Appendix to The "Econometric Forecasting" Chapter of
PRINCIPLES OF FORECASTING: A HANDBOOK FOR RESEARCHERS AND PRACTITIONERS

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Introduction

The appendix tables and the appendix list of references give the detailed basis for the figures shown in the tables in the body of the chapter. The connections between the two sets of tables are shown below.

Appendix Table	Chapter Table
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Tables A1, A3, A5, A6 and A7 are intended to include all relevant articles published between 1985 and early 1998, together with some earlier articles. Coverage is restricted to articles that contain out-of-sample comparisons of forecast accuracy. Undoubtedly, there will be some articles published during the relevant period, and more recent articles, that have been overlooked. I may have incorrectly coded one of your articles. Please inform me of any sins of omission or commission (preferably pointing out both the mistake and the correct form).

APPENDIX TO "ECONOMETRIC FORECASTING"

Table A1 Sources for pairwise comparison of estimating different vector autoregression models

Methods	Authors, year and number of series
Unrestricted *vs* restricted lag order	Bessler & Babula 1987 (2,1,*) Fanchon & Wendell 1992 (0,3,*), Funke 1990 (0,5), Kaylen 1988 (2,1), Kling & Bessler 1985 (1,3;1,2,2*;2,1), Liu Liu, Gerlow & Irwin 1994 (0,3), Park 1990 (1,3)
Variables in levels *vs* differenced *(3 CV found)*	Hoffman & Rasche 1996 (1,5) [same for variables expressed in levels or in differences], Lin & Tsay 1996 (1,0)
(2 CV found)	Lin & Tsay 1996 (0,1)
(1 CV found)	Clements & Hendry 1995 (1,0), Joutz Bessler, D. & J.L. Kling 1995 (2,2), Lin & Tsay 1996 (0,1), Sarantis & Stewart 1995 (2,1)
(No CV found)	Clements & Hendry 1995 (0,1), Lin & Tsay 1996 (0,4) Zapata & Garcia, 1990 (0,1)
Bayesian, levels *vs* restricted	Fanchon & Wendell 1992 G (2,2), Funke 1990 G (3,2), Holden & Broomhead 1990 G (5,2), Kaylen 1988 S&G (3,0), Kling & Bessler 1985 S (2,2;2,3;0,3), Kumar Leone & Gaskins 1995 G (5,0;5,0), Liu, Gerlow & Irwin 1994 G (2,1), Simkins 1995 G (3,0)
Bayesian, levels *vs* unrestricted	Artis & Zhang 1990 G (2,1;1,2;3,0;3,0;3,0;1,2;3,0), Bessler & Kling 1986 S&G (5,0), Dua & Miller 1996 G (3,0;3,0;1,2), Dua & Ray 1995 G (4,0), Fanchon & Wendell 1992 G (2,2), Funke 1990 G (5,0), Joutz, Bessler, & Kling 1995 (2,2), Kaylen 1988 S&G (3,0), Kling & Bessler 1985 S (3,1;3,2;1,2), Kunst & Neusser 1986 G (7,0,*), LeSage 1989 S (4,0;4,0;4,0;3,1;3,1), Liu, Gerlow & Irwin 1994 G (3,0), Lupoletti & Webb 1986 G (2,1,*), Sarantis & Stewart 1995 G (2,1), Shoesmith 1995 S (2,4) G (4,2), Simkins 1995 G (3,0), Trevor & Thorp 1988 G (5,8)
Bayesian, levels *vs* differenced	Joutz, Bessler, & Kling 1995 (4,0), Kunst & Neusser 1986 G (2,5,*), Sarantis & Stewart 1995 G (3,0), Trevor & Thorp 1988 G (4,9), Webb 1995 S (2,1), Zapata & Garcia 1990 G (0,1)
Bayesian, differences *vs* differenced	Hafer & Sheehan 1989 G (2,2), Kinal & Ratner 1986 G (3,0,*), LeSage 1990a S&G (2,1), LeSage 1990b S&G (2,0), Partridge & Rickman 1998 G (results for S almost identical) (6,1), Sarantis & Stewart 1995 G (1,2), Shoesmith 1992 G (2,0;1,1), Zapata & Garcia 1990 G (0,1)
No CV found	
ECM *vs* unrestricted, levels	Bessler & Fuller 1993 (0,12), Lin & Tsay 1996 (4,0), Zapata & Garcia 1990 (1,0)
ECM *vs* restricted and differenced	Webb 1995 (1,2)
ECM *vs* unrestricted, differenced	LeSage 1990a (1,0), LeSage 1990b (1,0), Lin & Tsay 1996 (1,3), Webb 1995 (1,2), Zapata & Garcia 1990 (0,1)
BECM *vs* Bayesian, differenced	LeSage & Pan 1995 S (6.5,4.5) (average of 3 different forms of prior)

