

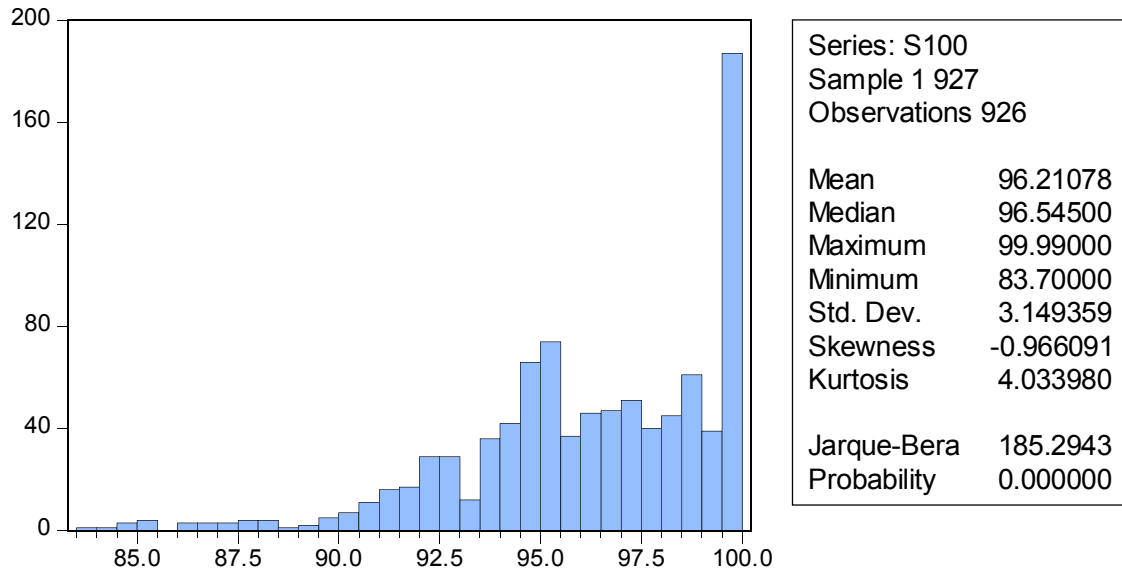
**Masters in Finance**  
**FINANCIAL ECONOMETRICS**  
**Spring 2011**  
**Gerald P. Dwyer**  
**Exam**

The points allocated suggest the time that you should spend on a question. You have 2 hours to complete the exam and 100 total points on the exam.

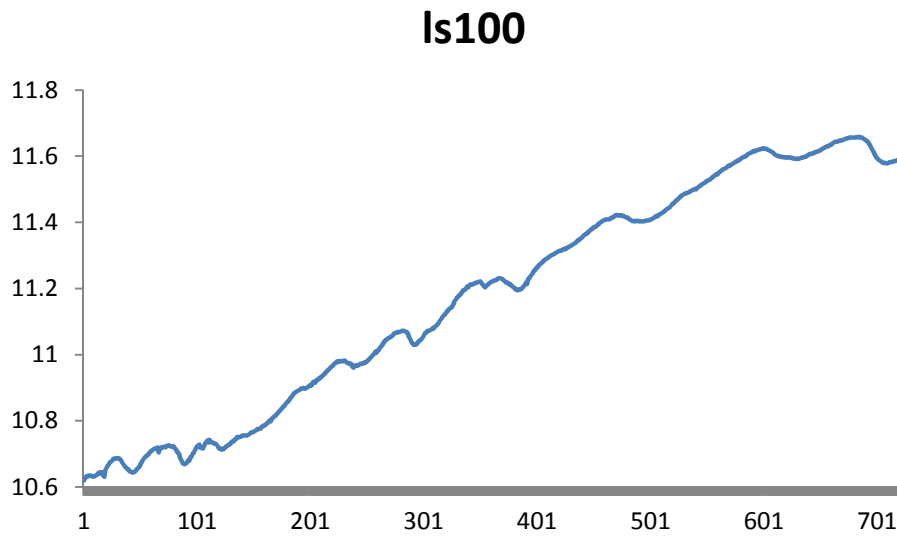
Your grade on all questions will be based solely on your explanation.

No questions are "optional." All questions must be answered to get a grade of 100.

1. (15 points) A colleague shows you the following output from EViews with a graph and descriptive statistics on the series "s100". Briefly, explain what each of the statistics is and what it tells you about s100. Is there anything you see in the graph that is not indicated by the statistics?



2. (25 points) Assertions have been made in the newspaper that the time series in the attached graph – Is100 – has a new trend. From observations 1 to about 600 or maybe about 675, the series indicates growth; the series no longer is growing.
- Being careful about the question of unit roots, outline the statistical tests you would use to determine whether the trend in the series has fallen to zero in the last part of the series.
  - What would you learn from a statistical test that you could not learn by separately computing (i.) the growth rate up to observation 600 and (ii.) the growth rate from observation 600 to the end of the series? These statistics would provide the exact change in the growth rate for these two time periods.



