

SESSIONS

1 GLOBAL FORECASTING

CHAIR: Janet Sniezek, *University of Illinois, 603 E. Daniel Street, Champaign, IL 61820, USA*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: PEEL

1.1 ON THE CYCLIC METHODS FOR LONG-TERM FORECASTING

Mikhail Postan, *Odessa State Marine University, 34, Mechnikov Str., 270029, Odessa, UKRAINE*

Georgiy Kuzjmenko, *Odessa State Marine University, 34, Mechnikov Str., 270029, Odessa, UKRAINE*

We show that reliable global long-term forecast can be calculated by means of relatively simple cyclic schemes which are based on the solar-earthly relationships also. The general principle which we use is necessity of fundamental unity between deterministic and stochastic factors of the natural process. This principle can most completely be expressed by wave-mechanical solitonics.

The simplified variant of this conception leads to the so-called method of binary forecasting (MBF) which gives only an increase or decrease forecast of predictable value in time-series. That is why we can expect high degree of trustworthiness from MBF. A practical realization of MBF is a complex computational problem in the field of discrete programming but it can be solved with standard personal computers.

With the help of MBF was calculated the 27-yearly forecast of solar activity and solar-earthly dependencies which is corroborated. In particular, for climatic changes and earthquake activity the mentioned forecast is almost completely came true.

1.2 MULTIPLE SCENARIOS AND REASONING ABOUT THE FUTURE

Janet Snizek, *University of Illinois, 603 E. Daniel Street, Champaign, IL 61820, USA*
Kristine M. Kuhn, *Department of Psychology, University of Illinois at Urbana-Champaign, Champaign, IL 6180-0942, USA*

Although the generation of multiple scenarios is commonly advocated as a deterrent against excessive confidence in a forecast, there is evidence that it does not work. Even worse, forecasters can become even more confident following generation of multiple scenarios (Snizek, Kuhn, & Spurlock, 1995) than after generation of a single or no scenario. This paper reports the results of experimental manipulations of the number and types of scenarios generated for forecasts of three global variables over the next 50 years: world population, mean global temperature, and the number of nations. Results show how reasoning processes shift with generation of successive scenarios, and identifies the conditions under which such shifts actually heighten forecast confidence.

1.3 THE FORECAST OF INTERACTION BETWEEN IRRATIONALITY AND RATIONALITY IN THE PROCESS OF GLOBALIZATION

Nikita Pokrovsky, *Sociology Department, Moscow State University, Moscow 119899, RUSSIA*

The catastrophism of the contemporary state of civilization approaching its global state is manifested in the fact that humankind is entering the era of the new conflict. The goals of the conflict are achieved not so much by the use of military force, but rather by the threat of its use on micro and macro levels. The role of social control is maintained by unconscious social fear. The global conflict is characterized by the multiple-nuclei origin (ethnic clashes and wars, isolated zones of economic protest, "metastasis" terrorism, etc.) which transforms the whole political map of the globe.

Being largely informational in its essence, conflict dictates the means of resisting itself. The means of resistance must also be primarily informational and rational. That is: 1. the unification of rational groups (first of all professional) into the centers of resistance to irrationality; 2. the creation of a dynamic system of interaction of those centers on the horizontal level; 3. the transformation of the centers of rationality into the centers of power.

The only way by which remained rational structures still can resist to irrationality requires the use of the "Lilliput principle." The body of irrationality (similar to Gulliver's body) can be tightened only by various braces of rational ties.

2 FORECASTING AND RECESSIONS

CHAIR: Roy A. Batchelor, *Dept. of Banking and Finance, City University Business School, Frobisher Crescent/Barbicon Centre, London, EC2Y-8HB, UK*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: CONFERENCE D

2.1 FORECAST ERRORS AND GREAT DEPRESSIONS

Pentti Vartia, *The Research Institute of the Finnish Economy, Lonnrotinkatu 4 B, FIN 00120 Helsinki, FINLAND*

Jukka Lassila, *The Research Institute of the Finnish Economy, Lonnrotinkatu 4B, FIN-00120 Helsinki, FINLAND*

Great depressions usually come as surprises and thus involve large forecasting errors on the national, firm and household level. We discuss and analyze the role of forecasts in economic decision making using Finland's recent experiences as an example.

2.2 CONSUMER CONFIDENCE AND THE PROBABILITY OF RECESSION

Roy A. Batchelor, *Dept. of Banking and Finance, City University Business School, Frobisher Crescent/Barbicon Center, London, EC2Y-8HB, UK*

Pami Dua, *Department of Economics, University of Connecticut, Scofieldtown Rd., Stamford, CT 06903, USA*

This paper uses a version of the Neftci probabilistic forecasting techniques to assess the contribution of consumer survey responses to the prediction of major recessionary and inflationary episodes.

3 NEURAL NETWORKS I: PRICE FORECASTING

CHAIR: Mirko Novak, *Institute of Computer Science, 18207 Prague 8, Pod vodarenskou vezi 2, CZECH REPUBLIC*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: YORK

3.1 STABILITY ON EMERGING MARKETS: ARTIFICIAL NEURAL NETWORK MODELS IN STOCK PRICES FORECASTING

Zbigniew H. Gontar, *University of Lodz, Department of Computer Science, ul. Rewolucji 1905r. nr. 39, 90-214 Lodz, POLAND*

This paper presents an artificial neural network (ANN) approach to financial prognosis on emerging markets. Stability of emerging markets and selection of the proper methodologies of ANN implementation in financial forecasting is discussed. The three ANN models are described: the Multi-Layer Perception, Kohonen Feature Maps and Recurrent Network. The methodological aspects of the paper relate to the numerical simulations made on the daily stock prices of the Warsaw Stock Exchange.

3.2 DESIGNING NEURAL NETWORKS AND SELECTING PARAMETERS FOR SHORT-TERM PRICE FORECASTING

Chrispin Ntungu, *University of Manitoba, 403-66 Dafoe Rd., Winnipeg R3T 2N2, CANADA*

Iebeling Kaastra, *Canadian Wheat Board, CANADA*

Milton Boyd, *University of Manitoba, 403-66 Dafoe Rd., Winnipeg R3T 2N2, CANADA*

Neural networks are universal and highly flexible function approximators first used in the fields of cognitive science and engineering. However, the large number of parameters that must be selected to develop a neural network forecasting model still involves much trial and error. The objective of this paper is to provide a practical introductory guide in the design of a neural network for short-term forecasting of prices and financial time series data. An eight-step procedure to design a neural network forecasting model is explained including a discussion of tradeoffs in parameter selection, some common pitfalls, and points of disagreement among practitioners.

3.3 FORECASTING AND SYSTEM RELIABILITY

Vaclav Sebesta, *Institute of Computer Science, Academy of Sciences of the Czech Republic, Pod vodarenskou vezi 2, 18207 Prague 8, CZECH REPUBLIC*

Emil Pelikan, *Institute of Computer Science, Pod vodarenskov vezi 2, 182 07 Prague 8, CZECH REPUBLIC*

Mirko Novak, *Institute of Computer Science, Pod vodarenskou vezi 2, 18207 Prague 8, CZECH REPUBLIC*

In this contribution an approach is presented to the design of artificial systems (technical, informational, economical) which can be optimized with respect to their operational reliability and life-time. This is based on the use of some concepts from the general theory of system parameter tolerances, applied simultaneously with the knowledge of time-series forecasting. Such an approach seems to be novel and opens the possibility of significant system operation availability and life-time prolongation, of system repair price and time reduction. As a main tool for the necessary time-series prediction the artificial neural networks can be used. Besides the basic theory of such ultra-reliable systems also some applications in power engineering and aircraft engine construction will be mentioned.

4 EVALUATING FORECASTS

CHAIR: Herman Stekler, *Dept. of Economics, George Washington University, Washington, DC 20052 USA*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: CONFERENCE C

4.1 A PANEL DATA ANALYSIS OF SURVEY FORECASTS

Kajal Lahiri, *SUNY Albany, Economics Department, 1400 Washington Avenue, Albany, NY 12222, USA*

We develop a methodology for analyzing forecasts and their errors using multi-dimensional panel data. Our model allows for a complex correlation among forecasts made by different individuals, for different targets, and at different horizons to be expressed as a function of a few fundamental parameters. Direct measures of aggregate shocks and their volatility are estimated prior to the series being realized. Our GMM estimation of the panel data model using predetermined but not strictly exogenous instruments allows for missing data. We apply our methodology to data from the ASA-NBER survey forecasts, and resoundingly reject the rationality hypothesis.

4.2 THE ACCURACY OF OECD FORECASTS OF THE INTERNATIONAL ECONOMY: THE BALANCE OF PAYMENTS

J. C. K. Ash, *University of Reading, UK*

S. M. Heravi, *University of Reading, UK*

David J. Smyth, *Louisiana State University, 2107 CEBA, Economics Dept., Baton Rouge, LA 70803, USA*

This paper analyzes the accuracy of the balance of payment forecasts made by the OECD for the G7 countries, Canada, France, Germany, Italy, Japan, the UK and the USA. The data set comprises one-, two-, and three-step ahead semi-annual forecasts of the main components of the balance of payments. Various measure of accuracy are computed. Also, a comparison is made with competing naive and time series predictions. The analysis includes diagnostic checks on forecast performance, including rationality tests for unbiasedness, efficiency and consistency.

AN EVALUATION OF THE FORECASTS OF THE FEDERAL RESERVE

Herman Stekler, *Dept. of Economics, George Washington University, Washington, DC 20052, USA*

Fred Joutz, *Department of Economics, The George Washington University, Washington, DC 20052, USA*

This paper will evaluate the accuracy of the economic forecasts of the Federal Reserve for the period 1965-1989. We will use the customary techniques for evaluation, including mean squared errors, tests for bias, comparisons against other standards, etc. In addition, we plan to determine whether the forecasts were useful to the users of those predictions, the Open Market Committee, and whether the Fed's forecasts contained information not available in other predictions which were available at the same time.

EVALUATING ACCURACY (OR ERROR) MEASURES

Spyros Makridakis, *INSEAD, Technology Management, Boulevard de Constance, 77305 Fontainebleau, FRANCE*

M. Hibon, *INSEAD, Technology Management, Boulevard de Constance, 77305 Fontainebleau, FRANCE*

This paper surveys all major accuracy measures found in the field of forecasting and evaluates them according to two statistical and two user oriented criteria. It is established that all accuracy measures are unique and that no single measure is superior to all others. Instead there are tradeoffs in the various criteria that must be considered when selecting an accuracy measure for reporting the results of forecasting methods and/or comparing the performance of such methods. It is concluded that symmetric MAPE and Mean Square Error are to be preferred for reporting or using the results of a specific forecasting method while the difference between the MAPE of NAIVE 2 minus that of a specific method is a preferable way of evaluating some specific method to some appropriate benchmark.

5 BUSINESS FORECASTING

CHAIR: Jim Cox, 325 Williams Hall, Dept. of Marketing, 5590, Illinois State University, Normal, IL 61761, USA

MONDAY, JUNE 05, 1995

9:00 AM - 10:30AM

ROOM: CONFERENCE E

5.1 A PRAGMATIC APPROACH TO FORECASTING FINANCIAL PROSPECTS FOR SMALLER AMERICAN INDUSTRIES

J. Kendrick Noble Jr., 45 Edgewood Lane, Bronxville, NY 10708, USA

Large American industries are well-studied; small ones are not but, in the United States, sufficient data can be found to develop many histories and forecasts of and for them. To be useful, both must be couched in terms and amounts acceptable to the industries, which can be best determined from trade association reports if available. Industry financial structures can be approximated using Census, Internal Revenue Service, trade association and corporate reports in combination, which are described. The results are not precise, but the references are usually estimates as well. Forecasts can then be prepared, generally using ratios to permit long-term relationships to be determined and projected, using analysts' or forecasters' methods.

5.2 FORECASTING IN SMALL BUSINESSES

Jim Cox, 325 Williams Hall, Dept. of Marketing, 5590, Illinois State University, Normal, IL 61761, USA

This paper describes the findings of an empirical study on the forecasting practices of 267 small businesses located in the Midwest. Several studies have been done examining the forecasting practices of medium and large businesses. However, almost no studies have been done examining the forecasting practices of small businesses. Some of the areas addressed include: techniques used, perception of the usefulness of forecasting, hindrances to forecasting, accuracy, who performs forecasting, and the time horizons used.