One CV found	
ECM *vs* restricted, levels	Bessler & Covey 1991 (0,1), Fanchon & Wendell 1990 (0,3,*), Sarantis & Stewart 1995 (3,0)
ECM *vs* unrestricted, levels	Fanchon & Wendell 1990 (1,2,*), Joutz, Bessler, & Kling 1995 (1,3), Lin & Tsay 1996 (1,0), Shoesmith 1995 (5,1)
ECM *vs* restricted, differenced	Shoesmith 1995 (2,0;1,1;1,1;1,1), Tse 1995 (1,0)
ECM *vs* unrestricted, differenced	Bradley & Lumpkin 1992 (1,0), Joutz,Bessler, & Kling 1995 (3,1), LeSage 1990a (2,0), LeSage 1990b (1,0), Lin & Tsay 1996 (1,0), Sarantis & Stewart 1995 (3,0), Tegene & Kuchler 1994 (3,0)
BECM *vs* Bayesian, differenced	LeSage & Pan 1995 S (2.7,1.3) (average of 3 different forms of prior)
Two CV found	
ECM *vs* unrestricted, levels	Lin & Tsay 1996 (1,0)
ECM *vs* unrestricted, differenced	Lin & Tsay 1996 (1,0)
Three CV found	
ECM *vs* unrestricted, levels	Hoffman & Rasche 1996 (3,2,*) [variables expressed in levels; (4,2) in differences], Lin & Tsay 1996 (0,1)
ECM *vs* unrestricted, differences	Hoffman & Rasche 1996 (1,3,2*) [variables expressed in levels; (3,2,*) in differences], Lin & Tsay 1996 (0,1)
Four CV found	
ECM *vs* unrestricted, levels	Hall, Anderson, & Granger 1992 (4,0)

Notes: CV - cointegrating vectors

Sources for cell entries shown below using the following layout: Author year General (Litterman's, "Minnesota", or symmetric) or Specific Bayesian prior (number of series where first method was better, number of series where second method was better). Semicolon separates different VAR models in the same study. Out-of-sample forecast RMSE, lead times not specified. * indicates that the methods were equally accurate for one series, 2* indicates for two series, etc.

Lin and Tsay (1996) results are underrepresented in Table 1. Their results are tabulated by group, not by series. They examined 32 monthly financial and macroeconomic series divided into seven groups (most commonly with five variables in a group) but forecast accuracy was reported only by group.

Table A2 Individual studies comparing forecast accuracy of econometric models with subjective models, Armstrong (1985) and Fildes (1985) summaries.

	Objective better	No difference	Subjective better
Environmental change small			
Observations few	Christ 1975 Haitovsky, Treyz & Su 1974 Hultgren 1955 McNees 1974	Bunn & Seigal 1983	Hirsch & Lovell 1969 McNees 1975 Rippe & Wilkinson 1974 Vandome 1963
Observations many	Armstrong & Grohman 1972		Liebling, Bidwell & Hall 1976
Environmental change large			
Observations few			Rippe & Wilkinson 1974
Observations many	Armstrong & Grohman 1972 Cartter 1965		
Ex ante, short and medium	Joyeux 1980 (1,0,0)	Zarnowitz 1979 (0,3,0)	
Ex post, short and medium	Kenward 1976 (1,0,0) Walton 1979 (1,0,0)		Burrows 1971 (0,0,1) Rippe & Wilkinson 1974 (0,0,15)
Ex ante, long	Armstrong & Grohman 1972 (1,0,0)		
Ex post, long			Rippe & Wilkinson 1974 (0,0,15)

Figures in parentheses are the number of series in each study for which causal model forecast is better, same as or worse than judgmental, as reported in Fildes (1985). These figures appear in the totals of Table 3.

