Web page for Analysis of Financial Time Series, Third Edition
(Ruey S. Tsay, Wiley-Interscience 2010, Probability and Statistics)
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This page contains data sets used and other information about the book.
Most data files are different from those of the first edition.
You may find the book on Amazon, Barnes and Noble, and Wiley.

The main software package used in the book is R:
Other packages used are
SCA (Scientific Computing Associates),
S-Plus with FinMetrics (Insightful)
RATS (Regression Analysis of Time Series).

Further Instructions and some demonstrations for using R and S-Plus
can be found in my teaching web for Business 41202.

Errata of the book.

Solutions to exercises are available for instructors who use
the book as a textbook. Please send request to Kathleen Pagliaro of
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Chapter 1: Financial Time Series and Their Characteristics

Data used in the text:
(1) Daily simple returns of IBM, VW, EW, SP (01/02/70-12/31/08):
(Format: date, IBM, VW, EW & SP): d-ibm3dx7008.txt
(2) Daily simple returns of Intel stock (12/15/72-12/31/08): d-intc7208.txt
(3) Daily simple returns of 3M stock (01/02/70-12/31/08): d-3m7008.txt
(4) Daily simple returns of Microsoft stock (03/04/86-12/13/08): d-msft8608.txt
(5) Daily simple returns of Citi-group stock (03/14/86-12/31/08): d-c8608.txt
(6) Monthly simple returns of IBM, VW, EW, SP (1/26-12/08):
(Format: date, IBM, VW, EW, & SP): m-ibm3dx2608.txt
(7) Monthly simple returns of Intel stock: m-intc7308.txt
(8) Monthly simple returns of 3M stock (02/46-12/08): m-3m4608.txt
(9) Monthly simple returns of Microsoft stock: m-msft8608.txt
(10) Monthly simple returns of Citi-group stock: m-c8608.txt
(11) Monthly 10-yr and 1-yr Treasury constant maturity rates (04/53-02/09):
(Format: year, month, date, rate): m-gs10.txt & m-gs1.txt
(12) Daily exchange rate between U.S. dollar and Japanese yen:

(01/04/00 - 03/27/09): d-jpus.txt
(13) Monthly bond returns (1-12m, 24-36m, 48-60m, 61-120m):
(Format: date, bond returns): m-fama-bonds.txt
(14) Monthly 3-yr and 5-yr Treasury constant maturity rates:
m-gs3.txt and m-gs5.txt
(15) Weekly Treasury Bill rates: w-tb3ms.txt & w-tb6ms.txt

Data sets for Exercises:

1. Daily simple stock returns of American Express, Caterpillar, and Starbucks: d-3stocks9908.txt

2. Monthly simple returns of IBM stock, VW, EW, and S&P: m-gm3dx7508.txt

3. See S&P returns in Problem 2.

4. See American Express stock returns in Problem 1.

5. Exchange rates of Canadian Dollar: d-caus.txt
United Kingdom Pound: d-usuk.txt
Japanese Yen: d-jpus.txt, and
Euro: d-useu.txt versus U.S. Dollar.

R package used: fBasics

Chapter 2: Linear Time Series Analysis and Its Applications

Data sets used in the chapter:
(1) Monthly IBM stock, VW index, EW index and S&P index returns: m-ibm3dx2608.txt
(2) Growth rate of U.S. quarterly real gnp: dgnp82.txt (same as q-gnp4791.txt)
(3) Monthly simple returns of 3M stock: m-3m4608.txt
(4) U.S. quarterly GDP (1947-2008): q-gdp4708.txt
(5) Daily values of S&P 500 index: d-sp55008.txt
(6) Quarterly earnings of JNJ (1960-1980): q-jnj.txt
(7) Monthly simple returns of Deciles 1, 2, 9 & 10: m-deciles08.txt
(8) Weekly 1-yr & 3-yr interest rates: w-gs1yr.txt & w-gs3yr.txt
(9) Daily simple returns of VW and EW indices in: d-ibm3dx7008.txt