6 MANAGING FORECASTS

CHAIR: Gregory Hudak, *Information Resources, 150 North Clinton Street,
Chicago, IL 60661-1416, USA*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: CONFERENCE B

6.1 FORECASTING TO SUPPORT EFFICIENT CONSUMER RESPONSE INITIATIVES

Gregory Hudak, *Information Resources, 150 North Clinton Street, Chicago, IL 60661-1416, USA*

A goal within the consumer packaged goods (CPG) industry is to respond to customer demand on a "just-in-time" basis. The CPG industry accepts this premise as part of four such initiatives that comprise Efficient Consumer Response (ECR). A key driver of ECR is forecasting. Accurate forecasts of product demand and of shipments, both considered in the presence of trade deals and promotions, are essential. Decisions are facilitated if all key data and information are visible to managers and decision makers involved in the overall process. Forecasting is a fundamental hub in the decision making process, linking such activities as marketing, continuous replenishment programs (CRP), vendor managed replenishment (VMR), distribution resource planning (DRP), transportation, procurement, and finance. As a consequence, forecasts must be easy to understand, reconciled with current inventories and production schedules, and be presented within a reporting structure in a form consistent with the multi-level organizational and geographical strata of the company.

This presentation reviews the principles and methodology that underlie a forecasting solution proposed by IRI Logistics. Also described briefly is The Logistics Partner, a software suite of products that enables necessary data and information integration, promotion planning, forecasting and generation of manufacturing requirements.

7 ARIMA MODELS

CHAIR: V. A. Reisen, *UFES-Brazil, Rua Dr Dido Fontes 971 Apt 204, Tardium Da Penha Vitoria E S, BRAZIL*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: CONFERENCE F

7.1 CANONICAL ANALYSIS OF MULTIVARIATE ARMA (p,d,q)(P,D,Q) MODELS

Marcia Woolf Bulach, *5 Elsham Rd., London W14 8HA, UK*

Identification of a suitable Multivariate Time Series Model, questions of stability, and the difficulties of the prediction are well recognized. Thus, a variety of methods appear to be worth examining. We recommend applying classical canonical analysis to a realization of a Multivariate Time Series partitioning it into two overlapping sets or non-overlapping sets at a sequence of lags $s=0,1,\dots$ in order to try to elucidate the internal structure of the time-dependence between the component variables and to reduce dimensionality if the number of variables is large. We implement canonical correlation analysis in a study of Multivariate Time Series in an original way by examining the subsets of the multivariable at different time lags. We did not restrict ourselves to low order models or to models based on Akaike's restricted proposal (past/present) *(present/future).

7.2 METHOD OF FORECASTING FOR LONG MEMORY TIME SERIES MODELS: SIMULATIONS AND APPLICATION

V. A. Reisen, *UFES-Brazil, Rua Dr Dido Fontes 971 Apt 204, Tardium Da Penha Vitoria E S, BRAZIL*

In this work we show some results of real data where the characteristics of long memory are present. The method of forecasting is based on the ARIMA (p,d,q) for fractional values of d. We demonstrated that the usual method of forecasting for the model above can also be used for series with long memory characteristic when d is fractional. These results were obtained by simulation and applied to two sets of real series: wind speed data and astronomy data. For estimating the fractional parameter d we used the method proposed by Reisen (1994). We also analyzed other methods suggested recently in the literature for estimating the fractional parameter d.

8 ANALYSTS' EARNINGS FORECASTS

CHAIR: Lawrence D. Brown, *State University of New York at Buffalo, Samuel P. Capen Professor of Accounting, 372 Jacobs Mgmt. Center, Buffalo, NY 14260-4000, USA*

MONDAY, JUNE 05, 1995

9:00AM - 10:30AM

ROOM: CONFERENCE G

8.1 EQUITY VALUATION AND ANALYSTS' FORECASTS OF THE BEHAVIOR OF ABNORMAL EARNINGS

Victor Bernard, *School of Business Administration, University of Michigan, 701 Tappan St., Ann Arbor, MI 48109-1234, USA*

Jeffery Abarbanell, *School of Business Administration, University of Michigan, 701 Tappan St., Ann Arbor, MI 48109-1234, USA*

Charles M. C. Lee, *School of Business Administration, University of Michigan, 701 Tappan St., Ann Arbor, MI 48109-1234, USA*

Equity valuation can be framed as the process of estimating the difference between the price and book values of shares. That difference is equal to the value of abnormal earnings (relative to a normal return on book value) over the analyst's forecast horizon, plus the value of abnormal earnings beyond that point (the so-called "terminal value"). In this study we seek to identify the factors that explain cross-sectional variation in analysts' assessments of evolution of abnormal earning within the forecast horizon as well as cross-sectional variation in their assessment of long-run abnormal earnings reflected in terminal values. The variation is attributable to competitive forces, accounting artifacts, and potentially, forecast inefficiency.

8.2 TRADING VOLUME AND DIFFERENT ASPECTS OF ANALYSTS' DISAGREEMENT: AN EMPIRICAL STUDY FOCUSING ON THE INFLUENCE OF DIFFERENTIAL BELIEF REVISIONS

Orie Barron, *Indiana University, School Of Business, Dept. of Accounting, Bloomington, IN 47405, USA*

This study examines whether monthly trading volume is associated with both dispersion in analysts' prior forecasts and differential forecast revisions. In a multiple regression framework, estimated coefficients suggest that the monthly percentage of equity shares traded is associated with (1) high levels of dispersion in the prior month's forecasts, (2) low correlations between analysts' current and prior forecasts, and (3) forecast movements that are more divergent. Assuming that analysts' forecasts proxy for investors' beliefs, these results are consistent with Karpoff's (1986) prediction that trading volume is associated with both differential prior beliefs and differential belief revisions.

8.3 AN EXAMINATION OF THE BIAS IN CONSENSUS ANALYST FORECASTS

Jerry C. Y. Han, State University of New York at Buffalo, Jacobs Management Center, Buffalo, NY 14260-4000, USA

Lawrence D. Brown, State Univ. of New York at Buffalo, Samuel P. Capen Professor of Accounting, 372 Jacobs Mgmt. Center, Buffalo, NY 14260-4000, USA

Little is known about which firm-specific characteristics are associated with the bias in analyst forecasts, and nothing is known about whether factors impacting bias in U.S. firms generalizes to firms in other countries. This paper relates consensus analyst forecast bias to firm size, analyst following, fiscal period, price to earnings ratio, book to market ratio, and past bias. Each factor will be examined individually with U.S. data over the 40 fiscal quarters, 1985-1994, and for all six factors combined. Similar analyses will be undertaken over appropriate time periods for selected country groups (e.g., Europe, Pacific Rim).

9 FORECASTING FOR THE FEDERAL GOVERNMENT

CHAIR: Peg Young, *Office of Inspector General 54B1, Dept. of Veterans Affairs, 810 Vermont Ave, NW, Washington, DC 20420, USA*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: CONFERENCE C

9.1 FORECASTING PC PRICE TRENDS

Paul M. Hriljac, *The MITRE Corporation, M/S W622, 7525 Colshire Drive, McLean, VA 22102, USA*

Pamela T. Geriner, *The MITRE Corporation, M/S W622, 7525 Colshire Drive, McLean, VA 22102, USA*

The decision of when to buy computer equipment is confounded by the fact that prices for a given capability continue to decline, but newer and more advanced capabilities are simultaneously being introduced to the market. This paper describes a method for modeling and forecasting price data for PC's and their components that will assist decision makers. Time series representing quarterly values of price indices of PC's and their components will be examined. Vector ARMA models are fit to this collection of time series by the use of MAP estimators. Intervention analysis will be applied to these models to investigate the effects on the indices of the high rate of technological change in this industry.

9.2 FORECASTING PHYSICIAN DEMAND IN THE DEPARTMENT OF VETERANS AFFAIRS

Peg Young, *Office of Inspector General 54B1, Dept. of Veterans Affairs, 810 Vermont Ave, NW, Washington, DC 20420, USA*

George Wesley

The debate continues as to the eventual format of the US Healthcare system, and the Department of Veterans Affairs (VA) must determine how to meet the demand for care of the veterans who utilize the VA medical centers (VAMCs) under the varying scenarios being proposed. The first step in preparing these strategic plans requires the derivation of models to forecast physician requirements for the VAMCs. This paper will present several models for performing such a forecast. Techniques presently being employed in health care modeling will be contrasted to univariate and multivariate time series models to compare accuracy as well as to understand the strengths and weaknesses of the different modeling approaches.

9.3 FORECASTING LABOR FORCE MEASURES OF THE RURAL UNITED STATES

Karen S. Hamrick, *USDA Economic Research Service, 1301 New York Ave., NW 928, Washington, DC 20005-4788, USA*

Rural areas currently account for about 27 million workers, or 21 percent of the US labor force. Accurate forecasts of rural labor market conditions are helpful in designing policies to aid rural development. The models currently used by the US Department of Agriculture for forecasting rural labor market indicators are presented, discussed, and evaluated. Because of the limited availability of data on rural areas, these models have more constraints on their limitations, the models generated fairly accurate ex post forecasts of the rural unemployment rate, rural employment level, rural labor force, and the rural underemployment rate.

10 THE MILLENNIUM PROJECT

CHAIR: Jerome C. Glenn, *UNU/Wider/Millennium Project, 4421 Garrison St. NW, Washington, DC 20016-4055, USA*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: PEEL

10.1 A REVIEW OF THE MILLENNIUM PROJECT OF UNU/WIDER

Jerome C. Glenn, *UNU/Wider/Millennium Project, 4421 Garrison St., NW, Washington, DC 20016-4055, USA*

The United Nations University, an autonomous organ of the UN that can focus intellectual resources on world problems as a global, decentralized, non-degree granting, post-graduate research institution, is examining the feasibility of the MILLENNIUM PROJECT through its center in Helsinki (World Institute for Development Economic Resources). This project is proposed to assist in organizing futures research to continuously update and improve humanity's thinking about the future, and make that thinking available through a variety of media for consideration in public policy, advanced training, public education, and systematic feedback. This presentation discusses the three phases of the feasibility of this project and the anticipated first studies of the full project.

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ACKNOWLEDGMENTS

The ISF 95 Committee would like to thank Syracuse University's Maxwell School of Citizenship and Public Affairs for making important contributions to the organization of the symposium, the preparation of the program book and for providing the personnel and facility support invaluable to the conference planning effort.

For their individual efforts which have be indispensable to the symposium preparation, the ISF 95 Committee would like to specially acknowledge the following individuals for the contributions and dedication.

Ms. Diane Beebe

Ms. Susan Campbell

Ms. Helen Dewey

Ms. Jennifer Hefferan

THE FIFTEENTH INTERNATIONAL SYMPOSIUM ON FORECASTING
TORONTO, CANADA JUNE 4-7, 1995

MESSAGE FROM THE GENERAL CHAIR

Dear Conferees:

On behalf of the International Institute of Forecasters and the International Association of Business Forecasting, we welcome you to Toronto and the Fifteenth Annual International Symposium of Forecasting.


The purpose of the Symposium is to enhance communication of advances in research and to promote interaction between researchers and practitioners by personal contact. The theme of this year's Symposium is Technological Forecasting. It was chosen in recognition of the growing importance and speed of change in all fields due to scientific and technological advances around the world and of the contributions forecasting can make to better manage these changes. We believe you will find in this Symposium the environment and the program that will contribute to further developments in forecasting, both scientific and professional.

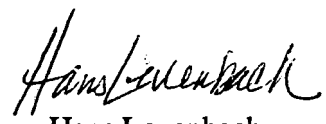
The location of the Symposium in downtown Toronto will give many of you a chance to experience a dynamic city, Canada's financial, arts and sports centre. We hope you will enjoy your visit.

With your participation and support we look forward to a lively and successful Symposium.