Table A3 Causal versus subjective model forecasts, agricultural commodities, recorded as (better, no difference, worse) according to the specified accuracy criterion, by *series*

Author	Date	pr	qu	per	Criteria	Steps	Horizon	Ex ante or post	Score	Commod-ities	Comment
Bessler & Brandt	1981	3		Q	MSE	1	short	EA	(3,0,0)	HG, BF, CK	single equation vs expert
Brandt & Bessler	1981	1		Q	MSE	1				HG	incl. in Bessler and Brandt, 1981
	1983	1		Q	MAPE	1	short	EP	(1,0,0)	HG	single equation vs expert
Elizak & Blisard	1989	5		Q	Theil U2	1	short	EA	(5,0,0)	BF, CK, FI, LM, PK	VAR vs USDA forecast (often worse than naive)
Garcia et al.	1988	1		M	MSE	1	short	EA	(0,1,0)	BF	Econometric vs futures price
Gellatly	1979		1	Q	MSE	1	short	EA	(0,0,1)	BF	single equation vs expert
Just & Rausser	1981	8		Q	RMSE	1-4	short	EA	(4,3,1)	BF, CO, CN, HG, SM, SO, SY, WH	4 large scale econometric models and USDA vs futures prices
Leuthold, Hartmann	1981	1		Q	RMSE	2	short	EA	(0,0,1)	HG	3 equation system vs futures price
Miller, Jelinek	1982	5		M	PRMSE	3	short	EA?	(1,3,1)	CN, SY, BF, FD, HG	from 4 large scale econometric models, vs expert and futures. Futures usually better.
Trapp	1981		1	Q	RMSE	1	short	EP	(0,0,1)	BF	single equation vs producer intentions
Vere & Griffith	1990	1	2	Q	MSE	1	short	EP	(1,0,0)	LM	Australian lamb slaughter and price vs expert
Total price series		26									
Total quantity series			4								
Overall (better, same, worse)							short	EA	(13,7,4)		
								EP	(2,0,1)		
								all	(15,7,5)		

Notes to Table A3
pr = number of price series, qu = number of quantity series (e.g., production, exports)
per = data frequency: D day, W week, Q quarter A annual. Steps = number of steps ahead reported.
Commodity codes: AA alfalfa hay, AP apples, BA barley, BF beef, usually slaughter steer, BK pork bellies, BN beans, BU butter, CA cattle, CC cocoa, CF coffee, CI citrus, CK chicken, usually broiler, CL cottonseed oil, CN corn, CO cotton, FC number of cattle on feed, FD feeder calves, FI fish, FX flax, HA all hay, HG, hogs, either barrows and gilts, or slaughter sows, HY hypothetical (simulated) data, LM lamb, OA oats, PC pecans, PE peas, PK pork, PN peanuts, PO potato, RI rice, RY rye, SB sugar beets, SF sows farrowing, SG grain sorghum, SM soybean meal, SO soybean oil, SP sweet potato, SU sugar, SY soybeans, TE tea, TO tobacco, TM tomato, WD durum wheat, WH all wheat, WL wool, WS spring wheat, WW winter wheat.

Table A4 Forecast accuracy of extrapolative and causal models, by *series* (based on Fildes 1985, 572-574, Table 3)

Horizon	Causal better	No difference	Extrapolative better
Short, EP	79	1	73
Short, EA	25	2	14
Short/medium, EP	21	1	8
Short/medium, EA	9	2	7
Medium, EP	35	2	17
Medium, EA	56	0	20
Medium/long, EP	11	1	9
Medium/long, EA	2	0	0
Total, all horizons	238	9	148
Ex post	146	5	107
Ex ante	92	4	41

Table A5 Econometric versus univariate forecasts, agricultural commodities, recorded as (better, no difference, worse) according to the specified accuracy criterion, by *series*

