Test 1

In the following $\{\varepsilon_t\}$ denotes a Gaussian White Noise process. Give the name of the respective process $\{Y_t\}$, e.g. and ARIMA(1,1,1) or MA(2).... **(5)**

$$(1) \quad (1-\phi_1 L-\phi_2 L^2)(1-L)Y_t = (1+\theta_1 L+\theta_2 L^2)\varepsilon_t$$
$$(2) \quad Y_t = \frac{1+\theta_1 L}{(1-\phi_1 L-\phi_2 L^2)}\varepsilon_t$$

Which of the following processes $\{Y_t\}$ qualify as unit root processes? Give a short explanation **(15)**!

$$(1) \quad (1-0.7L-0.3L^2)Y_t = \varepsilon_t$$
$$(2) \quad (1-L)Y_t = (1+0.3L)\varepsilon_t$$
$$(3) \quad Y_t = (1-0.4L)^{-1}\varepsilon_t$$
$$(4) \quad Y_t = (1+0.9L^2)(1-L)\varepsilon_t$$
$$(5) \quad Y_t = \frac{(1+0.9L^2)}{1-0.8L-0.1L^2}\varepsilon_t$$

where $\{\varepsilon_t\}$ denotes a Gaussian White Noise process.

Test 2

In the 1970 and 1980, large simultaneous equation models have been popular in modelling macroeconomic processes. What are, from an econometric point of view, the main points of critique against the use of the models. (10)

Test 3

Argue in favor (or against) following statements. Argue True, since....ör "Wrong, as...", respectively.

a) Any finite MA process is stationary and invertible (3)

b) Any AR(1) process can be represented as an MA($infty$) process with absolutely sumable coefficient sequence. (3)

c) Structural VARs circumvent the methodological problems associated with large simultaneous equation models. Hence, to model economic I(1) series, the

best strategy is to model the series in first differences, allow for any contemporaneous interdependence, and estimate the primitive form of the SVAR by OLS (10)

d) Using a Dickey-Fuller test, one tests the null-hypothesis that the series is described as a quite general type of non-stationary process. (5)

e) The Engle-Granger two step method is applicable to model the dynamics of an $n-$variable system where up to $n-1$ cointegrating relations may exist. (5)

f) To estimate an MA(1) maximising the conditional likelihood function is always an appropriate strategy which yields consistent parameter estimates. (5)

Test 4

Propose an univariate stochastic process to model the following economic data. Defend your choice.

a) Daily data of yields of US bonds with maturity of 10 years. (5)

b) DAX index (daily close data) (5)

c) Money stock M3 (de-seasonalized quarterly data) (5)

d) Daily Returns of Daimler Chrysler stock. (5)

e) Log gross domestic product (quarterly de-seasonalized data). (5)

f) Rate of inflation (monthly, de-seasonalized). (5)

Test 4

You task is to set up an econometric model with five economic time series. The first series is the consumer price index for country A, the second is the consumer price index for country B, the third series is the exchange rate (how many units of currency of country one do you get for one unit of the currency of country a), and the fourth and the fifth denotes the gross domestic product (in real terms) of both countries. Your task is to formulate an appropriate econometric model for the dynamics of this five variable system.

There are some priors that should be used for building your model. These are:

i) Allegedly, the series are all generated by an I(1) process.

ii) One, and only one, cointegrating relation exists between the five series and

it is derived from the assumption that the weak form of the purchase power parity hypothesis holds between the two countries.

a) In the first step you want to test whether the I(1) assumption holds. How do you conduct such a test using the Dickey-Fuller test idea? Describe which model you estimate and what null hypothesis, exactly, you are testing using which test statistic. (10)

- Assume that you cannot reject the null-hypothesis that all series are I(1) on a significance level of 1 %. The next step would be to test that there exists one cointegrating relation given by the PPP hypothesis. How do you proceed to test the hypothesis? (10)

- Assume that you cannot reject the hypothesis that one cointegration relation (given by the PPP) holds. How do you proceed? Describe (write down) the econometric specification for which you want to estimate the parameters. How do you conduct the parameter estimation? (10)

Test 5

A researcher has conducted a series of Dickey-Fuller tests to test some time series for stationarity. Your task is to interpret the results.

b) The researcher has estimated the model of the form

$\Delta Y_t =$

$a_0 + \gamma Y_{t-1} + a_2 t + \epsilon_t$

The researcher works under the null hypothesis that the true data generating process is

$Y_t = \mu + Y_{t-1} + \epsilon_t$.

The researcher has computed the estimate $\hat{gamma}$=-0.06. The OLS standard error of the parameter estimate is given by. 0.03. The sample size is 100.

c) Another time series studied by the researcher is the following.

Given this series, what test strategy would you pursue to to test for non-stationarity. What would your estimated model and what would the exact null hypothesis be? Defend your strategy!(5)

d) Additinally, the researcher studies wants to test whether following time series was generated by a (non-)stationary process

Given this series, what test strategy would you pursue to to test for non-stationarity. What would your estimated model and what would the exact null hypothesis be? Defend your strategy!(5)

a) The p-value of the Dickey-Fuller τ statistic computed by the researcher is 0.0001 (we assume that he picked a sensible estimated model and null hypothesis. Interpret the result (5)