All the best,


Stuart Bretschneider
Program Chair


R. Joel Rahn
General Chair


Hans Levenbach
Financial Chair



The Premier
of Ontario

Le Premier ministre
de l'Ontario

Legislative Building
Queen's Park
Toronto, Ontario
M7A 1A1

Hôtel du gouvernement
Queen's Park
Toronto (Ontario)
M7A 1A1

Welcome to Ontario!
The 15th Annual International Symposium on Forecasting
Sheraton Centre Hotel, Toronto
June 4 to 7, 1995

I extend a warm welcome to all of you taking part in this symposium. Special greetings go to those of you who have travelled a long distance to attend.

Whether you come from near or far, I encourage you to make the time to explore more of our beautiful province and experience our outstanding hospitality.

Home to people from nearly every nation around the world, Toronto is a cosmopolitan crossroads of many cultures. This community of communities offers superb dining, shopping, entertainment and cultural attractions. And within easy travelling distance, you'll find a range of things to amuse and amaze you. You can visit Niagara Falls, experience the charm of small towns in the countryside or discover untouched wilderness -- just to mention some of the options. There's a lot to choose from, and you can be sure that every choice is the right choice!

I wish each of you a successful and productive conference. Enjoy your visit with us, and come back again soon!

A handwritten signature in dark ink, appearing to read "Bob Rae".

Bob Rae





Barbara Hall
Mayor

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Dear Friends,

On behalf of my colleagues on City Council, it is a pleasure to welcome to Toronto the delegates attending the **International Symposium on Forecasting**.

We are delighted that Toronto was selected to host your event, for Torontonians like nothing better than entertaining visitors. As one of the world's most liveable cities, Toronto combines the energy and excitement of a dynamic urban centre with the friendliness and civility of a small town. Our downtown core is healthy and thriving, our neighbourhoods are flourishing, and our streets are clean and safe.

Most of Toronto's distinctive characteristics can be attributed to our ethnic and cultural diversity. With our rich multicultural heritage, Toronto is one of the few cities in the world where virtually anyone can feel comfortable, no matter how far from home.

Whether you are a frequent, or first-time visitor to our city, we sincerely hope each of you will take the time to experience the many attractions Toronto has to offer.

Best wishes for an enjoyable stay in our city and a successful event.

Yours truly,

Mayor

ISF 95 ORGANIZING COMMITTEE

GENERAL CHAIR

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GENERAL INFORMATION

REGISTRATION

The Symposium registration area is location and times are listed below for your convenience.

Location: by Civil Ballroom

Hours:	Sunday, June 4	3:00pm - 7:30pm
	Monday, June 5	7:30am - 4:00pm
	Tuesday, June 6	7:30am - 4:00pm

BADGES

Your name badge serves as a pass for all program sessions, exhibit displays, refreshment breaks, luncheons and conference events.

Please wear your badge at all times while in the convention areas.

CONTINENTAL BREAKFASTS AND COFFEE BREAKS

Continental Breakfast will be available Monday, Tuesday and Wednesday in the Windsor Room each morning from 7:00am to 9:00am. Coffee and tea will be available during the morning and afternoon breaks in the corridor outside of the session rooms.

IIF/IABF STAFF

Members of the Organizing Committee will be available throughout the Symposium to provide help and can be identified by the White Badges.

Blue Badges will be worn by Directors of IIF.

Exhibitors can be identified by Red Badges.

All conference attendees are encouraged to approach both Organizing Committee Members and Directors with suggestions for IIF and future ISF Conferences.

MESSAGE CENTER

A bulletin board will be located in the registration area for personal messages, phone announcements, program changes, and related information.

ADDITIONAL COPIES OF PROGRAM BOOK

Additional copies of this Program Book may be purchased at the registration desk for \$20.00. After the conference, copies may be purchased for \$30.00 (US) by contacting:

Dr. Stuart Bretschneider
Center for Technology & Information Policy
Syracuse University - The Maxwell School
400 Eggers Hall
Syracuse, NY 13244-1090

Please use bank draft, international money order, postal cheque, check drawn on a US bank payable to the International Institute of Forecasters.

OFFICIAL HOTEL

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POINTS OF INTEREST IN TORONTO

There is a Special Desk for Companion Programs and Tours available in the Sheraton Centre Lobby. The Special Desk is staffed at all times and will happily provide information on the Toronto sites and events.

Additional information on the sites, shops, and restaurants is available through the hotel. Please take advantage of the hotel staff's expertise on Toronto points of interest.

EXHIBITORS

AUTOMATIC FORECASTING SYSTEMS

FEATURING: Autobox
ADDRESS: PO Box 563
Hatsboro, PA 10040
USA
CONTACT: David Reilly

BUSINESS FORECAST SYSTEMS

FEATURING: Forecast Pro
ADDRESS: 68 Leonard Street
Belmont, MA 02178
USA
CONTACT: Eric Stellwagen

DELPHUS

FEATURING: Peer Planner
ADDRESS: 103 Washington Street, Suite
348
Morristown, NJ 07960
USA
CONTACT: Hans Levenbach

DEMAND SOLUTIONS/IDS SYSTEMS

FEATURING: Demand Solutions, PC
software for Demand
Management and Distribution
Planning.
ADDRESS: 1425 Bayview Avenue, Suite
104
Toronto, Ontario
CANADA
CONTACT: Jack Gow

ELSEVIER SCIENCE PUBLISHERS BV

FEATURING: Textbooks, publications and
is the publisher of the
International Journal of
Forecasting.
ADDRESS: 655 Avenue of the Americas
New York, NY 10010
CONTACT: Ms. Sandra Pierre-Lys

GREYSTONE SOFTWARE

FEATURING: Logol
ADDRESS: 1340 Copperstone Circle
Chesapeake, VA 23320
USA
CONTACT: Sean Gorman

**INTERNATIONAL INSTITUTE OF
FORECASTERS**

FEATURING: Membership information to
the IIF.
ADDRESS: Syracuse University
The Maxwell School
400 Eggers Hall
Syracuse, NY 13244-1090
CONTACT: Stuart Bretschneider

**INTERNATIONAL SYMPOSIUM ON
FORECASTING 1996
ISTANBUL, TURKEY**

FEATURING: Conference information for
the 1996 symposium.
Address: ISF-96 General Chair
Sciences de l'Administration
Universite Laval, Ste-Foy
Quebec, PQ G1K-7P4
CANADA

ISF-96 Program Chair
School of Business & Mgmt.
Temple University
Philadelphia, PA 19122
USA
Contact: Muhittin Oral, General Chair
Celal Aksu, Program Chair

SMART SOFTWARE

FEATURING: SmartForecasts
ADDRESS: 4 Hill Road
Belmont, MA 02178
USA
CONTACT: Charles Smart

JOHN WILEY & SONS

FEATURING Text books and publications
in Statistics, Economics and
Forecasting.
ADDRESS: Baffins Lane
Chichester, West Sussex
PO19
ENGLAND
CONTACT: Martin Vicars

PRE-CONFERENCE WORKSHOP

A practical workshop of forecasting methods will be held prior to the conference program. The all-day session will be held from 9:00am to 4:00pm on Sunday, June 4 at the Sheraton Centre Hotel. The workshop will be both theoretical and practical, focusing on the relationship of alternative forecasting models leading to model selection. A unified approach will like extrapolative models (ARIMA), models using auxiliary series and the multiple time series methods.

PRESENTERS:

David Reilly
Automatic Forecasting Systems
PO Box 563
Hatsboro, PA 10040
USA

Celal Aksu
Temple University
School of Business & Management
Philadelphia, PA 19122
USA

LOCATION:

to be announced

TIME:

Sunday, June 4, 1995
9:00am - 4:00 pm

COST:

\$200.00 (Canadian)

COMMITTEE MEETINGS

DIRECTORS

Sunday, June 4, 1995
1:00pm - 3:00pm
Room: Conference G

EDITORS & ASSOCIATE EDITORS

Sunday, June 4, 1995
3:00pm - 5:00pm
Room: Conference G

KEYNOTE ADDRESS: SPYROS MAKRIDAKIS

CHAIR: J. Scott Armstrong, *Marketing Department, Wharton School, University of Pennsylvania, Philadelphia, PA 19104, USA*

MONDAY, JUNE 05, 1995

8:00AM - 8:50AM

ROOM: ESSEX BALLROOM

FORECASTING: ITS ROLE AND VALUE FOR PLANNING AND STRATEGY

Spyros Makridakis, *INSEAD, Technology Management, Boulevard de Constance, 77305 Fontainebleau Cedex, FRANCE*

Long-Term predictions are indispensable for planning and strategy. Yet little is known about their value, their limitations or the most appropriate way of making and using them. This paper examines these issues and proposes two approaches to long-term forecasting while illustrating their use to planning and strategy. The first approach consists of identifying and extrapolating critical long term trends while assessing their impact on society and firms. The second approach studies the analogy of the industrial and information revolutions and the specific consequences of the five most important inventions of the industrial revolution in terms of the consequences of similar ones of the information revolution. The paper concludes by advocating that much needs to be done to integrate forecasting, on the one hand, and long-term planning and strategy on the other if we want to increase the ability of organizations to anticipate important forthcoming changes, as well as their consequences, and successfully adapt themselves to these changes and the opportunities as well as the dangers associated with them.

SPYROS MAKRIDAKIS



Following the attainment of a place in the Greek Sailing Team in the Olympics of 1960, Spyros Makridakis set sail for New York University from where he obtained a Ph.D. in 1969. Since then he has advised numerous international organizations and government agencies and consulted

worldwide with companies such as AT&T, Motorola, American Express, Aussedat Rey, L' Air Liquide and Seagram. Spyros has held teaching and research positions with several European and American institutions; as a research fellow with IIM Berlin, an ICAME fellow at Stanford University and a visiting scholar at MIT and Harvard. Makridakis is now a Research Professor at INSEAD. His present research is concerned with the implication of technological, competitive and other changes on work and management; and, in particular, the types of strategies business organization will need to adopt and implement in order to survive and prosper in the remainder of this century and the 21st century.

In addition to teaching and consulting expertise, Makridakis has also authored or co-authored eighteen books including *Forecasting Methods for Management* (Wiley) which is now in its 5th edition and has sold more than 120,000 copies in twelve languages. Professor Makridakis has written close to 100 articles and papers in various publications and was also the founding chief editor of the *Journal of Forecasting* and the *International Journal of Forecasting*. His latest books are *Forecasting, Planning and Strategy for the 21st Century* and *Single Market Europe: Opportunities and Challenges for Business*.

KEYNOTE ADDRESS: LILIAN SHIAO-YEN WU

CHAIR: Hans Levenbach, *Delphus Inc., 103 Washington St., Suite 348,
Morristown, NJ 07960, USA*

MONDAY, JUNE 05, 1995 12:30PM - 1:30AM ROOM: CIVIC BALLROOM

TECHNOLOGY FORECASTING: FORESIGHT AND PLANNING

*Lilian Shiao-Yen Wu, IBM Thomas J. Watson Research Center, Yorktown
Heights, NY, USA*

This talk will center on recent experiences serving on President Clinton's Committee of Advisors on Science and Technology (PCAST). The include serving on the PCAST Critical Technologies Panel and the PCAST Fusion Review Panel.



Lilian Shiao-Yen Wu is a member of the research staff at the IBM Thomas J. Watson Research Center, Yorktown Heights, NY, USA. She is also a member of President Clinton's Committee of Advisors on Science and Technology; a member of the National Research Council Committee on Women in Science and Engineering; and Director of the International Institute of Forecasters.

KEYNOTE ADDRESS: ALAN L. PORTER

CHAIR: Stuart Bretschneider, *Center for Technology & Information Policy, Syracuse University - The Maxwell School, 400 Eggers Hall, Syracuse, NY 13244-1090, USA*

TUESDAY, JUNE 06, 1995 8:00AM - 8:50AM ROOM: ESSEX BALLROOM

TECHNOLOGY OPPORTUNITIES ANALYSIS; PROFILING THE EMERGENCE OF NOTEBOOK COMPUTERS

Alan L. Porter, ISyE, Georgia Tech, Atlanta, GA, 30332-0205, USA

“Technological intelligence” is a prime requirement for successful technology management. A particular challenge arises in extracting helpful information for the vast quantities of data becoming available. Our Technology Opportunities Analysis Knowbot (TOAK) helps analyze electronic database information to profile emerging technologies. Application of TOAK to monitor and forecast developments in notebook computers will be illustrated.