Author	Date	pr	qu	per	Criteria	Steps	Horizon	Ex ante or post	Score	Comm-odities	Comment
Arzac & Wilkinson	1979	14	18	Q, A	RMSE	1	short	EP	(23,2,7)	BF, CK, CN, PK etc.	From a 42 equation livestock-feed sector model vs AR(4)
Babula	1988		3	A	MAPE	1	short	EP	(2,0,1)	CO, RI, SY	Imports to Canada. OLS and SUR vs naive
Babula et al.	1991	3		M	RMSE	1-18	short /med	EA	(3,0,1)	CN, CK(2)	3 equation VAR vs naive
Bessler & Babula	1987	2	2	M	RMSE	1-12	short	EA	(2,2,0)	WH	4 equation VAR with 3 lags usually better than restricted VAR, which was similar in structure and performance to AR (mostly order 2)
Bessler & Brandt	1981	3		Q	MSE	1	short	EA	(1,1,1)	HG, BF, CK	single equation vs ARIMA
Bessler & Covey	1991	1		D	RMSE	1-10	short	EA	(1,0,0)	BF	Weak evidence of cointegration but VAR in differences more accurate than VECM against ARIMA
Bessler & Kling	1986	2	2	Q	RMSE	1-8	short /med	EA	(5,0,0)	HG, CN; HG, SF	Hog sector. ARIMA worse than VAR with general prior, better than unrestricted VAR or symmetric prior. US disp income forecast also.
Bourke	1979	1		Q, M	RMSE	1	short	?	(0,0,2)	BF	Single equation vs ARIMA
Brandt & Bessler	1981	1		Q	MSE	1				HG	incl. in Bessler and Brandt, 1981
	1983	1		Q	MAPE	1	short	EP	(0,0,1)	HG	Single equation worse than ARIMA, better than naive
	1984	1		Q	RMSE	1	short	EA	(0,0,1)	HG	4 equation restricted VAR vs ARIMA
Conway et al	1987	3		Q	RMSE	1	short	EP	(3,0,0)	BF, CK, PK	Meat retail prices. Varying parameter vs ARIMA
									(0,0,3)		OLS vs ARIMA
Conway et al	1990		1	A	RMSE		long	EP?	(0,0,1)		capital investment. Naive better than AR model and OLS
Davison et al.	1989		7	A	MAPE	1	med	EP	(3,0,4)	SY	Exports to 7 countries, vs naive
Elizak & Blisard	1989	5		Q	Theil U2	1,4,8	short med	EA	(5,0,0) (0,2,3)	BF, CK, FI, LM, PK	5 equation VAR of meat retail prices vs naive

Fanchon & Wendell	1992	4	M	MSE	1-58	short /med/ long	EA	(3,1,0)	CN, FD(3)	4 equation Bayesian VAR best 2 times, restricted VAR best 2 times against AR models (up to order 4)
Foote, Roy, & Sadler	1976	2	2 Q	RMSE	1	short	EP	(4,0,0)	HG, PK; HG(2)	4 equation sector model, each quarter separate vs naive
Garcia et al.	1988	1	M	MSE	1	short	EA	(0,0,1)	BF	Econometric better at 5-6 months ahead than ARIMA
Gellatly	1979		1 Q	MSE	1	short	EA	(0,0,1)	BF	Naive better than ARIMA (See Gellatly, 1981)
Gil & Albisu	1993	1	M	RMSE	1	short	EA	(0,0,1)	CN	single equation vs ARIMA
Goodwin	1992	1	Q	RMSE	1	short	EA	(0,1,0)	BF	2 forms of VAR vs ARIMA
Harris & Leuthold	1985	1	Q	RMSE	1-4	short	EP?	(0,0,2)	BF, HG	single equation vs ARIMA
Hauser & Anderson	1987	1	M	RMSE	1-5?	short	?	(0,0,1)	SY	daily price variance vs ARIMA
Holt & Brandt	1985	1	M	RMSE	2	short	EA	(1,0,0)	HG	Composite best. Different econometric models at different horizons vs ARIMA
Kling & Bessler	1985	2	3 Q	RMSE	1,4	short	EA	(2,0,3)	CN, HG; SF, HG	5 equation VAR (incl. US disp income) vs ARIMA
Kulshreshtha et al.	1982	1	M	MSE	1-6	short	EA EP	(1,0,1) (1,0,1)	BF, FD	Single equation vs ARIMA
Labys & Granger	1970	6	M	MSE	1	short	EA	(1,0,5)	CL, RY, SM, SO, SY, WH	Single equation (from stepwise regression) vs 5 univariate.
Leuthold et al.	1970	1	1 D	Theil U1	1	short	EA	(2,0,0)	HG	single equation vs ARIMA or naive
Maclaren	1977	5	Q	MSE	1,4	short	EP	(2,1,2)	BF, BK, CK, PK, LM	Wholesale prices. 5 econometric methods, principal components overall best vs naive
McClements	1970	1	1 Q	MAPE, U_2	1-3	short	EA	(1,1,3)	HG, SF	3 equation to 1 equation, successively as actual lagged variable values available vs naive
Miller & Jelinek	1982	5	M	PRMSE	3	short	EA?	(2,3,0)	CN, SY, BF, FD, HG	from 4 large scale econometric models, vs naive
Myer & Yanagida	1984	1	Q	RMSE	1	short	EP	(1,0,0)	AA	Annual single equation combined with quarterly ARIMA vs naive
Owen et al	1991	1	D	RMSE	1-10	short	EA	(1,0,0)	BF	Single equation vs AR model.
Park & Tomek	1988	2	M	MSE	1	short	EA?	(1,0,1)	BF, SY	Naive better than ARIMA and ES
Park	1990	2	2 M	RMSE	1,3,6	short	EA	(4,0,0)	BF, FD; BF, FC	4 equation Bayesian and restricted VAR consistently best over vector ARMA

