McGill University
Department of Economics
Econ 662D2: Graduate Econometrics I
Winter 2011
Course outline

Professor: Jean-Marie Dufour

January 5, 2011

This course is a sequel to ECON 662D1 given during the Fall 2011 semester.

The basic textbook is the same, but additional or modified material will be presented in the lectures.

Documents and other material relevant to the course will be available from my web page:

`http://www.jeanmarieedufour.com`
`http://www2.cirano.qc.ca/~dufourj/Web_Site/`

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Lecture hours: Monday 16:05 - 17:25; Wednesday 16:05 - 17:25.
Beginning: January 3, 2011. End: April 8, 2011 (Monday schedule).
Study break: February 21-25, 2011.
Exam period: April 11-28, 2011.
Easter holiday: April 22-25, 2011.
Room: Leacock 109
Office hours: Monday 15:00 - 16:00 and 17:30 - 18:30 (or by appointment)
Teaching assistants: to be determined
TA sessions: to be determined
e-mail: `jean-marie.dufour@mcgill.ca`

Evaluation will be based on 3 elements (percentage refer to the entire year's grade);

1. a mid-term exam (February or beginning of March 2011): 10%;
2. assignments: 7.5%;

3. a final exam (April 2009): 20%;

4. a term paper (due by the last class of April): 25%.

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/) for more information).
L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/).

Recommended text

The main reference for this course is the textbook:

DM2004 Davidson, R. et J. G. MacKinnon (2004), *Econometric Theory and Methods* (ETM), Oxford University Press, Oxford.

BROCKWELL, P.J. and DAVIS, R.A. (1991). Time Series: Theory and Methods, Second Edition. Springer-Verlag, New York. (BD)

HAMILTON, J. (1994). Time Series Analysis. Princeton University Press, Princeton, NJ. (H)

Other books used

Am1985 Amemiya, T. (1985), Advanced Econometrics, Harvard University Press, Cambridge, Massachusetts.

GM1989 Gouriéroux, C. et A. Monfort (1989), Statistique et modèles économétriques, Volumes 1 et 2. Economica, Paris.

GM1995 Gouriéroux, C. et A. Monfort (1995), Statistics and Econometric Models, Volumes 1 and 2. Cambridge University Press, Cambridge, U.K.. English translation of previous book.

Rao1973 Rao, C. R. (1973), Linear Statistical Inference and its Applications, Second Edition, Wiley, New York.

White1984 White, H. (1984), Asymptotic Theory for Econometricians, Academic Press, Orlando, Florida.

BOX, G.E.P. and JENKINS, G.M. (l976). Time Series Analysis, Forecasting and Control. Holden-Day, San Francisco. (BJ)

BROCKWELL, P.J. and DAVIS, R.A. (1996). An Introduction to Time Series and Forecasting. Springer-Verlag, New York. (BD96)

DHRYMES, P. (1998). Time Series, Unit Roots, and Cointegration. Academic Press, San Diego, CA. (D)

ENDERS, W. (1995). Applied Econometric Time Series. Wiley, New York. (E)

FULLER, W.A. (1976). Introduction to Statistical Time Series. Wiley, New York. (F)

ESTIMA (2000). RATS Version 5: User's Guide. Estima, Evaston, Illinois.

GOURIEROUX, C., and MONFORT, A. (l997). Time Series and Dynamic models. Séries temporelles and modèles dynamiques. Cambridge University Press, Cambridge, U.K.. (GM)

GRANGER, C.W.J. and NEWBOLD, P. (l986). Forecasting Economic Time Series, Second Edition. Academic Press, New York. (GN)

LOEVE, M. (1977). Probability Theory (I and II), 4th Edition. Springer-Verlag, New York. (L)

LÜTKEPOHL, M. (1991). Introduction to Multiple Time Series Analysis. Springer-Verlag, New York. (Lu)

MADDALA, G. S. and KIM, In-Moo (1998). Unit Roots, Cointegration, and Structural Change. Cambridge University Press, Cambridge, U.K.. (MK)

MILLS, T.C. (1990). Time Series Techniques for Economists. Cambridge University Press, Cambridge. (M)

MILLS, T.C. (1999).The Econometric Modelling of Financial Time Series. Cambridge University Press, Cambridge, U.K.. (M99)

NELSON, C. (l973). Applied Time Series Analysis for Managerial Forecasting. Holden-Day, San Francisco. (N)

REINSEL, G.C. (1993). Elements of Multivariate Times Series Analysis. Springer-Verlag, New York.

SARGENT, T.J. (l979). Macroeconomic Theory. Academic Press, New York. (S)

WEI, W.S. (1991). Time Series Analysis. Univariate and Multivariate Methods. Addison Wesley, New York.

Course outline

1. Introduction
   (a) Notion of a time series
   (b) Examples of time series
   (c) Objectives and problems of time series analysis
   (d) Model classification
   (e) History of time series analysis
2. Introduction to stochastic processes
   (a) Basic notions
   (b) Hilbert spaces
   (c) Linear and ARMA processes
   (d) Nonstationary processes
3. Prediction
   (a) Correlations and prediction
   (b) Prediction of stationary processes

(c) Prediction of nonstationary processes

4. Descriptive methods

   (a) Graphical analysis
   (b) Empirical distribution analysis
   (c) Transformation and smoothing of time series

5. Statistical methodology

   (a) Linear regression
   (b) Generalized least squares and related topics
   (c) Instrumental variables methods
   (d) Generalized methods of moments
   (e) Multivariate models

6. Construction of ARIMA models by the Box-Jenkins method

   (a) Estimation of the mean, autocovariances and autocorrelations
   (b) Specification (model identification) methods
   (c) Estimation
   (d) Model validation (diagnostic checking)
      i. Analysis of residuals
      ii. Model selection criteria
      iii. Predictive validation (diagnostic checking)
   (e) Seasonal ARIMA models

   (a) Exponential smoothing and ARIMA models
   (b) Aggregation problems

7. Univariate spectral analysis

8. Modeling of tendency and decomposition problems

   (a) Regression models with autocorrelated errors
   (b) Heteroskedasticity-autocorrelation consistent (HAC) methods
   (c) Intervention analysis
   (d) Linear trends and integrated processes
   (e) Unit root tests

(f) Models with unobserved components
(g) Beveridge-Nelson decomposition
(h) Seasonal adjustment
(i) Long memory models

9. Multivariate models

(a) Multivariate time series models
(b) Causality, exogeneity and shocks
(c) Regressions between stationary time series
(d) Transfer functions
(e) Regressions betwen nonstationary time series
i. Spurious regressions
ii. Cointegration
iii. Error-correction models
(f) Vector autoregressions (VAR)
(g) Box-Tiao approach to multivariate ARIMA modeling
(h) ARMAX models

10. Other time series topics

(a) State space models and Kalman filtering
i. ARCH models
ii. Other nonlinear models
iii. Chaos
(b) Expectations modeling
(c) Nonparametric methods
(d) Specification errors and other problems
(e) Forecast analysis

11. Simultaneous equations

12. Discrete and limited dependent variables

13. Testing the specification of econometric models