ALAN L. PORTER



Alan L. Porter's major concentration is technology forecasting and assessment. He received a BS in Chemical Engineering from Caltech (1967) and a Ph.D. in Engineering Psychology from UCLA (1972). He served on the University of Washington faculty through 1974. In 1975 he joined the School of Industrial & Systems Engineering at Georgia Tech, where he now serves as Professor. He also is professor of Public Policy and directs

the Technology Policy and Assessment Center at Georgia Tech. From 1991 to 1993 he was Acting Director of Georgia Tech's Management of technology Program. He has authored some 150 professional publications.

Current interests focus on technology opportunities analysis, in particular, computer-aided exploration of information resident in electronic databases. Recent projects have studied telework, electronic delivery of service, office automation, computers in R&D, and indicators of international technology. He has consulted with Search Technology Inc. on the Air Force "Designer's Associate" project, and is collaborating with them to integrate technology opportunities analysis into a program management package for the Advanced Research Projects Agency (ARPA).

Dr. Porter is Associate Editor of *Technology Analysis & Strategic Management* and for *Information and Decision Technologies*. He co-founded the International Association for Impact Assessment and served it variously as editor of the *Impact Assessment Bulletin*, Secretary, Executive Director, and President-Elect (1994-95). He has served as chairman, Engineering and Public Policy Division, American Society for Engineering Education; chairman, Technology Forecasting and Technology Transfer Committee, Institute of Electrical and Electronics Engineers; representative to the Engineering Section, American Association for the Advancement of Science; and member, NAS/NAE Committee on National Research Council Research Associates Career Outcomes. He serves on the Bellcore Advisor Council.

KEYNOTE ADDRESS: PETER SCOVELL

CHAIR: Stuart Bretschneider, *Center for Technology & Information Policy, Syracuse University - The Maxwell School, 400 Eggers Hall, Syracuse, NY 13244-1090, USA*

WEDNESDAY, JUNE 07, 1995 8:00AM - 8:50AM ROOM: ESSEX BALLROOM

TECHNOLOGY OPPORTUNITIES ANALYSIS; PROFILING THE EMERGENCE OF NOTEBOOK COMPUTERS

Peter Scovell, NORTEL North America, 185 Corkstown Road, Nepean, Ontario K2H 8V4, CANADA

Predicting the appropriate telecommunications technologies to exploit requires a great deal of time, energy, and careful planning. Northern Telecom supplements the in-house expertise of the research and development subsidiary, Bell-Northern Research, with strategic links to major universities around the world. The knowledge generated from this technology management model is then applied to create leading-edge products and services for tomorrow's global telecommunications networks.

The scope and versatility of these multimedia networks is growing, enabled by the application of advanced technologies that are breaching down traditional barriers of time, distance, and information format. The increasing power of optical fiber, distributed computing, radio, speech recognition, and cell-based switching is redefining the structure and increasing the value of global information networks.

The pervasive changes will enable widely accessible, high-capacity bandwidth at low cost, attracting a host of new product and network service providers. As a result, we are on the threshold of very exciting era in which people will be able to transmit, access, and manage information - on a global basis - in virtually an form.

PETER SCOVELL



Peter Scovell was appointed Vice-President of the Semiconductor Components Group (SCG) for Northern Telecom Limited in 1994. Currently based in Ottawa, Canada, Peter is responsible for an organization that

designs, develops and fabricates leading-edge silicon, optoelectronic and microwave high-speed electronic products, mainly for use in telecommunications systems produced by Northern Telecom. SCG employs 2,200 people in its operations in Canada, Europe and the United States.

Prior to his current assignment, Peter was Managing Director of SCG's Optoelectronics organization in Paignton, England (1993-94). Between 1991-92, he was the Vice-President of Advanced Systems and technologies within Bell-Northern Research in Ottawa.

Peter joined Northern Telecom in 1990 as Assistant Vice-President, Wireless Development, for an organization that is now part of SCG operations in Ottawa. For the 13 years previous, he had held various management positions with STC PLC, a British electronics and telecommunications company acquired by Northern Telecom in 1991.

Peter was granted a doctorate degree in theoretical physics for England's Leeds University in 1976. He is married with two children.

SCHEDULE OF EVENTS

DATE

TIME

SESSION

ROOM

MONDAY, JUNE 05, 1995

8:00AM - 8:50AM	KEYNOTE: Spyros Makridakis	Essex Ballroom
9:00AM - 10:30AM	1 Global Forecasting	Peel
	2 Forecasting and Recessions	Conference D
	3 Neural Networks I: Price Forecasting	York
	4 Evaluating Forecasts	Conference C
	5 Business Forecasting	Conference E
	6 Managing Forecasts	Conference B
	7 ARIMA Models	Conference F
	8 Analysts' Earnings Forecasts	Conference G
1:00AM - 12:30PM	9 Forecasting for the Federal Government	Conference C
	10 The Millennium Project	Peel
	11 Neural Networks II: Exchange Rate Forecasting	York
	12 Bayesian Models	Conference D
	13 Co-Integration Methodology	Conference E
	14 Forecasting and Seasonality I	Conference B
	15 Applications I	Conference F
	16 Kernel Method	Conference G
12:30PM - 1:30PM	KEYNOTE LUNCHEON: Lilian Wu	Civic Ballroom
2:00PM - 3:30PM	17 Business Cycles	Peel
	18 Judgmental Forecasting	Conference D
	19 Forecasting in the Labor Market	Conference E
	20 Neural Networks III: Time Series I	York
	21 Forecasting and Seasonality II	Conference B
	22 What Should Forecasters Know? (Panel Discussion)	Conference C
	23 Time Series Forecasting I: Sampling Based Bayesian Methods	Conference F
	24 Forecasting on the Internet	Conference G

4:00PM - 5:30PM	25	Non-linear Models	Conference A
	26	Interest Rates	Conference D
	27	Choosing Projects: Forecasting Benefits	Peel
	28	Time Series Forecasting II	Conference E
	29	What Should a Business Forecaster Know?	Conference C
	30	VAR Forecasting Models	Conference F
	31	Forecasting and Seasonality III	Conference B
	32	Predicting Trends	Conference G
	33	Neural Network IV: Time Series II	York

TUESDAY, JUNE 06, 1995

8:00AM - 8:50AM	KEYNOTE: Alan L. Porter		Essex Ballroom
9:00AM - 10:30AM	34	What Should an Academic Forecaster Know?	Conference C
	35	ARMA Models and Box-Jenkins	Conference D
	36	Forecasting Tourism	Peel
	37	Time Series Forecasting III: Disaggregation of Multiple Time Series	Conference E
	38	Forecasting in the Insurance and Lending Markets	Conference F
	39	Neural Networks V: Applications I	York
	40	Forecasting Needs for Population-Based Planning	Conference G
	41	Forecasting for the Supply Chain	Conference B
11:00AM - 12:30PM	42	Applications II	Conference D
	43	Improving Forecasting I	Conference C
	44	Technological Forecasting I	Conference F
	45	Time Series Forecasting IV: Seasonal Time Series	Conference E
	46	Regional Forecasting I	Peel
	47	Neural Networks VI: Applications II	York
	48	Judgmental Forecasting II	Conference G
	49	Forecasting and Quality Control	Conference B
12:30PM - 1:30PM	LUNCHEON		Civic Ballroom
2:00PM - 3:30PM	50	Scenario Analysis and Strategic Planning	Conference D
	51	Improving Forecasting II	Conference B
	52	Forecasting Demand	Conference E
	53	Forecasting Exchange Rates I	Conference F
	54	Regional Forecasting II	Peel
	55	Time Series Forecasting V	York

	56	Healthcare Forecasting	Conference G
	57	Financial Forecasting	Conference C
4:00PM-5:30PM	58	Forecasting Energy Consumption	Conference D
	59	Forecasting Exchange Rates II	Conference E
	60	Macro-economic Models	Conference F
	61	Technological Forecasting II	Peel
	62	Time Series Forecasting VI: Selecting and Evaluating Models	York
	63	Improving Forecasting III	Conference B
	64	Forecasting Software to Support Operations & Production	Conference C
	65	What Should a Government Forecaster Know?	Conference G

WEDNESDAY, JUNE 07, 1995

8:00AM - 8:50AM	KEYNOTE: Peter Scovell		Essex Ballroom
9:00AM - 10:30AM	66	Forecasting the Hungarian Economy	Windsor Room East
	67	Forecasting Consumption	Windsor Room West
	68	Forecasting Inflationary Cycles	Conference G
	69	Business Forecasting - Best Practices	York
	70	Fuzzy Forecasting	Norfolk
	71	ARMA Models	Conference B
	72	Forecasting Stocks	Conference C
	73	Probabilistic Forecasting I: Quantitative Methods	Peel
11:00AM - 12:30PM	74	Economic Forecasting Stream: UK Models	Windsor Room East
	75	Energy Forecasting	Windsor Room West
	76	Demand Forecasting	Norfolk
	77	Applications III	Conference G
	78	What Should a Forecaster Know?	Conference C
	79	Advertising Effects Forecasting	York
	80	Teaching Forecasting: A View from Varying Perspectives	Conference B
	81	Probabilistic Forecasting II	Peel
12:30PM - 1:30PM	FAREWELL RECEPTION		Windsor Room

PANELS AND DISCUSSION SESSIONS

DATE TIME	SESSION	ROOM
MONDAY, JUNE 05, 1995		
11:00AM - 12:30PM	10 The Millennium Project	Peel
2:00PM - 3:30PM	22 What Should Forecasters Know? (Panel Discussion)	Conference C
	24 Forecasting on the Internet	Conference G
4:00PM - 5:30PM	29 What Should a Business Forecaster Know?	Conference C
TUESDAY, JUNE 06, 1995		
9:00AM - 10:30AM	34 What Should an Academic Forecaster Know?	Conference C
4:00PM - 5:30PM	64 Forecasting Software to Support Operations & Production	Conference C
	65 What Should a Government Forecaster Know?	Conference G
WEDNESDAY, JUNE 07, 1995		
11:00AM - 12:30PM	78 What Should a Forecaster Know?	Conference C
	80 Teaching Forecasting: A View from Varying Perspectives	Conference B

PRACTICE ORIENTED SESSIONS

DATE TIME	SESSION		ROOM
MONDAY, JUNE 05, 1995			
9:00AM - 10:30AM	5	Business Forecasting	Conference E
	6	Managing Forecasts	Conference B
2:00PM - 3:30PM	24	Forecasting on the Internet	Conference G
	29	What Should a Business Forecaster Know?	Conference C
TUESDAY, JUNE 06, 1995			
9:00AM - 10:30AM	41	Forecasting for the Supply Chain	Conference B
11:00AM - 12:30PM	49	Forecasting and Quality Control	Conference B
4:00PM - 5:30PM	64	Forecasting Software to Support Operations & Production	Conference C
	65	What Should a Government Forecaster Know?	Conference G
WEDNESDAY, JUNE 07, 1995			
9:00AM - 10:30AM	69	Business Forecasting - Best Practices	York

11 NEURAL NETWORKS II: EXCHANGE RATE FORECASTING

CHAIR: Mirko Novak, *Institute of Computer Science, 18207 Prague 8, Pod vodarenskou vezi 2, CZECH REPUBLIC*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: YORK

11.1 THE ECONOMIC VALUE OF NEURAL NETWORK SYSTEMS FOR EXCHANGE RATE FORECASTING

Christian L. Dunis, *Vice President, Chemical Bank, 125 London Wall, London EC2Y 5AJ, UK*

The development in nonlinear modeling spans a wide range of approaches, from formalizing chartist techniques to Artificial Neural Networks (ANNs), from ARCH/GARCH processes to chaotic dynamics.

Combined with extensive databanks and the greater availability of powerful computers, these new techniques make it now possible to devise systems that can help take and manage risk positions in different asset markets.

This paper investigates the application of ANNs to high frequency forecasting of the following exchange rates: the GBP/DEM, the DEM/FRF, the DEM/ITL, the USD/DEM, the USD/CHF and the DEM/JPY.

For benchmarking purposes, our models results are compared to those of two naive linear models. They are evaluated not only on the basis of their respective forecasting accuracy, but also on the basis of their economic significance. i.e. the models are also tested by means of a trading strategy.