Park, Garcia, & Leuthold	1989	1	M	MSE	2,4,6	short	EA	(0,0,1)	HG	single equation vs ARIMA
Sapsford & Varoufakis	1990	1	M	MSE	1(?)	short	EA	(1,0,0)	CF	single equation vs ARIMA
Spreen & Arnade	1984	1	A	MSE	1	short	?	(1,0,0)	FD	single equation vs ARIMA and ES. Treatment of contemporaneous explanatory variables not clear
Tegene & Kuchler	1994	3	A	RMSE	1,3	med/ long	EA	(3,0,0)		Farmland price in 3 regions. 2 equation ECM better than ARIMA. VAR in differences worst.
Vere & Griffith	1990	1	2 Q	MSE	1 1-12?	short short /med	EP EA	(2,0,1) (2,0,1)	LM	Australian lamb consumption, slaughter and price vs naive (better than ARIMA
Vere & Griffith	1995	1	Q	MSE	1	short	EP	(0,0,1)	LM	13-equation model, 5 different specifications for farm price. Best structural model vs ARIMA
Zapata & Garcia	1990	1	M	RMSE	1-6	short	EA	(1,0,0,)	BF	3 equation VAR in differences. ARIMA (2,1,2) better than ECM
Total price series	62									
Total quantity series	26									
Overall (better, same, worse) totals						short	EP EA n.s.	38,3,19 27,8,19 1,0,3		
						sh/ med	EA	13,0,2		
						med	EP EA	3,0,4 0,2,3		
						long s/m/l	EP EA	0,0,1 3,1,0		
						All		85,14,51		

Notes to Table A5
pr = number of price series, qu = number of quantity series (e.g., production, exports)
per = data frequency: D day, W week, Q quarter A annual. Steps = number of steps ahead reported.
Commodity codes: see notes to Table A3.
EA ex ante (unconditional) forecast, EP ex post (conditional) forecast, n.s. forecast type not stated.
Horizons: short: 1 year, 1-6 quarters, or 1-12 months; medium: 2-3 years, 7-12 quarters, or 13-36 months; long: everything else.

Table A6 Econometric versus univariate forecasts, tourism studies, recorded as (better, no difference, worse) according to the specified accuracy criterion, by *series*

Author	Date	Freq	Steps	Criteria	Horiz on	Ex ante or post	Score	Comment
Gapinski & Tuckman Florida inbound *Transportation Res.*	1976	Q	1-8	Theil U	short	EP	(2,0,1)	Auto, aeroplane and both. Single equation vs trend curve, both better than naive
Wandner & Van Erden US to Puerto Rico Hawkins et al (eds) *Tourism Planning*	1980	M	1-12	MAPE	short	EP	(0,0,1)	Transfer function better up to 6M then ARIMA. Versus single equation
Witt & Rice UK outbound Sparkes and Witt (eds) *Business forecasting...*	1981	A	1-4	RMSE	med/ long	EP	(1,0,0)	Single equation vs trend curve
Fritz et al. Florida inbound *Annals of Tourism Res.*	1984	Q	1-8	MSE	short/ med	EP	(1,0,0)	Single equation vs ARIMA
Van Doorn Netherlands inbound *Tourism Mgt*	1984	M	1-24	MSE MAPE	short/ med	EP	(0,0,1)	Harmonic smoothing better than classical decomposition, X-11and ARIMA vs single equation
Martin & Witt France, Germany, UK, USA outbound	1989	A	1	PRMSE MAPE	short	EP	(0,0,4)	Naive better than autoregression, exponential smoothing, trend curve and single equation
International J. Forecasting	1989		2	PRMSE MAPE	med	EP	(0,0,4)	Autoregressive better than all others
Witt UK, USA outbound *Proc Europ. Mktg Acad.*	1991	A	1 2	MAPE MAPE	short med	EP	(0,1,1) (0,1,1)	single equation vs naive
Witt UK, USA outbound Johnson & Thomas (eds) *Choice and Demand in Tourism*	1992	A	1	MAPE	short	EP	(2,0,0)	single equation vs naive