Data sets for Exercises:

3. Monthly U.S. unemployment rate: m-unrate.txt

4. Monthly simple returns of Deciles 1, 2, 9, & 10: m-deciles08.txt

5. Daily returns of IBM (Date, IBM, VW, EW & SP): d-ibm3dx7008.txt

6. Demand of electricity in logarithm: power6.txt

7, 8 & 9. Daily returns of IBM, VW, EW & S&P: d-ibm3dxwkdays8008.txt

10,11 & 12. Weekly yields of Moddy's AAA & BAA seasoned bonds:
w-Aaa.txt and w-Baa.txt

13. Monthly returns of EW: m-ew6299.txt

14. Log prices of futures and spot of SP500: sp5may.dat

15. Quarterly GDP implicit price deflator: q-gdpdef.txt

R packages used: fBasics, fUnitRoots, timeSeries (fSeries), TSA

Chapter 3: Conditional Heteroscedastic Models

Data sets used in the text:
(1) Monthly simple returns of Intel stock: m-intc7308.txt
(2) 10-minute FX log returns (Mark-Dollar): exch-perc.txt
(3) Monthly excess returns of the S&P 500 index: sp500.dat
(4) Monthly simple returns of IBM stock in: m-ibmvwew2697.txt & m-ibmvwewsp2603.txt
(5) Daily simple returns of IBM stock, VW, EW, and SP5: d-ibmvwewsp6203.txt
(6) Monthly log returns of IBM stock and S&P 500 index: m-ibmspln.dat
Data for Example 3.4: m-ibmsplnsu.dat
(7) Daily returns of S&P 500 index: d-sp8099.txt

Data sets for Exercises:
5. Monthly simple returns of Intel stock: m-intc7308.txt

6. Monthly simple returns of Merck stock: m-mrk4608.txt

7. Monthly simple returns of 3M stock: m-3m4608.txt

8-10. Monthly simple returns of GM stock & SP500: m-gmsp5008.txt

11-15. Daily simple returns of GM stock and SP500: d-gmsp9908.txt

R package used: fGarch

Chapter 4: Nonlinear Models and Their Applications

Data sets used in the text:
(1) Monthly U.S. civilian unemployment rate(48-09): m-unrate.txt
(2) Daily returns of IBM stock in the file: d-ibmvwewsp6203.txt
(3) Monthly simple returns of 3M stock: m-3m4608.txt
RATS program for smooth TAR: star.rats
(4) Quarterly growth rates of U.S. gnp: q-gnp4791.txt
(5) Weekly 3-month Treasury Bill rates: w-tb3ms7097.txt
(5) Monthly log returns, in percentages, of IBM stock: m-ibmln2699.txt
(6) Monthly EW, VW & IBM returns: m-ibmvwew2697.txt
(6) Quarterly unemployment rates: q-unemrate.txt

R and S commands for Example 4.7 are in nnet-ibm.sor

Data sets for Exercises:
1. Daily returns of JNJ stock: d-jnj9808.txt

2,3,5: Monthly returns of GE stock: m-ge2608.txt

6. Weekly U.S. interest rates:
(a) Treasury 1-year constant maturity rates: w-gs1yr.txt
(b) Treasury 3-year constant maturity rates: w-gs3yr.txt

R packages used: fGarch, TSA

Chapter 5: High-Frequency Data Analysis and Market Microstructure

Data sets used in the text:
(1) IBM transactions data (11/1/90-1/31/91): The columns are date/time, volume, bid quote, ask quote, and transaction price: ibm.txt
(2) IBM transactions data of December 1999. (day. time, price): ibm9912-tp.dat
(3) BA transactions data on December 1, 2008: taq-td-ba12012008.txt
(4) Adjusted time durations between trades (11/01/90-1/31/91): ibmdurad.dat
(5) Adjusted durations in (4) for the first 5 trading days: Positive durations only: ibm1to5-dur.txt
(6) Data for Example 5.2
(a) The ADS file: ibm91-ads.dat
(b) The explanatory variables as defined: ibm91-adsx.dat
(7) Transactions data of IBM stock on November 21, 1990
(a) original data: day15-ori.dat
(b) data for PCD models: day15.dat
data descriptions in file: day15.txt
(8) Daily prices of Apple stock (01/04/1999 - 11/20/2007): d-aapl9907.txt