We briefly describe the principles of ANNs, the data preprocessing that they require and the success we have had in training them to forecast the direction and magnitude of movements of our exchange rate series.

In the last years, the value of neural nets in the modeling of economical dynamics has been studied by a lot of authors. The basic paradigm is to identify the dynamical system only by observed data. This program is limited by the small number of training data relative to the complexity of a market dynamics. In the last years a lot of mathematical techniques have been developed to identify high dimensional nonlinear system by a relative small number of noisy data. On the other hand one can add new information to the model building process. In this talk a transformation of a Fuzzy rule description of an economical system to a neural net is presented. In this framework we can combine observed data and rule information about the market behavior. On one hand this concept allows the evaluation of common knowledge of a market, on the other hand it leads to specific mathematical problems. Possible solutions are discussed in the talk.

CHAIR: R. C. Souza, *Sistemas, DEE, PUC/RJ, Rua Marques de Sao Vicente 225, Gavea, 22453, Rio de Janeiro, RJ, BRAZIL*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: CONFERENCE D

BVAR MODELING WITH FUNCTIONS OF INPUT-OUTPUT TABLE COEFFICIENTS

Jim Twomey, *Salford University, Technology House, Salford University Business Park, Salford M6 6AP UK*

Neville Topham, *Salford University, Technology House, Salford University Business Park, Salford M6 6AP UK*

Peijie Wang, *Salford University, Technology House, Salford University Business Park, Salford M6 6AP UK*

This paper summarizes the results of our BVAR (Bayesian Vector AutoRegression) forecasting practice in sectoral analysis arena. Functions of the A-matrix of input-output table are formulated to serve as the priors in BVAR modeling. Associating the technical relations between sectors, the coefficients of A-matrix are embedded with worthwhile information and constraints which gives rise to the improvements in the performance of the model. The paper also incorporates an ECM (Error Correction Mechanism) element of cointegration approach, the gains of which, especially in long-run, having been envisaged.

BAYESIAN VECTOR AUTOREGRESSIVE MODEL OF TURKISH ECONOMY

Burc Ulengin, *Istanbul Technical University, Management Faculty, 80680 Macka, Istanbul, TURKEY*

In this paper, we estimated an eight variable Turkish monthly macroeconometric model within the context of Bayesian vector autoregression (BVAR) over the period 1978.01-1993.12. The BVAR macroeconometric model estimated in this paper includes eight variables. Since, the monthly data on real GDP or GNP are not available, we use the available monthly industrial production index.

Employing some forecast accuracy measures we examined forecast performance of the estimated model economy within a quarter. At the second step, using impulse response functions and variance decomposition measures the monthly responses of Turkish key macroeconomics variables to anticipated shocks in policy variables are examined. The model results are compared with the government stabilization program results.

R. C. Souza, *Sistemas, DEE, PUC/RJ, Rua Marques de Sao Vicente 225, Gavea, 22453, Rio de Janeiro, RJ, BRAZIL*

Monica Barros, *Grupo de Sistemas, DEE, PUC/RJ, Rua Marques de Sao Vicente 225, Gavea, 22453, Rio de Janeiro, RJ, BRAZIL*

In this paper we present a Dynamic Bayesian Model for the truncated normal distribution. The classical and static solution to the problem of finding estimators for the parameters of the original normal distribution was treated in the 1950's and 1960's. This paper extends the dynamic formulation of West, Harrison and Migon by considering a distribution which is not a member of the Exponential Family and, in the process, we propose some analytic approximations that lead to "almost" conjugate posterior and predictive distributions. Some real and simulated series are analyzed.

13 CO-INTEGRATION METHODOLOGY

CHAIR: A. Garcia-Ferrer, *Departamento de Analisis Economico: Economia Cuantitativa, Universidad Autonoma de Madrid, Campus de Cantoblanco, 28049 Madrid, SPAIN*

MONDAY, JUNE 05, 1995 **11:00AM - 12:30PM** **ROOM: CONFERENCE E**

13.1 TIME SERIES ANALYSIS OF ICELANDIC INFLATION 1970-1990

Helgi Tomasson, *University of Iceland, Faculty of Econ and Bus Admin, Oddi v/Sturlugotu, IS-101 Reykjavik, ICELAND*

In the period 1970-1990 the Icelandic economy was characterized with high inflation. There has been some demand for short term prediction. A mixture of a regression model and ARMA model on quarterly data is presented. The possibility of cointegrating relations with macroeconomic variables is analysis with the Johansen regression method. The possibility of non-linearity, non-normality and structural breaks are considered.

13.2 FORECASTING DEMAND FOR ELECTRONIC COMPONENTS

Kent Webb, *San Jose State University, 13315 Simon Lane, Los Altos, CA 94022-3229, USA*

This paper applies co-integration techniques to the problem of building a derived demand model for electronic components. Technological development issues are examined in the context of the statistical analysis of data from government and market research sources.

13.3 COINTEGRATION, ERROR CORRECTION MODELS AND FORECASTING: THE U.K. DEMAND FOR MONEY

Alfonso Novales, *Universidad Complutense Campus de Somosaguas, Departamento de Economia Cuantitativa, Pozuelo de Alarcon, 28223 Madrid, SPAIN*

A. Garcia-Ferrer, *Departamento de Analisis Economico: Economia Cuantitativa, Universidad Autonoma de Madrid, Campus de Cantoblanco, 28049 Madrid, SPAIN*

In this paper we take a close look to the practical relevance of the cointegration methodology. As a starting example, we have considered the U.K. demand for money and discussed the use of the cointegration testing and estimation techniques to specify and estimate a money demand function that can be exploitable for optimal policy design. Our conclusions are, for this particular application, mainly negative. The unit roots tests do not conform with the evidence that we get from more basic practices and statistics used in standard ARIMA specifications. Additionally, these, as well as more ad-hoc simple reduced form models used as baseline references, perform better in out of sample short and long terms forecasting.

14 FORECASTING AND SEASONALITY I

CHAIR: Philip Hans Franses, *Econometric Institute, Erasmus University Rotterdam, PO Box 1738, NL-3000 DR Rotterdam, NETHERLANDS*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: CONFERENCE B

RECENT DEVELOPMENTS IN MODELING SEASONALITY

Philip Hans Franses, *Econometric Institute, Erasmus University Rotterdam, PO Box 1738, NL-3000 DR Rotterdam, NETHERLANDS*

In this paper an up-to-date review is given of recent developments in modeling seasonality in economic time series. These developments primarily concern descriptions of seasonal variation with an explicit focus on incorporating seasonality in econometric models instead of removing such variation using some seasonal adjustment method. We review developments in deciding whether seasonality is stochastic or deterministic and developments in periodic parameter models, both for univariate and multivariate time series.

SEASONAL UNIT ROOTS IN DAILY FINANCIAL TIME SERIES

I. C. Andrade

S. H. Thomas

R. J. O'Brien

Andrew Clare, *Brunel University, Department of Economics, Uxbridge, Middlesex UB8 3PH, UK*

According to the Efficient Market Hypothesis (EMH) we should not expect to find deterministic seasonal patterns in asset returns in financial markets, since informed investors will simply exploit this pattern until it disappears. However, there is strong evidence to suggest that equity and bond market returns exhibit a deterministic seasonal pattern at both the monthly and daily frequencies. Since the results from investigations of deterministic seasonality may be misleading in the presence of stochastic seasonality, in this paper we develop tests for seasonal unit roots for daily data by extending the methodology of Hylleberg et al (1990) and Osborn (1990) and apply our tests to UK and US daily stock returns. We also investigate a suggestion by Franses and Romijn (1993) to create a price series for each day of the week and test for cointegration amongst these series. Our results suggest that we can reject the existence of seasonal unit roots at daily frequency in both of these stock market indices using their procedure. Thus, the existence of the weekend effect as documented by French (1980) and others is not due to the existence of seasonal unit roots which have been ignored.

14.3 FORECASTING OF SEASONAL COINTEGRATED PROCESSES

Hans-Eggert Reimers, *Hundestrasse 43/2, D-23552, Lubeck, GERMANY*

In the paper forecasts of seasonal cointegrated models are analyzed using the ML-approach suggested by Lee (1992). The forecasts of seasonal co-integrated models in fourth differences are compared with forecasts of cointegrated models in first differences including seasonal dummies. The comparison is done by means of simulating different seasonal cointegration models basing on a bivariate model from Ahn and Reinsel (1994). For both approaches VAR models are the basis for forecasting. The forecasts are calculated for different specifications lag length and cointegration rank. The squared forecast errors of each component are set in relation to the diagonal elements of the theoretical MSE matrix of the underlying model to obtain results independent from the innovation variances. Our main result of the simulation study is that models in first differences with seasonal dummies forecast smaller errors than the seasonal cointegrated models. They are more robust against specification changes than the latter. Models in fourth differences with more seasonal cointegrating relations than in the underlying model have explosive roots of the AR representation and produce very high forecast errors. This is not affected by the choice of the lag length. Both modeling procedures are applied to the German income-consumption process.

15 APPLICATIONS I

CHAIR: Celal Aksu, *Temple University, School of Business & Mgmt., Philadelphia, PA 19122, USA*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: CONFERENCE F

15.1 HARMONIZED STATISTICAL FORECASTING AND BACKCASTING SALES TAXES: GEORGIA, 1981-1994

Henry Thomassen, *Economic Advisor, State of Georgia, 2709 East Sudbury Ct., Atlanta, GA 30360, USA*

Tracking annual forecasts of state's point-of-sale taxes through monthly collections spurs user interest in antecedent economic behavior. Confidence builds on knowing why forecasts fit. At minimum, officials want backcasts of the differently-driven taxable purchases of households and businesses.

This paper attempts to capture the prospective and the precedent dynamics imbedded in a time series of sales tax collections. The Janus representation begins with a testable stochastic model. Conversion to state-space form suited for specification with a Kalman filter gives the structure dimension. The novelty arises from the simultaneous handling of the observed, what will become observable, and what will never be observed.

The model builds on Georgia's record from 1981 to 1990. Its service in forecasting, backcasting, and interpreting the sales tax path from 1991 to 1994 provides an ex post test. The approach appears practical when tracking fit is not explainable by reported data alone.

15.2 MODELING AND FORECASTING BANK CARD MARKET IN FRANCE: SOME DEVELOPMENTS IN THE USE OF ECONOMETRIC MODELS

Mohsen Hamoudia, *17, Rue des Galons, F-92190 Meudon, FRANCE*

In this paper we intend to describe briefly some developments in modeling and forecasting bank card market (credit and debit cards) in France. At first this paper examines medium to short term forecasts generated by endogenous models. Secondly the paper presents some developments in the use of econometric models including the process of explanatory variables selection. Comparisons of the quality of models and forecasting performance generated by both approaches are elaborated. Lastly the paper explores modeling and forecasting work in the case of market segmentation with specific explanatory variables.

15.3 IDENTIFICATION OF FORECASTING NEEDS FOR COMPETITIVENESS ANALYSIS

Muhittin Oral, *Universite Laval/Dept. des, operations et des systems dec., Faculte des sciences de l'adm., Laval, Quebec G1K-7P4, CANADA*

Celal Aksu, *Temple University, School of Business & Mgmt., Philadelphia, PA 19122, USA*

Competitiveness Analysis is needed at different levels for different purposes. At the national level, it provides insight as to the comparative competitive advantages of nations, whereas at the firm level it is instrumental in positioning the firm vis-à-vis its competitors. At both levels, there are many parameters the values of which are to be estimated or forecasted. This paper provides a framework for identifying such forecasting needs and their methodological implications. Also to be discussed is a research agenda of forecasting to perform a more comprehensive competitiveness analysis.

KERNEL METHOD

CHAIR: P. Geoffrey Allen, *Dept. of Agr. & Resource Econ., Univ. of Massachusetts, 229 Draper Hall, Amherst, MA 01003, USA*

MONDAY, JUNE 05, 1995

11:00AM - 12:30PM

ROOM: CONFERENCE G

COMPARISON OF PROBABILITY FORECASTS FROM THE KERNEL ESTIMATION METHOD AND FROM THEORETICAL DISTRIBUTIONS

P. Geoffrey Allen, *Dept. of Agr. & Resource Econ., Univ. of Massachusetts, 229 Draper Hall, Amherst, MA 01003, USA*

Bernard J. Morzuch, *Dept. of Resource Econ., University of Massachusetts, Amherst, MA 01003, USA*

Electric companies need probabilistic forecasts of the daily electricity peak load one or two months ahead. They use forecasts to schedule generator maintenance so as to equalize the risks of capacity shortfall.