Witt New Zealand inbound *Tourism Mgt*	1992	A	1-3	MAPE	short/ med	EP	(1,0,0)	Delphi better than naive and single equation
Gonzalez & Moral Spain inbound *International J. Forecasting*	1995	M	1	RMSE	short	EP	(0,1,0)	Transfer function better than structural time series model (STSM) and ARIMA better than ECM
Young & Pedregal Spain inbound *International J. Forecasting*	1997	M	1-12	RMSE	short	EP EA	(2,0,2) (2,1,1)	Same data as Gonzalez and Moral, 4 forecast origins (Dec 1988-91) and different estimation software. EA better than EP at 2 of 4 origins. Versus univariate basic structural model.
Kulendran & King Australia inbound *International J. Forecasting*	1997	Q	1,2,4, 8	RMSE	short med	EA	(1,1,2) (1,0,3)	4 origin countries. Regression with ARMA errors usually better than ECM. AR with order chosen by Schwartz BIC usually better than seasonal ARIMA
Overall						EP EA	(9,3,15) (4,2,6)	

All results before 1995 taken from Witt and Witt (1995). See their article for citations.
EA ex ante (unconditional) forecast, EP ex post (conditional) forecast, n.s. forecast type not stated.
Horizons: short: 1 year, 1-6 quarters, or 1-12 months; medium: 2-3 years, 7-12 quarters, or 13-36 months; long: everything else. Steps = number of steps ahead reported.

Table A7 Econometric versus univariate forecasts, recorded as (better, no difference, worse) according to the specified accuracy criterion, by series. Studies published since 1985, mostly macroeconomic series.

Author	Date	Freq	Step	Criteria	Horizon	Ex ante or post	Score	Comment
Aksu & Nayaran	1991	M	1	MSE	short	EA	(1,0,0)	90-day T-bill rate. Univariate vs bivariate VARMA
Alexander	1995	Q	1	MAPE	short	EA	(0,0,1)	Mean of earnings per share, about 300 US companies, econometric vs ARIMA
Alexander & Thomas	1987	M	1,3,6 12 24,36	RMSE	short med	EP EP	(0,0,3) (0,0,3)	3 exchange rates. AR(1) over naive over varying parameter over fixed parameter structural asset model
Artis & Zhang	1990	Q	1-4 5-8	Theil's U_2	short med	EA	(20,0,1) (18,0,3)	Two 6 equation BVAR, unrestricted VAR vs AR(3) for output, inflation, balance of payments, 7 countries
Bidarkota	1998	Q	1	MSE MAE	short	EA	(1,0,0)	US real interest rate, directly (uni-variate AR(3)) vs computed from 2-equ ECM of nominal interest rate, inflation
Boothe & Glassman	1987	M	1, 3, 6, 12	RMSE profit	short	EP EP	(0,0,2) (1,0,1)*	2 exchange rates. Econometric vs naive (random walk)
Brodie & de Kluyver	1987	B	1, 6	RMSE	short	EP	(7,2,6)	Multiplicative market share vs. naive for 15 low-cost branded goods, New Zealand
Brown, Song, & McGillivray	1997	Q	1-4 5-8 9-12	MSE	short med long	EP	(1,0,0) (1,0,0) (1,0,0)	UK house price. Time varying parameter best over error correction equation, AR(8) and VAR with 4 lags worst
Chambers	1990	Q	1	RMSE	short	EP/EA	(4,0,0)	4 non-durable commodity groups, UK. Dynamic LES (EP) better than VAR, ECM (EA) vs naive
Craine & Havenner	1988	M	1 3	MSE	short	EA EP	(1,0,1) (2,0,0)	Short- & long-term US interest rates. Transfer function over AR and random walk
Cummins & Griepentrog	1985	Q	1-8	PRMSE	short/ med	EA	(1,0,1)	Insurance claims, US. Econometric vs ARIMA
Curry et al	1995	W	1-16	Theil's U_2	short	EA	(1,0,0)	Canned soup sales. BVAR over transfer function. Results not disaggregated.
Deaves	1996	Q	1-4 8,12 20+	RMSE	short med long	EA	(0,0,1) (1,0,0) (1,0,0)	3-month interest rates, Canada. VECM worse than naive, ARIMA short-term, better otherwise