RATS programs for estimating duration models:
The data file used is ibm1to5-dur.txt
(a) EACD model: eacd.rats
(b) WACD model: wacd.rats
(c) GACD model: gacd.rats
(d) Threshold-WACD model: tar-wacd.rats

Data sets for Exercises:
3. Adjusted durations of IBM stock (11/2/90): ibm-d2-dur.txt

4 & 5. Transactions data of 3M (12/99): mmm9912-dtp.txt

6. Adjusted durations of 3M (12/99): mmm9912-adur.txt

7, 8, 9 & 10. Trade data of Boeing (BA) stock:
(a) taq-td-ba12012008.txt, (b) taq-td-ba12022008.txt, (c) taq-td-ba12032008.txt
(d) taq-td-ba12042008.txt, & (e) taq-td-ba12052008.txt
R scripts: (a) number of trades: hfntra.R, (b) high-frequency returns: hfrtn.R

Chapter 6: Continuous-Time Models and Their Applications

Data sets used in the text:
(1) Daily simple returns of IBM stock in 1998: d-ibmy98.txt
(2) Daily log returns of Cisco stock in 1999: d-csco2007.txt

Source code of a Fortran program for European call and put options based on the simple jump diffusion model discussed in the text: kou.f (You need to compile the program.)

Chapter 7: Extreme Values, Quantile Estimation, and Value at Risk

Data sets used in the text:
(1) Daily returns of IBM stock: d-ibm6298.txt (9190 obs)
(2) RATS programs used in Example 7.3:
(Note: returns used in the example are not in percentages.)
(a) AR(2)-GARCH(1,1): example7-3a.rats
(b) AR(2)-GARCH(1,1)-t5: example7-3b.rats
(3) Daily log returns of Intel stock (Example 7.4): d-intc7208.txt
(4) Data used in Subsection 7.7.8
(a) Mean-corrected daily log returns of IBM: d-ibmln98wm.txt
(b) The explanatory variables on page 294: d-ibml25x.txt

Data sets for Exercises:
1 & 8. Daily returns of GE stock: d-ge9808.txt

2 & 3. Daily returns of Cisco stock: d-csco9808.txt

4. Daily returns of HP and 3 indices: d-hpq3dx9808.txt

5, 6, & 7. Daily returns of Alcoa stock and S&P 500 index: d-aaspx9808.txt

R packages used: evir, nnet, fGarch

Chapter 8: Multivariate Time Series Analysis and Its Applications

Data sets used in the text:
(1) Monthly returns of IBM and S&P 500: m-ibmsp2608.txt
The SCA commands used to analyze the series: sca-ex-ch8.txt
Source code of a Fortran program for multivariate Q-stat: qstat.f
(2) Monthly simple returns of bond indexes: m-bnd.txt
(3) Monthly U.S. interest rates of Example 8.6: m-gs1n3-5301.txt
SCA commands used: sca-ex8-6.txt
(4) Weekly U.S. interest rates (3-m & 6-m): w-tb3n6ms.txt
(5) Log prices of SP500 index futures and shares: sp5may.dat
(6) Pairs trading example: d-bhp0206.txt & d-vale0206.txt

Data sets for Exercises:

1. Monthly returns of MRK et al.: m-mrk2vw.txt

2, 3, & 4. Monthly U.S. interest rates (1 & 10 yrs): m-gs1n10.txt

7. Monthly U.S. interest rates (1-yr & 3-yr): m-gs1n3-5304.txt

R packages used: urca, fUnitRoots

Chapter 9: Principal Component Analysis and Factor Models

Data sets used in the text:

