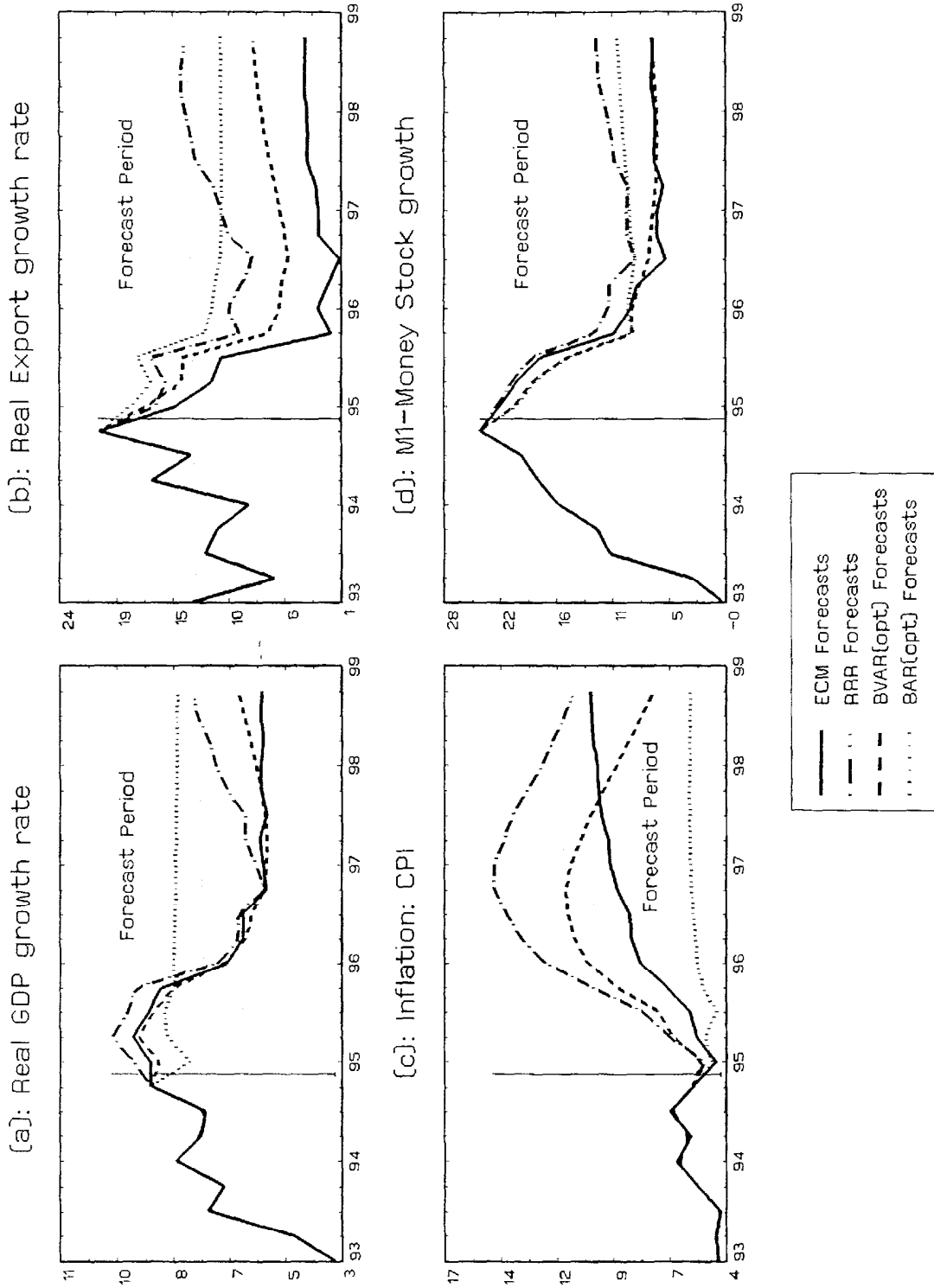
Figures 1[a]-[d]: USA Forecasts



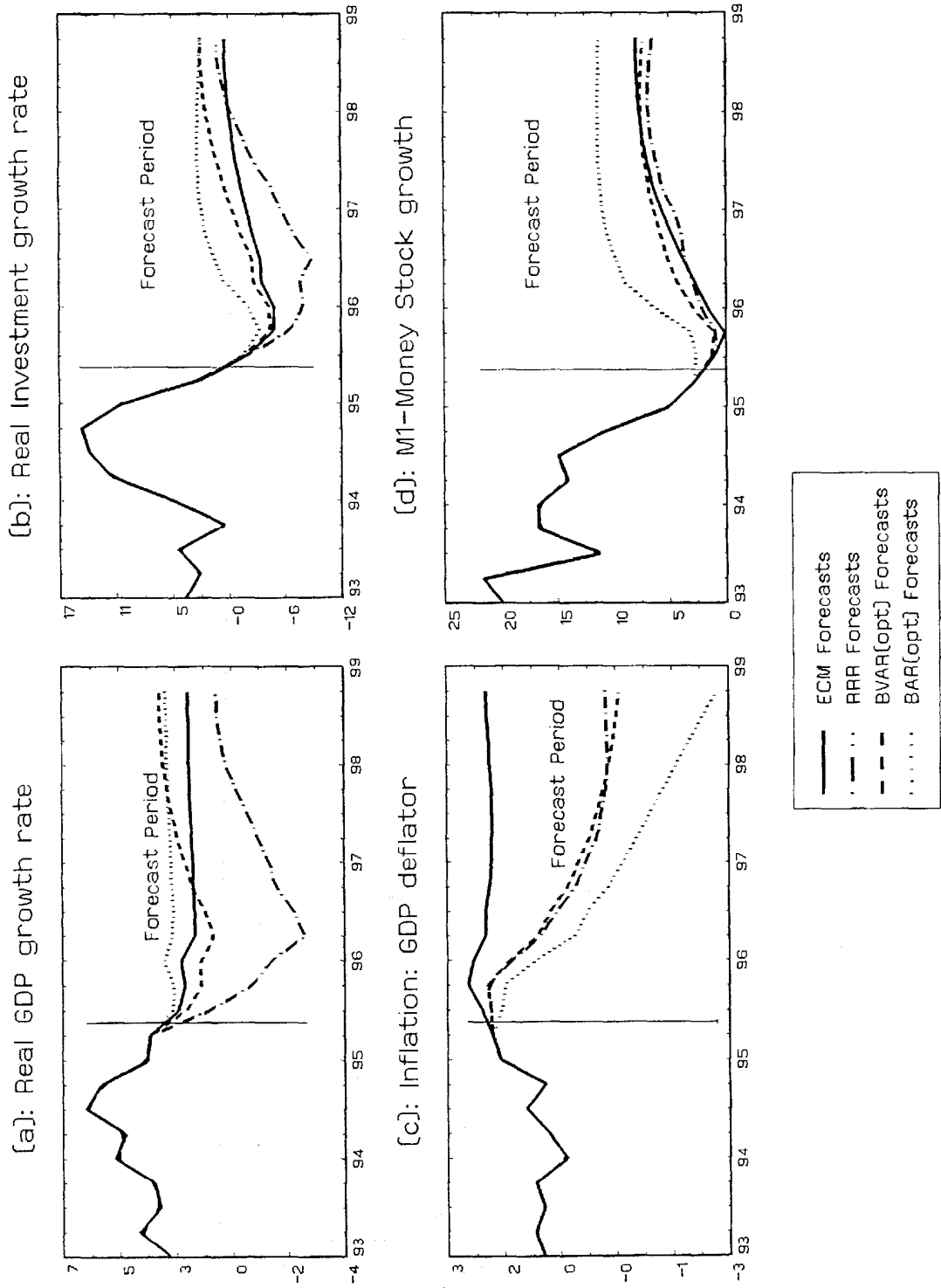
Figures 2(a)-(d): JAPAN Forecasts



Figures 3(a)–(d): Korea Forecasts



Figures 4[a]-[d]: AUSTRALIA Forecasts



Figures 5(a)–(d): New Zealand Forecasts