Dhrymes & Peristiani	1988	Q	1,4,8	PRMSE	short	EA	(9,1,13)	For 23 US macroeconomic variables.
						EP	(10,0,13)	Although Wharton EFA model's *published*
					med	EA	(15,0,8)	forecasts dominate ARIMA forecasts, the
						EP	(12,0,11)	uncorrected model values do not.
Dua & Miller	1996	M	1-6	RMSE	short	EA	(7,1,1)	BVAR or VAR vs AR, all 12 lags, 3 employment variables over 3 intervals
Dua & Ray	1995	Q	1-4	RMSE	short	EA	(4,0,0)	BVAR (4 lags) better than ARIMA but
			5-8		med		(4,0,0)	VAR (4) usually worst. Connecticut housing permits, income, employment, unempl.
Dua & Smyth	1995	Q	1-4	RMSE	short	EA	(1,0,0)	Univariate and 2-,5-,6- variable BVAR all
			5-8		med		(1,0,0)	with 4 lags, of US house sales
Edlund & Karlsson	1993	Q	1-4	RMSE	short	EA	(0,0,1)	Unemployment, Sweden. ARIMA and
			5-8		med		(0,0,1)	transfer function beat 5 VAR/ ECM
Fackler & Krieger	1986	Q	1,4	PRMSE	short	EA	(3,0,2)	Macroeconomic variables, US. 5-equation VAR in differences, 4 lags, vs ARIMA
Fildes, Randall, & Stubbs	1997	D	1	RMSE	short	EP	(1,0,0)	Water use: single equation better than ES and ARIMA, rolling regression slight improvement.
			1	MAPE	short	EP	(1,0,0)	Gas demand: equation with AR(1) disturb-
						EA	(1,0,0)	ances and bias correction best. Multivariate better than ARIMA, ES. EP better than EA.
Fritsche & Wallace	1997	Q	1-4	RMSE	short	EP	(2,0,2)	Unrestricted PPP better than imposed PPP vs naive for 4 exchange rates
Funke	1990	M	1,3, 6, 9, 12	Theil's U_2	short	EA	(3,0,2)	Two 6 equation BVAR, unrestricted and restricted VAR vs ARIMA for industrial production, 5 OECD countries
Funke	1992	M	1, 3, 6, 9, 12	Theil's U_2	short	EA	(1,0,0)	German unemployment rate. 4 equation VAR better than regular or multiple-intervention ARIMA except at 1M ahead
Garcia-Ferrer et al.	1987	A	1	RMSE	short	EA	(7,1,1)	Real gnp growth in 9 countries AR(3) plus explanatory variables better than AR(3)
Glennon, Lane & Johnson	1987	Q	1-6	MAPE	short/ med	EP	(1,0,2)	Employment, 3 industries, 1 US region. 28-equation structural model vs ARIMA
Gunel	1987	M	1-13	RMSE	short	EA	(1,0,0)	Monthly electric load, single equation better than ARIMA

Hafer & Sheehan	1989	Q	1,4, 8	RMSE	short med	EA	(4,0,0) (2,0,2)	4 equation restricted VAR (Schwartz BIC criterion) vs AR(4) or naive for GNP deflator, M1, GNP and T-bill rate. BVAR results similar
Hall, Anderson, & Granger	1992	M	1	RMSE	short	EA	(4,0,0)	US T-bills, 1-4 months maturity. ECM better than VAR better than naive
Heuts & Bronckers	1988	M	1-12	RMSE	short	?	(1,0,1)	Truck sales, Holland, 5-equation multi-variate ARIMA vs univariate ARIMA
Holden & Broomhead	1990	A	1-4	RMSE	short	EA	(3,1,3) (5,0,2)	7 UK macroeconomic variables. 3 large scale models vs AR (better than ARIMA); RVAR or BVAR vs AR
Holden & Peel	1986	Q	1-6	RMSE	short/ med	EA	(2,0,0)	3 large scale models better than AR for UK gdp growth and inflation rate
Huss	1985	A	2,4,6 11	MAPE, MdAPE	short/ med	EA	hard to score	5 measures of electricity consumption from 49 US utilities. Econometric does poorly.
Kinal & Ratner	1986	M	1-12	RMSE	short	EA	(3,0,1)	4 macroeconomic variables, New York state. Differenced BVAR better than differenced VAR and ARIMA
Kumar et al.	1995	M	1,3,6 12	MdRAE	short	EA	(5,0,0)	Consumer durables, US. BVAR with buying intentions index better than RVAR, naive
LeSage	1989	M	1-6	RMSE	short	EA	(19,0,1)	4 equation BVAR models vs univariate for wage rates, 4 US cities, for 5 industries
LeSage &, Magura	1991	M	1, 6, 12	PRMSE	short	EA	(13,0,7)	Best of 4 very large VAR models vs AR(5) for employment in 20 US industries
Lin	1986	Q	1-12	MSE	short/ med	EP	(5,0,0)	5 components of US public construction. Single equation vs ARIMA
Lin	1992	A	1	MAPE	short	EP	(4,0,0)	Simultaneous system better than ARIMA or naive for accounting data from 6 large firms
Longbottom & Holly	1985	Q	1 4	RMSE RMSE	short short	EP EP	(7,1,6) (9,0,5)*	Large scale macroeconomic model (LBS) vs ARIMA for UK macroeconomic data
Lord	1991	A	1	RMSE	short	EP	(6,0,1)	Prices of 7 storable commodities. ECM vs ARIMA
Lupoletti & Webb	1986	Q	1,2, 4	RMSE	short	EA	(2,0,1)	US macroeconomic variables. VAR vs ARIMA. Large scale models beat VAR