(1) Monthly stock returns of Table 9.1: m-fac9003.txt
(2) Monthly macroeconomic variables: (CPI & CE16): m-cpice16-dp7503.txt
(3) Monthly excess returns of Table 9.2: m-barra-9003.txt
(4) Monthly log returns, in percentages, of IBM, HPQ, INTC, JPM & BAC stocks: m-5clog-9008.txt
(5) Monthly returns of U.S. bond indices: m-bnd.txt
(6) Monthly returns of 40 stocks in Table 9.6: (Company ID, date, return): m-apca0103.txt

Data sets for Exercises:

1. Monthly returns of stocks and S&P index: m-fac-ex-9008.txt

2 Monthly returns of MRK, JNJ, GE, ... & VW index: m-mrk2vw.txt

3. to 6. Monthly simple excess returns: m-excess-c10sp-9003.txt

7. Federal funds rate & IP index: m-fedip.txt

Chapter 10: Multivariate Volatility Models and Their Applications

Data sets used in the text:

(1) HK and Japan daily market indices (Example 10.1):
Data file (714 data pts): d-hkjp0608.txt
Bivariate GARCH programs: hkja-c.rats and hkja-c1.rats
(2) Monthly returns of Pfizer and Merck stocks: m-pfemrk6508.txt
(3) Monthly returns of IBM and S&P 500: m-ibmsp2699.txt
Constant-correlation GARCH program: ibmsp-ex102.rats
Time-varying correlation GARCH: ibmsp-ex102q.rats
Cholesky Decomposition: ibmsp-choles.rats
(4) Daily log returns of S&P 500, Cisco and Intel stocks:
Data (3 columns): d-spcscointc.txt
Time-varying 3-dim GARCH model: cholesky-ex103.rats
(5) Daily exchange rates and stock returns: d-fxsk9904.txt

Data sets for Exercises:

1 - 4: Monthly log returns of S&P 500, IBM and GE stocks: m-ibmhpqsp6208.txt

5, 6: Simple returns of GE, IBM & S&P index: m-geibmsp2608.txt

7, 8, 9: Monthly log returns, in percentages, of S&P 500 index, IBM and GE stocks: m-spibmge.txt

10. Daily log returns of Dell and Cisco stocks: d-dellcsco9099.txt

Chapter 11: State-Space Models and Kalman Filter

Data sets used in the text:

(1) Daily realized volatility series of Alcoa stock: (5m, 10m, 20m) aa-3rv.txt

(2) Monthly excess returns of GM stock: see Table 9.1 of Chapter 9.

(3) Quarterly earnings of Johnson and Johnson: see Chapter 2.

Data sets for Exercises:

2. Realized volatility of Alcoa stock (20m interval): aa-rv-20m.txt

3. Monthly simple excess returns of Pfizer stock and S&P 500 index: m-pfesp-ex9003.txt

5. U.S. producer price index data (January 1947 to November 2009): m-ppiaco4709.txt

Chapter 12: Markov Chain Monte Carlo Methods with Applications

Data sets used in the text:

(1) Change series of weekly US interest rates (3-y & 1-y): w-gs1n3c.txt

(2) Change series of weekly US 3-yr interest rate: w-gs3c.txt

(3) Monthly log returns of S&P 500 index: m-sp500-6209.txt

(4) Monthly log returns of IBM stock & SP 500: m-ibmsp6209.txt

(5) Monthly log index of S&P 500 index: m-sp5-6204.txt

(6) Monthly log returns of GE stock: m-geln.txt

Data sets for Exercises:

4, 6. Monthly simple returns of Ford Motors stock and S&P500: m-fsp6508.txt

5. Daily returns of Cisco stock: d-csco0108.txt

7. Monthly returns of Procter & Gamble stock and VW index: m-pgvw6508.txt

8. Monthly 30-year mortgage rate & 3-month Treasury Bill rate: m-mort3mtb7109.txt