Peak loads are extreme values, whose forecast distributions may come from a variety of parent populations, e.g. Cauchy, gamma or Weibull families. The best fitting distribution varies by month, and previous work has shown that the best fitting distribution is frequently not the best forecasting distribution.

Use of a theoretical distribution limits the number of parameters to estimate, but at the cost of inflexibility. the kernel method has been suggested as a more flexible way to estimate probability density functions but applications, especially of its out-of-sample forecasting performance, have been extremely limited. We compare kernel estimates of peak load forecast distributions with forecast distributions obtained from previous work.

16.2 LOCAL LINEAR KERNEL SMOOTH CONDITIONAL QUANTILES

Keming Yu, *Department of Statistics, The Open University, Walton Keynes Milton Keynes, MK7 6AA England, UK*

Chris M. Jones, *Department of Statistics, The Open University, Walton Keynes Milton Keynes, MK7 6AA England, UK*

Let (X, Y) be a pair of random variables with distribution $F(y|x)$ and $0 < p < 1$. An important concept in apply statistics is that of the p th conditional percentile, $F^{-1}(p|X=x)$ of Y given X defined in terms of conditional distribution $F(y|x)$. Smoothing estimate these conditional percentiles has very important forecasting meaning. Firstly, a 100 per cent $(1-p)$ nonparametric predictive interval always relates to the estimates of $F^{-1}(p/2|x)$ and $F^{-1}(1-p/2|x)$. Secondly, percentiles of a variable Y conditional on another variable X , when plotted against X , can be a more useful descriptive tool for functional form than a grand summary for the average of the distributions. Lastly, reference centile charts are commonly used in the area of medical forecasting-preliminary medical diagnosis to establish whether some measure of interest on an individual lies within a 'normal' range.

This talk presents a rather practical and flexible advance smoothing technique by taking advantage of local linear kernel fit.

17 BUSINESS CYCLES

CHAIR: A. Garcia-Ferrer, *Departamento de Analisis Economico: Economia Cuantitativa, Universidad Autonoma de Madrid, Campus de Cantoblanco, 8049 Madrid, SPAIN*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: PEEL

17.1 USING LONG, MEDIUM AND SHORT TERM TRENDS TO FORECAST TURNING POINTS IN THE BUSINESS CYCLE: INTERNATIONAL EVIDENCE

Ricardo A. Queralt, *Universidad Autonoma de Madrid, Departamento de Analisis Economico, Campus de Cantoblanco, 28049 Madrid, SPAIN*

A. Garcia-Ferrer, *Departamento de Analisis Economico: Economia Cuantitativa, Universidad Autonoma de Madrid, Campus de Cantoblanco, 28049 Madrid, SPAIN*

Based in a Schumpeterian framework the analysis of the business cycles is considered as a sum of short, medium and long term cycles defined for a particular class of unobserved components models. By associating the trend with the low frequencies of the spectrum in the frequency domain, manipulation of the spectral band width will allow us to define subjective length trends with specific properties. In this paper, we will see how these properties can be exploited to anticipate business cycle turning points, not only historically but also in a true ex-ante exercise. The procedure is later applied to the U.S. post-World War II GNP quarterly data, as well to another set of European countries.

17.2 PREDICTING PHASE CHANGES IN THE US BUSINESS CYCLE

Allan Layton, *School of Economics and Public Policy, Queensland University of Technology, GPO Box 2434, Brisbane 4001, AUSTRALIA*

Hamilton (1989) concluded the application of his Markovian regime-switching model to US GNP quarterly growth rates was able to track business cycle dates with reasonable accuracy. The current paper extends this work by applying the quasi-Bayesian version of the regime-switching model (Hamilton 1991) to monthly growth rates of the leading, long-leading and coincident indexes of the US economy which are compiled and published by Columbia University's Center for International Business Cycle Research (CIBCR). Such data are more relevant than US GNP for business cycle dating since it is the coincident index and its components which are used to obtain the officially recognized business cycle chronology, and movements in the leading indicators have been found historically to systematically anticipate phase changes in the US economy. A simple rule applied to the algorithm's regime probabilities for each data point of the coincident index produces a phase chronology which exactly reproduces the turning points of the index produced by the Bry-Boschan (1971) method and which is therefore almost identical to the official US business cycle chronology. In order to simulate 'real time' conditions, the dating algorithm is also applied sequentially to the coincident index, augmenting the index sample period one observation at a time, to see how quickly the last eight business cycle turning points could have been identified. Finally, the regime switching model is applied to both CIBCR's leading and long-leading indexes. This is done using both the entire data sample as well as in 'real time' (for the last eight business cycle turning points). The application of a simple rule to the resultant regime probabilities is found to result in a very reliable advance warning business cycle phase signaling system.

18 JUDGMENTAL FORECASTING

CHAIR: Fred L. Collopy, *Weatherhead School of Management, Case Western Reserve University, Cleveland, OH, USA*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: CONFERENCE D

QUALITATIVE MATRIX FORECASTING AS A STRUCTURED JUDGMENT METHOD FOR RESEARCH

David D. Clarke, *Psychology Department, University of Nottingham, Nottingham, NG7-2RD UK*

Louise Maskill, *Psychology Department, University of Nottingham, Nottingham, NG7 2RD, UK*

Despite the rapid development of forecasting methods and applications in recent years, there is still a relative neglect of qualitative judgmental methods, and of the contribution they can make to substantive research in fields like psychology. Domains that are hard to represent quantitatively, like natural discourse, are now being used as a model for the development of new methods, and as 'toy problems' on which to address the difficulty of forecasting such things as negotiations, and political decisions. A family of qualitative 'matrix-forecasting' methods is now being developed and evaluated, which allow experts systematically to explicate, record, evaluate, re-examine and refine the basis of their predictive judgments. The methods can be adapted to enhance the existing forecasting capabilities of individuals and teams, or to extract regulatory principles from the system under investigation. Empirical studies have also examined the accuracy of these methods; the problems of developing better accuracy metrics for non-numerical predictions; and the selective use of case-historical information for optimal forecasting efficiency.

FORECASTING DEMAND FOR THE PERFORMING ARTS

Fred L. Collopy, *Weatherhead School of Management, Case Western Reserve University, Cleveland, OH, USA*

Those who book the performing arts must generally make commitments well in advance of an event's scheduled occurrence. Typically, they have little historical data available, so forecasts are made judgmentally. This research compares the accuracy of alternative approaches to forecasting demand, including combinations of judgments and the use of simple bootstrapping and decomposition models. Description of a knowledge elicitation process and initial results will be presented.

18.3 ADJUSTING EXPONENTIAL SMOOTHING FOR JUDGMENTAL INTERVENTION

Daniel W. Williams, *12420 Locust Grove Rd., Richmond, VA 23233, USA*

Forecasters sometimes know that planned changes should result in a data series level shift. Lacking a better method, practitioners often lump an estimate of the planned level shift onto the product of an exponential smoothing model. A proposed technique lets the forecaster include level shift information in an exponential smoothing model. Forecasts are made using the technique and other forecast models, and are updated through various simulated level shifts. The study shows improved accuracy and model fitting under some conditions. Guidelines are provided. Other advantages of the proposed technique are: ease of detection when the planned change does not occur, automation of data through final reporting, and ease of adjusting the forecast for new assumptions about the planned change.

FORECASTING IN THE LABOR MARKET

CHAIR: Pami Dua, *Department of Economics, University of Connecticut, Scofieldtown Rd., Stamford, CT 06903, USA*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: CONFERENCE E

NEW TOOLS FOR ANALYZING AND FORECASTING CONNECTICUT EMPLOYMENT AND UNEMPLOYMENT

Pami Dua, *Department of Economics, University of Connecticut, Scofieldtown Rd., Stamford, CT 06903, USA*

Stephen M. Miller, *Department of Economics, University of Connecticut, Storrs, CT 06269, USA*

We develop coincident and leading employment indexes for the Connecticut economy. Four employment-related variables enter the coincident index while five employment-related variables enter the leading index. The peaks and troughs in the leading index lead the peaks and troughs in the coincident index by an average of 3 and 9 months. Finally, we use the leading index to forecast employment and unemployment.

MODELING REPLACEMENT DEMAND: A RANDOM COEFFICIENT APPROACH

Ed Willems. *Research Centre for Education and the Labor Market, University of Limburg, PO Box 616, 6200 MD Maastricht Netherlands, NETHERLANDS*

Replacement demand due to retirement, (temporary) withdrawals of women owing to birth and child fostering, occupational mobility, etc. is an important element of the future demand for newcomers on the labor market. It is however often neglected in manpower forecasting studies. In this paper we develop a flow model with which we can forecast the replacement demand at a detailed level of occupations and types of education. The essential element of the model is the determination of the yearly outflow coefficients for each occupation or type of education, and distinguished by age category and gender. Instead of applying a fixed coefficient approach (Willems and De Grip, 1993), we will specify equations that can explain the flow patterns. Further, we introduce the random coefficient estimation technique in the model. This technique takes the reliability of the parameters explicitly into account. If a specific parameter estimation is unreliable, it will tend towards the mean value for that age category over the occupations or types of education. This means that the element of judgmental forecasting can be considerably reduced and it will be shown that this will lead to much more robust replacement demand forecasts.

19.3 FORECASTING EDUCATIONAL OUTFLOW PER TYPE OF EDUCATION

Astrid Matheeuwsen, Research Centre for Education and the Labor Market, University of Limburg, PO Box 616, 6200 MD Maastricht, NETHERLANDS

Lex Borghans, ROA, PO Box 616, Maastricht 6200 MD, NETHERLANDS

In manpower forecasting, in which the future labor market prospects of different types of education are forecasted, the expected demand for new entrants to the labor market and the future supply are brought together. The expected supply of new entrants onto the labor market consists for a large extent of the flow of school-leavers who will enter the labor market. For this purpose official outflow projections, which are made at a high level of aggregation, have to be broken down into the outflows for different types of education. The two main problems in making such projections are that trends in outflow coefficients might be overwhelmed by yearly independent differences, and that available time series are rather short. In this paper several models will be considered to analyze and forecast the outflow ratios from this point of view. These models, including a state space model and a pooled model are formulated, estimated (with maximum-likelihood) and compared. Based on the results of these estimations a rule-of-thumb for the projection of these outflow ratios is formulated.

20 NEURAL NETWORKS III: TIME SERIES I

CHAIR: C. Lee Giles, *NEC Research Institute, 4 Independence Way, Princeton, NJ 08540, USA*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: YORK

20.1 LEARNING CONDITIONAL PROBABILITY DISTRIBUTIONS FOR NOISY TIME SERIES

John Taylor, *The Center for Neural Networks, Kings College, Strand, London WC2R2LS, UK*

D. Husmeier, *The Center for Neural Networks, Kings College, Strand, London, WC2R2LS, UK*

D. Allen, *The Center for Neural Network, Kings College, Strand, London, WC2R2LS, UK*

The problem of learning conditional probability distributions for noisy time series is described, and a universal two-layer architecture deduced. All moments of the distribution are shown to be obtainable from the weights of the associated neural network, and a training algorithm developed from maximum likelihood. Examples of applications are given to show the effectiveness of the method, and comparison to other neural net approaches to the problem noted. The framework is extended to allow a general theory of model comparison based on the Bayesian approach.

RECURRENT NEURAL NETWORKS: MODELS FOR TIME SERIES?

C. Lee Giles, *NEC Research Institute, 4 Independence Way, Princeton, NJ 08540, USA*

Neural networks have become fashionable and useful as models for time series analysis and prediction. We discuss one of the most powerful of neural net models-dynamically driven recurrent neural networks-and how appropriate they are for time series modeling. For these neural nets we discuss training and knowledge extraction issues. We also give examples of recurrent net usage on some typical time series.