Mitra & Rashid	1996	Q	1, 4	RMSE	short	EA	(0,0,1)	Canadian inflation, 3-equn. VAR vs naive
Mittnik	1990	Q	4 8	RMSE	short med	EP	(2,0,0) (2,0,0)	State space better than 12 large scale models and ARIMA, US real gnp and inflation
Öller	1985	Q	1	RMSE	short	EA	(4,0,0)	4 macroeconomic variables, Finland. Vector ARIMA vs univariate ARIMA
Partridge & Rickman	1998	M	1, 6, 12	MAPE	short	EA	(6,0,1)	3 kinds of BVAR vs. AR(9). Employment in 7 aggregate sectors, Georgia, US.
Puri & van Lierop	1988	Q	1-4	RMSE	short	EP EA	(0,0,1) (0,0,1)	9-equation structural model of US housing starts vs ARIMA
Reichenstein & Elliott	1987	Q	10	RMSE	med	EA	(1,0,0)	Inflation rate. Econometric model (best of 4 examined) vs ARIMA
Sexton	1987	A	1	MSE	short	EP	(1,0,0)	Econometric vs ARIMA for residential property values for 77 Minnesota counties
Swamy & Tavlas	1992	Q	1	RMSE	short	EP	(3,0,0)	Time varying parameter better than fixed and naive, 3 Australian money quantities
Talwar & Chambers	1993	Q	1,2	RMSE	short	EA?	3,6,12)	7 macroeconomic variables, 3 Canadian provinces, econometric vs ARIMA
Thomas	1993	Q	1-2 7-10	RMSE	short med	EA	(1,0,0) (1,0,0)	Econometric vs exponential smoothing for all classes of mail, US Postal Service
Thury	1985	A	1	RMSE	short	EA	(4,1,2) (2,1,4)	5 Austrian macroeconomic variables. 2 large structural models vs ARIMA
Tse	1995	D	1	RMSE	short	EA	(1,0,0)	Nikkei stock price index. VAR and ECM with futures price index better than naive and ARIMA (worst)
Watson, Pastuszek, & Cody	1987	M	1-12	RMSE	short	EA	(1,1,0)	Econometric over Holt-Winters for electric loads in two companies, north-east US
Weller	1989	M	1-12	RMSE	short	EA	(5,0,0)	5 different transfer functions vs ARIMA for employment in one small US region
West & Fullerton	1996	Q	1-5 6-10	RMSE	short med	EA	(18,0,1) (12,1,6)	Structural equation systems better than ARIMA and H-W for seas. adj non-agric. employment, 19 Florida metro areas

Overall (better,	short	EP	48,3,36
same, worse)		EA	169,13,62
totals		n.a.	1,0,1
	sh/	EP	5,0,0
	med	EA	2,0,0
	med	EP	15,0,14
		EA	55,1,20
	long	EP	1,0,0
		EA	1,0,0
	All	EP	69,3,50
		EA	225,14,82

*Not included in overall counts
EA ex ante (unconditional) forecast, EP ex post (conditional) forecast, n.s. forecast type not stated.
Horizons: short: 1 year, 1-6 quarters, or 1-12 months; medium: 2-3 years, 7-12 quarters, or 13-36 months; long: everything else. Step = number of steps ahead reported.

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