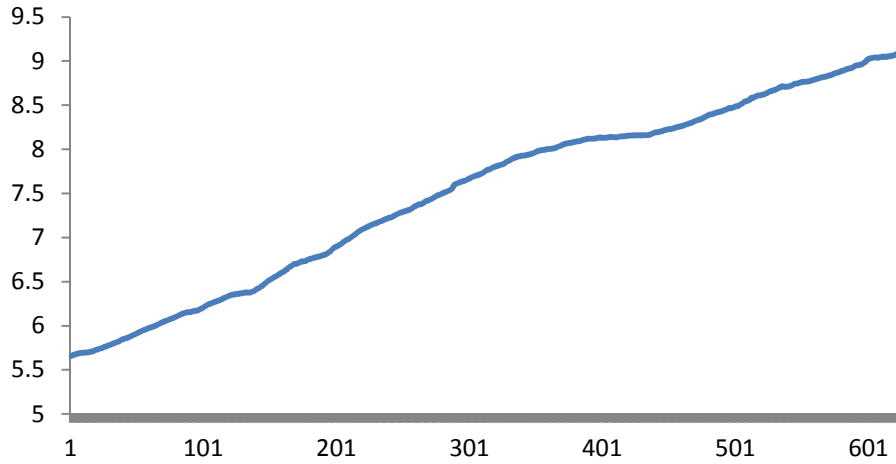
3. (15 points) You estimate a correlogram for a series and get the results below. What univariate time series model or models are suggested by this correlogram? Explain.

Sample: 1 628  
 Included observations: 626

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
*** .	*** .	1	-0.345	-0.345	74.755	0.000
* .	** .	2	-0.099	-0.248	80.969	0.000
. *	. .	3	0.110	-0.022	88.608	0.000
** .	** .	4	-0.210	-0.236	116.38	0.000
. *	* .	5	0.085	-0.084	120.97	0.000
. .	* .	6	0.010	-0.077	121.03	0.000
* .	* .	7	-0.112	-0.152	128.93	0.000
. .	* .	8	0.037	-0.146	129.82	0.000
. *	. .	9	0.087	0.004	134.63	0.000
. .	. .	10	0.012	0.046	134.71	0.000
* .	* .	11	-0.072	-0.080	138.00	0.000
. .	. .	12	0.009	-0.063	138.05	0.000
* .	* .	13	-0.081	-0.138	142.23	0.000
. *	. .	14	0.085	-0.015	146.91	0.000
. .	* .	15	-0.032	-0.094	147.57	0.000
. .	. .	16	-0.021	-0.063	147.87	0.000
. *	. .	17	0.114	0.046	156.26	0.000
* .	. .	18	-0.072	-0.027	159.64	0.000
. .	. .	19	0.002	-0.055	159.65	0.000
. .	. .	20	-0.000	-0.065	159.65	0.000
. .	. .	21	-0.032	-0.019	160.30	0.000
. .	. .	22	0.071	0.035	163.53	0.000
. .	. *	23	0.031	0.080	164.14	0.000
* .	. .	24	-0.072	-0.008	167.54	0.000

4. (15 points) A colleague shows you the series LSER1 in the attached figure. Your colleague also shows you the statistical results of tests for one and two unit roots on the next page.

### LSER1



Does lser1 have one or two unit roots? Explain how you reach that conclusion and which test results are helpful for reaching that conclusion.

Note:  $D(\text{LSER1})$  is the first difference of LSER1.

Null Hypothesis: LSER1 has a unit root  
 Exogenous: Constant  
 Lag Length: 5 (Automatic based on SIC, MAXLAG=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.108696	0.2414
Test critical values: 1% level	-3.440634	
5% level	-2.865969	
10% level	-2.569187	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LSER1 has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 5 (Automatic based on SIC, MAXLAG=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.488722	0.9839
Test critical values: 1% level	-3.972877	
5% level	-3.417060	
10% level	-3.130904	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSER1) has a unit root  
 Exogenous: Constant  
 Lag Length: 4 (Automatic based on SIC, MAXLAG=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.379331	0.0000
Test critical values: 1% level	-3.440634	
5% level	-2.865969	
10% level	-2.569187	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSER1) has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 4 (Automatic based on SIC, MAXLAG=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.719466	0.0000
Test critical values: 1% level	-3.972877	
5% level	-3.417060	
10% level	-3.130904	

\*MacKinnon (1996) one-sided p-values.

5. (15 points) A report examines output and employment, concluding that both have unit roots. You also are presented with the following statistical results for Johansen rank and max-eigenvalue tests. The authors conclude that there is one cointegrating vector between the two series. Do you agree or disagree? Why or why not?

Sample (adjusted): 6 208

Included observations: 203 after adjustments

Trend assumption: No deterministic trend (restricted constant)

Series: LSER1 LSER2

Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.190180	44.86214	20.26184	0.0000
At most 1	0.010002	2.040680	9.164546	0.7696

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.190180	42.82146	15.89210	0.0000
At most 1	0.010002	2.040680	9.164546	0.7696

6. (15 points) A report examines cointegration between two series and finds that there are two cointegrating vectors between the two series. This implies that the two series do not have unit roots. Why?