NON-LINEAR TIME SERIES FORECASTING- A RECURRENT NEURAL NETWORK APPROACH

Farhad Kamangar, *416 Yates St., 300, CSE, Nedderman Hall, University of Texas at Arlington, Arlington, TX 76006, USA*

Vasudev Rangadass, *2623 Tillman Drive, Arlington, TX 76019, USA*

The application of recurrent neural network models to the problem of non-linear time series forecasting will be investigated. Traditional forecasting methods do an adequate job of forecasting if the future values of the series mimic its past values and the relationship between the past and future is linear and the series stationary.

But real systems are dynamic, complex, iterative and non-linear. Preliminary results have shown that recurrent neural networks make a powerful tool for identifying and predicting systems that exhibit the above four characteristics.

In the paper the n-step ahead prediction capability of these networks will be shown in comparison to the neural networks like the back propagation and other forecasting methods such as Box and Jenkins and Kalman filtering. Simple non-linear models with non-Gaussian distributions will be used as data sources for simulation. Real world applicability will be demonstrated with stock market data.

21 FORECASTING AND SEASONALITY II

CHAIR: Philip Hans Franses, *Econometric Institute, Erasmus University Rotterdam, PO Box 1738, NL-3000 DR Rotterdam, NETHERLANDS*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: CONFERENCE B

21.1 TIME SERIES ANALYSIS WITH A CLASS OF DYNAMIC NON-LINEAR STATISTICAL MODELS

Ralph Snyder, *Monash University, Dept. of Econometrics, Wellington Rd., Clayton, VIC 3168, AUSTRALIA*

Keith Ord, *Pennsylvania State Univ., College of Business Admin., 303 Beam Bab, University Park, PA 16802, USA*

Anne B. Koehler, *Dept. of Decision Sciences, Miami University, Oxford, OH 45056, USA*

A class of dynamic, non-linear, statistical models is introduced for the analysis of univariate time series. A distinguishing feature of the models is their reliance on only one primary source of randomness: a sequence of IID normal disturbances. It is established that the models are conditionally Gaussian. This fact is used to define a conditional ML method of estimation and prediction. A particular member of the class is shown to provide the statistical foundations for the multiplicative Holt-Winters method of forecasting. This knowledge is exploited to provide a method for computing prediction intervals to accompany the more usual point predictions obtained from the multiplicative Holt-Winters method. The methods of estimation and prediction are evaluated by simulation. They are illustrated with an application to Canadian retail sales.

21.2 FORECASTING SEASONALLY COINTEGRATED SYSTEMS: AGRICULTURAL SUPPLY RESPONSE IN AUSTRIA

Adusei Jumah, *Federal Institute of Agricultural Economics, Vienna, AUSTRIA*

Robert M. Kunst, *Institut für Höhere Studien und, wissenschaftliche Forschung, Stumpergasse 56, Vienna A- 1060, AUSTRIA*

This paper examines the relevance of incorporating seasonality in agricultural supply models. Former studies have eliminated the problem of seasonality by using seasonally adjusted data. Recent developments in cointegration techniques allow modeling error-correcting structures in agricultural supply in the presence of seasonality. This paper forecasts Austria pig supply using seasonal data and demonstrates the effects of seasonal cointegration structures on prediction.

MODELING FIXED INVESTMENT AND THE PERIODIC STRUCTURE OF THE BUSINESS CYCLE

John Wells, *Department of Economics, Auburn University, Auburn, AL 36849-5242, USA*

The behavior of fixed investment spending has important implications for the performance of the economy and macroeconomic theory. Fixed investment is considered a leading economic indicator by the NBER, it is essential for economic growth, and plays a central role in several theories of the business cycle. Despite this significance, little research has been conducted on non-seasonally adjusted fixed investment. The importance of studying unadjusted data in this context stems from the finding that there is a seasonal pattern in business cycle durations and that turning points are unequally distributed throughout the year (see Ghysels 1994). Using unadjusted data on leading economic variables may allow one to exploit the periodic nature of the business cycle to predict turning points and the length of recessions. In contrast, seasonally adjusting data smooths away this potentially useful information and may distort the autocorrelation structure of the data. With these points in mind, this paper examines the short run and long run behavior of unadjusted fixed investment for the US and its relationship to other economic variables. We find that fixed investment can be modeled as seasonally cointegrated or periodically cointegrated with GNP. We test the error correction models resulting from these specifications against one another, with special attention given to their abilities to forecast turning points.

SEASONAL ADJUSTMENT WHEN MOVING SEASONALITY IS PRESENT

Brajendra C. Sutradhar, *Department of Mathematics and Statistics, Memorial University of Newfoundland, St. John's NF A1C 5S7, CANADA*

Economic time series are often presented in seasonally adjusted form so that the underlying short term trend can be more easily analyzed and current economic conditions can easily be assessed. The main problem of seasonal adjustment, however, arises from the fact that for most economic series, the seasonal patterns change over time. There are two different approaches available for seasonal adjustment. One is the X-11 ARIMA ad hoc procedure based on linear smoothing techniques that apply asymmetric moving average filters. The second approach is the "model-based" approach, resting on the application of signal extraction theory extended to cover certain kinds of non-stationary seasonal models. The purpose of this article is to examine the suitability of these approaches in seasonal adjustment when the changing seasonality is deterministic or stochastic or mixed. The paper also deals with tests for moving seasonality in the original or de-trended economic time series.

22 WHAT SHOULD FORECASTERS KNOW? (PANEL DISCUSSION)

CHAIR: Herman Stekler, *Dept. of Economics, George Washington University, Washington, DC 20052, USA*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: CONFERENCE C

22.1 WHAT SHOULD FORECASTERS KNOW?

Herman Stekler, *Dept. of Economics, George Washington University, Washington, DC 20052, USA*

Peg Young, *Office of Inspector General 54B1, Dept of Veterans Affairs, 810 Vermont Ave, NW, Washington, DC 20420, USA*

Roy A. Batchelor, *Dept. of Banking and Finance, City University Business School, Frobisher Crescent/Barbican Center, London, EC2Y-8HB, UK*

Allan Ginsberg, *AT&T Consumer Products*

Spyros Makridakis, *INSEAD, Technology Management, Boulevard de Constance, 77305 Fontainebleau Cedex, FRANCE*

Interest has been expressed in a certification program for forecasters. In such a program it would be necessary to determine the criteria for certification. Accordingly, ISF-95 will devote a number of sessions to exploring this topic from different perspectives. This panel, which is the first on this subject, will present the views of individuals who have been actively involved in a variety of forecasting activities; academic writing, business forecasting, consulting, and government analyzes.

The panel will examine some of the skills that a forecaster should possess. These include awareness of techniques, contextual knowledge, organizational awareness, evaluation procedures and their uses, and an understanding of the forecasting process, for example.

These topics will be explored in greater depth in the discussion sessions of this track, with each session devoted to a different perspective; business forecasting, prediction in the government, and the role of the academic forecasting community. A representative from each of the discussion sessions will present a report of that group's principal findings at the final plenary session in this track.

23 TIME SERIES FORECASTING I: SAMPLING BASED BAYESIAN METHODS

CHAIR: Nalini Ravishanker, *Department of Statistics, University of Connecticut, U-120, 196 Auditorium Rd., Storrs, CT 06269, USA*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: CONFERENCE F

23.1 BAYESIAN ANALYSIS OF MULTIVARIATE ARFIMA PROCESSES WITH APPLICATION TO COASTAL SEA-SURFACE TEMPERATURE IN CENTRAL CALIFORNIA

Bonnie K. Ray, *Department of Mathematics, New Jersey Institute of Technology, Newark, NJ 07102, USA*

Nalini Ravishanker, *Department of Statistics, University of Connecticut, U-120, 196 Auditorium Rd., Storrs, CT 06269, USA*

We present a general framework for Bayesian inference of concurrent time series exhibiting both long and short memory behavior. Each individual series is modeled by an autoregressive fractionally integrated moving average (ARFIMA) process and we also incorporate a contemporaneous correlation structure between the series in order to model the interdependence between them.

To facilitate a sampling based Bayesian approach, we derive the joint posterior density for the parameters in a form that is computationally feasible and use a modified Gibbs sampling algorithm to generate samples from the complete conditional distribution associated with each parameter. The procedure is illustrated using daily sea surface temperatures measured at three locations along the central California coast. These series are strongly interdependent due to similarities in local atmospheric conditions at the different locations and have been previously found to exhibit long memory when studied individually.

Our approach will enable us to investigate the effect of the interdependence between the series on forecasts.

AN EMPIRICAL ANALYSIS OF THE DYNAMICS OF EARNINGS AND POVERTY

John Geweke, Department of Economics, University of Minnesota, 271 19th Avenue, Floor 10, Minneapolis, MN 55455, USA

Michael Keane, Department of Economics, University of Minnesota, 271 19th Avenue, Floor 10, Minneapolis, MN 55455, USA

The goal of this research is to study the income mobility of the low income population, and to determine whether the persistence of poverty is related to the generosity of welfare benefits. Recent advances in Bayesian inference via the Gibbs sampler and data augmentation make it feasible to relax many of the assumptions of earlier models of earnings mobility. Using these methods, it is feasible to undertake Bayesian inference for models with individual random effects, as well as with complex error structures for the time varying error component. The paper uses these methods to produce exact predictive probabilities for future events related to income and poverty, such as the typical duration and number of spells below various income levels. It uses data from the Panel Study of Income Dynamics to form posterior distributions of parameters and latent variables, and predictive distributions, in models of earnings mobility for men.

MONTE CARLO POSTERIOR INTEGRATION IN GARCH MODELS

Andy Pole Caxton Corporation, 667 Madison Avenue, Floor 10, New York, NY 10021, USA

A Monte Carlo scheme is developed for sequential analysis of dynamic GARCH models. The multivariate garch model is extended by including temporally varying co-variances between related time series; the multivariate dynamic linear model by introducing garch structure in the evolution noise. The simulation scheme admits both nonlinear structural relationships and great generality in choice of noise distributions.

A Monte Carlo sample from the joint prior distribution at time t is transformed into a sample from the posterior distribution using a Metropolis algorithm together with density reconstruction using a mixture Dirichlet process model. Evolution is managed by propagating the sample from the time t posterior through the system equation into a sample from the time $t+1$ prior.

The techniques are illustrated with an application to currency exchange rates. Advantages of the sequential scheme over simpler all-at-once schemes are discussed.

24 FORECASTING ON THE INTERNET

CHAIR: Fred L. Collopy, *Weatherhead School of Management, Case Western Reserve University, Cleveland, OH, USA*

MONDAY, JUNE 05, 1995

2:00PM - 3:30PM

ROOM: CONFERENCE G

24.1 FORECASTING ON THE INTERNET

Fred L. Collopy, *Weatherhead School of Management, Case Western Reserve University, Cleveland, OH, USA*

This session is intended to serve as both a tutorial and a discussion of the future of forecasting information on the Internet. We have established a web server to provide material to both researchers and practitioners. We will discuss how to access that material, how to submit material to supplement it, and what other kinds of forecasting-related Internet services might be desirable.

NON-LINEAR MODELS

CHAIR: Xavier De Luna, *Swiss Federal Institute of Technology, DMA-EPFL, 1015 Lausanne, SWITZERLAND*

MONDAY, JUNE 05, 1995

4:00PM - 5:30PM

ROOM: CONFERENCE A

NON-LINEAR PREDICTION: A PARSIMONIOUS FAMILY OF PREDICTORS

Xavier De Luna, *Swiss Federal Institute of Technology, DMA-EPFL, 1015 Lausanne, SWITZERLAND*

The analysis of an observed univariate time series is often undertaken in order to get a prediction of a future event. With this purpose one can fix a class of predictors from which the optimal one will be identified and estimated. The more simple and common choice is the linear family, that is linear combinations of the lags of the series. However, it is well known that considering non-linearities in the lags may improve the prediction. We introduce in this paper a class of non-linear predictors based on polynomials and neural network methodology. These predictors have both advantages of being relatively simple to identify and of introducing non-linearity without increasing the number of estimated parameters by much compared to linear predictors.

THREE NONLINEAR PREDICTORS: A COMPARATIVE STUDY

M. Palus, *Institute of Computer Science, Pod vodarenskou 2, 182 07 Prague, CZECH REPUBLIC*

L. Pecen, *Institute of Computer Science, Pod vodarenskou vezi 2, 182 07 Prague, CZECH REPUBLIC*

P. Klan, *Institute of Computer Science, Pod vodarenskou vezi 2, 182 07 Prague, CZECH REPUBLIC*

Emil Pelikan, *Institute of Computer Science, POD vodarenskov vezi 2, 182 07 Prague 8, CZECH REPUBLIC*

In our study we present three types of nonlinear forecasting models: artificial feedforward neural networks (ANN), a model based on approximation of stochastic differential equation (SDE) and a model based on a convex combination of past observed data created by the known information principle (CCI). We compare the accuracy of these methods on the short-term foreign exchange rate forecasting problem using high frequency data collected from the REUTERS terminal. We also discuss some problems of nonlinear forecasting methodology, including statistical tests of nonlinear behavior of analyzed time series, methods for proper indicator selection, and methods for model validation.

25.3 FORECASTS OF MACROECONOMIC VARIABLES USING NONLINEAR VARs

David Peel, *University of Wales, Dept. of Economics, UWA, Aberystwyth Dyfed 5S423 3D3, UK*

David Byers, *Department of Economics, University College of Wales, Penglais, Aberystwyth, Dyfed SY23 3DB, UK*

A number of studies have found that macroeconomic variables exhibit nonlinearity in conditional mean, a property which linear VARs will fail to capture. In this paper we examine the forecasting performance of nonlinear VARs versus linear alternatives.

26 INTEREST RATES

CHAIR: Roy A. Batchelor, *Dept. of Banking and Finance, City University Business School, Frobisher Crescent/Barbicon Center, London, EC2Y-8HB, UK*

MONDAY, JUNE 05, 1995

4:00PM - 5:30PM

ROOM: CONFERENCE D

A MULTI-COUNTRY ANALYSIS OF INTEREST RATE FORECASTS

Denzil Fiebig, *The University of Sydney, Department of Econometrics, Sydney 2006, AUSTRALIA*

Ronald A. Bewley, *University of New South Wales, School of Economics, Sydney 2052, AUSTRALIA*

Whenever a collection of individual's forecasts are published on a regular basis, there is an incentive to report a forecast that is not too far from the expected range of the remainder of the panel. The loss associated with a forecast being incorrect and significantly different from the panel is potentially far greater than being equally wrong but in the middle of the reported range. Data for five years of monthly forecasts, eight countries and two interest rates with panels of between ten and thirty for each country are used to characterize the problem and assess the accuracy of the forecasts with specific attention paid to the possible asymmetry of the loss function.

INSIDE THE BLUE CHIP FINANCIAL FORECASTS

Roy A. Batchelor, *Dept. of Banking and Finance, City University Business School, Frobisher Crescent/Barbicon Center, London, EC2Y-8HB, UK*

This paper reports results of a survey of the inputs (training, experience, theory, etc.) used by 40 financial forecasters to produce predictions of interest rates and related variables. The paper tests for systematic relationships between inputs and the quality of outputs as measured by forecast bias, accuracy, and rationality.

26.3 AN EVALUATION OF INTERMEDIATE-TERM MARKET-WIDE INTEREST RATE FORECASTS

*Albert E. DePrince, Jr., Middle Tennessee State University, Economics & Finance Dept.
Murfreesboro, TN 37132, USA*

This study evaluates three types of market-wide forecasts: (1) surveys of interest rate forecasts, (2) implied forward rates obtained from the yield curve for U.S. Treasury securities, (3) and the futures market. Forecasts over a one- and two-year forecast horizons are evaluated; rates include those on 3-month eurodollars, 1-year Treasury bills, 2-year Treasury notes, 3-year treasury notes, and the 30-year Treasury bonds.

The study assesses the overall accuracy of and the presence of systematic errors in each forecast variable. Preliminary results show that (1) the implied forward rates are strongly related to the rates prevailing at the time the forecasts were made and (2) the forecasts tend to underforecast high rates and overforecast low rates, but (3) survey (consensus) forecasts seem preferable, on balance, to the forward rates and the futures data, and (4) the term premia seems to account for the systematic errors.

27 CHOOSING PROJECTS: FORECASTING BENEFITS

CHAIR: Robert F. Bordley, *Manager, Portfolio Planning, General Motors Research and Development, Warren, MI 48090-9055, USA*

MONDAY, JUNE 05, 1995

4:00PM - 5:30PM

ROOM: PEEL

EVALUATING POTENTIAL SOCIO-ECONOMIC IMPACTS OF GOVERNMENT-SPONSORED RESEARCH AND DEVELOPMENT: ALTERNATIVE METHODS FOR NEAR-TERM MESSY FORECASTS

Barry L. Bozeman, *School of Public Policy, Georgia Tech, SPP 700 DM Smith Bldg, Atlanta, GA 30332-0345, USA*

Drawing from data compiled in a recent analysis of industries' benefits from interactions with federal laboratories, the study considers the applicability of a variety of approaches to forecasting expected benefits from industry-federal lab R&D partnerships.

PICKING HIGH PAYOFF R & D PROJECTS

Robert F. Bordley, *Manager, Portfolio Planning, General Motors Research and Development, Warren, MI 48090-9055, USA*

General Motors has instituted a system for strategic project selection based on having R&D estimate technical hurdles and potential benefits of a project, management estimating the importance of the potential benefits and internal customers assessing likelihood of implementation. GM's two years of experience with the process reinforces the importance of simplicity and transparency. Forecasting of both future customer and societal needs and technology trends is clearly an important input to the process.

WHAT TO FORECAST? THE CHOICE OF FORECASTING TARGETS IN LARGE INVESTMENT PROJECTS

Seppo Pitkanen, *Dept. of Industrial Engineering, Lappeenranta Univ. of Technology, PO Box 20, SF-53851 Lappeenranta, FINLAND*

The process of evaluating the economic viability of an investment involves the estimation of the cash flow which is related to the operation of the project over a certain life span. An attempt to employ sophisticated techniques of forecasting in order to refine the estimates of all events which may effect the cash flow sounds unbelievable. A clever selection of the aspects to be considered will enable the analyst to use his/her resources in a more efficient way, such that the more crucial aspects will be elaborated more extensively than the less important ones.

The paper shows- with three practical cases- a selective way by which an analyst can introduce forecasting into the process of project evaluation as a tool for reducing the uncertainty of the cash flow.

28 TIME SERIES FORECASTING II

CHAIR: Sara Sjostedt, *Department of Mathematical Statistics, University of Umea, Umea 901 87 SWEDEN*

MONDAY, JUNE 05, 1995

4:00PM - 5:30PM

ROOM: CONFERENCE E

STATE SPACE MODEL REPRESENTATION OF INTEGRATED TIME SERIES AND TREND-CYCLE DECOMPOSITION

Young J. Joo, *Department of Management Science, KAIST, 373-1 Kusong-dong Yusong-gu Taejon, 305-701, KOREA*

Duk Bin Jun, *Department of Management Science, KAIST, 373-1 Kusong-dong Yusong-gu Taejon, 305-701, KOREA*

It has been a common practice to decompose an integrated time series into a random walk trend and a stationary cycle using the state space model. Application of state space trend-cycle decomposition, however, often misleads the interpretation of the model, especially when the basic properties of the state space model are not properly considered. In this study, it is shown that the spurious trend-cycle decomposition, indicated by Nelson (1988), results from the unobservable state space model, and the usual assumption of independent noises in the model results in the parameter redundancy. The equivalent relationships between the ARIMA (1,1,1) process and the state space model of a random walk trend and an AR(1) cycle, when the noises of trend and cycle are generally correlated, are also derived.

FORECASTING MULTIVARIATE TIME SERIES USING LATENT FACTORS

Sara Sjostedt, *Department of Mathematical Statistics, University of Umea, Umea 901 87 SWEDEN*

When forecasting multivariate time series it may be wise to look for a few latent factors having good predictive properties. These factors could be used to forecast the original time series. This ought to give more accurate and robust forecasts than using only the individual components of the multivariate time series. Here the factors are linear combinations of the original time series. Inspired by Stone & Brooks' paper (JRSS B, 1990) on continuum regression, time series factors with maximum autocorrelation (MAF), autocovariance (MAC) and variance (principal components) as special cases are considered. Using bootstrap techniques, some properties are investigated.

29 WHAT SHOULD A BUSINESS FORECASTER KNOW?

CHAIR: Herman Stekler, *Dept. of Economics, George Washington University, Washington, DC 20052 USA*

MONDAY, JUNE 05, 1995

4:00PM - 5:30PM

ROOM: CONFERENCE C

29.1 WHAT SHOULD A BUSINESS FORECASTER KNOW?

Herman Stekler, *Dept. of Economics, George Washington University, Washington, DC 20052, USA*

This session will examine the skills that a business forecaster should possess. These include awareness of techniques, user needs, organizational awareness, etc. The chair will select an individual who will report the substance of the discussions and the group's major findings to the final plenary session of this track.

VAR FORECASTING MODELS

CHAIR: Ken Holden, *The Business School, Liverpool John Moores University, 98 Mount Pleasant, Liverpool, L3 5UZ, UK*

MONDAY, JUNE 05, 1995

4:00PM - 5:30PM

ROOM: CONFERENCE F

EFFECTS OF DIMENSIONAL VECTOR AUTOREGRESSION ON COINTEGRATING RELATIONS

Jean-Pierre Indjehagopian, *ESSEC, Statistics Department, PO Box 105, F-95021 Cergy, FRANCE*

Granger and Engle (1987) have shown that the right specification of the model involves using an error-correction model (ECM) of the cointegrating system when the autoregression time series vector (VAR) is cointegrated of order 1,1 denoted by $c(1,1)$.

Therefore forecasts made from ECM rather than from the VAR on the differenced series which is misspecified. However a major difficulty remains to be ? : How does one modify the cointegrating relations if a cointegrated subvector of the time series vector studied is removed?

This paper examines the effects of removing the cointegrated subvector $c(1,1)$ on the cointegrating relations and on the forecasts made from ECMs. These results are applied to French foreign trade statistics, which are modeled using 8 quarterly import variables and 8 quarterly export variables according to geographic zones (EEC, OECD countries outside the EEC, Eastern European countries, etc.)

EMPLOYMENT CHANGES IN THE UK

Chris Ioannides, *Cardiff Business School, Colum Drive, Cardiff CF1 3EU, UK*
Robert McNabb, *Cardiff Business School, Colum Drive, Cardiff CF1 3EU, UK*

This paper investigates the breakdown of the relationship between output growth and employment growth in the UK over the period 1978-93 using quarterly data. It examines the contribution of the higher moments of the distribution of sectoral employment changes in determining movements in total employment. Data on employment and output for 10 industrial sectors for the period 1978:2 to 1993:4 are used in the study. The analysis we have undertaken is then used to forecast employment changes and these are compared to time series predictions which do not use sectoral information.

FORECASTING WITH UNEQUAL LAG LENGTH VAR MODELS

Sune S. Karlsson, *Stockholm School of Economics, Box 6501, 113 83 Stockholm, SWEDEN*

Mikael Gredenhoff, *Stockholm School of Economics, Box 6501, Stockholm 113 83, SWEDEN*

Vector Autoregressive (VAR) models are popular tools for forecasting. In order to simplify the task of identifying the model it is generally assumed that all variables enter with the same number of lags in all equations. In order to relax this assumption we need a reliable method for identifying VAR models with unequal lag lengths.

This paper uses Monte Carlo methods to compare the forecasting performance of VAR models identified with and without the assumption of equal lag length. This is done both for cases when the true model has equal lag lengths and when the true model has unequal lag lengths.

MONEY GROWTH AND INFLATION: IMPLICATIONS OF REDUCING THE BIAS OF VAR ESTIMATES

Tomas Brannstrom, *Stockholm School of Economics, Box 6501, Stockholm 113 83, SWEDEN*

A bivariate second-order VAR model of M1 growth and inflation is specified and estimated by means of least squares. The bias of the estimated parameters is approximated in three ways (following Tjostheim-Paulsen 1983; Nicholls-Pope 1988; and Brannstrom 1995) and new, bias-reduced estimates are computed. The effects of bias reduction on impulse-response functions, variance decompositions and forecasts are examined.