UNIVERSITY OF COLOMBO, SRI LANKA

FACULTY OF MANAGEMENT AND FINANCE

Bachelor of Business Administration (Level II- Semester VI) Examination 2018

BEC 2209- Financial Econometrics

Two (02) Hours

Answer All Questions

Use of Scientific Calculators is allowed

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1. i. Briefly describe the financial econometrics.

(02 Marks)

ii. What is meant by "Dummy Variable Trap"?

(02 Marks)

iii. Twelve financial institutions which apply one of four Financial Strategies (FS) are named as FS-1, FS-2 , FS-3 and FS-4. Following information is provided.

Institutions	Return	FS
1	11	FS-1
2	13	FS -2
3	10	FS -1
4	07	FS -3
5	10	FS -2
6	10	FS -4
7	08	FS -3
8	11	FS -1
9	09	FS -3
10	08	FS -4
11	08	FS -2
12	09	FS -4

Construct the dummy linear regression model comprising the intercept to study the effect of Financial Strategies on return.

(06 Marks)

iv. Briefly explain the Logistic Regression model

(03 Marks)

v. A researcher expects to study the financial growth of companies according to the companies' age. Age has been categorized in to three levels as less than 5 years, between 5 to 10 years and more than 10 years. They are coded as 1, 2 and 3 respectively. Financial growth is the response variable. It has been coded as High financial growth-1 and Low financial growth-0. Logit model provides the following estimated results.

Dependent Variable: Financial growth

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	1.32	.321	21.908	1	.000	4.345
	Constant	-1.12	.223	31.643	1	.000	.298

a. Variable(s) entered on step 1: Age.

a. Calculate the probabilities of high financial growth if the age of company is between 5-10 years.

(04 Marks)

b. Which information criteria do you apply to select the appropriate logistic model?

(03 Marks)

(Total 20 marks)

2. i. A regression model has been constructed using seven explanatory variables to determine the effect on financial performance. Seventy companies have been taken into the sample and residual sum of square is 325.6. Calculate the AIC and SIC.

(06 Marks)

ii. A researcher needs to determine the effect of individual factors on financial performance of the corporate sector. Selecting 50 listed companies, an analysis has been carried out. Earnings per share (EPS) is the endogenous variable. Board size (B Size), Board Skill (B Skill) and Firm size (F size) are the explanatory variables. Two multiple regression models have been constructed and the following information is given.

Model: 1.

EPS=1.93-1.23B Size +1.16 B Skill +e

Sum of Square of Total and multiple correlations are respectively 1157.163 and 0.186.

Model: 2

EPS=-6.75-1.56 B Size +1.28 B Skill +0.442 F Size +e

Adjusted R Square is 0.015.

Using the Information criteria, select the appropriate model.

(08 Marks)

iii. Government has decided to promote exports in the current year. If a company exports more than one million items the tax is reduced. Information on the income and number of units exported of a company during the last 10 months is provided below. Use the given data set and Construct Piecewise Linear Regression model.

Export income(Rs. Millions)	Export units(Millions)
3	0.30
4	0.35
5	0.40
5	0.80
8	1.10
9	1.20
9	1.50
10	1.52
10	1.60
11	1.70

(06 Marks)

(Total 20 marks)

3. i. Briefly describe the "Granger Causality"

(03 Marks)

ii. Suppose that there are two variables Gross Domestic Product (GDP) and Money Supply (MS). Write an equation for bilateral causality.

(04 Marks)

iii. It is expected to test whether MS causes GDP. Using 50 observations, regression models have been constructed for 3 period of lagged. Residual sum of square restricted (RSS_R) and residual sum of square unrestricted (RSS_{UR}) are 232 and 198 respectively. Test whether MS causes GDP or not at 5% level of significance..

(06 Marks)

iv. Briefly describe the condition to use Restricted and Unrestricted VAR models in econometrics studies?

(02 Marks)

v. What are the critics and advantages of VAR models?

(05 Marks)

vi. When do you use Auto Regressive Distributed Lag (ARDL) model.

(02 Marks)

vii. Vector Error Correction Model (VECM) has been constructed to determine long run equilibrium of GDP, Domestic debt and External debt. Interpret the following results.

Dependent Variable: D(GDP)
Method: Least Squares
Sample (adjusted): 1981 2012
Included observations: 32 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.582624	0.259620	-2.244145	0.0393
C(2)	0.250854	0.135236	1.854941	0.0821
C(3)	0.198529	0.063052	3.148639	0.0062
C(4)	0.319841	0.180720	1.769815	0.0958
C(5)	0.034285	0.177651	0.192988	0.8494
C(6)	0.254077	0.151937	1.672244	0.1139
C(7)	-0.096492	0.148709	-0.648865	0.5256
C(8)	0.147769	0.162885	0.907196	0.3778
C(9)	0.061271	0.126894	0.482854	0.6357
C(10)	-0.040151	0.218625	-0.183653	0.8566
C(11)	-0.399007	0.182815	-2.182565	0.0443
C(12)	0.063040	0.209277	0.301226	0.7671
C(13)	3.61E-06	2.90E-06	1.247008	0.2303
C(14)	-2.98E-06	1.94E-06	-1.539036	0.1433
C(15)	1.16E-06	2.05E-06	0.566739	0.5788
C(16)	0.084719	0.129104	0.656207	0.5210

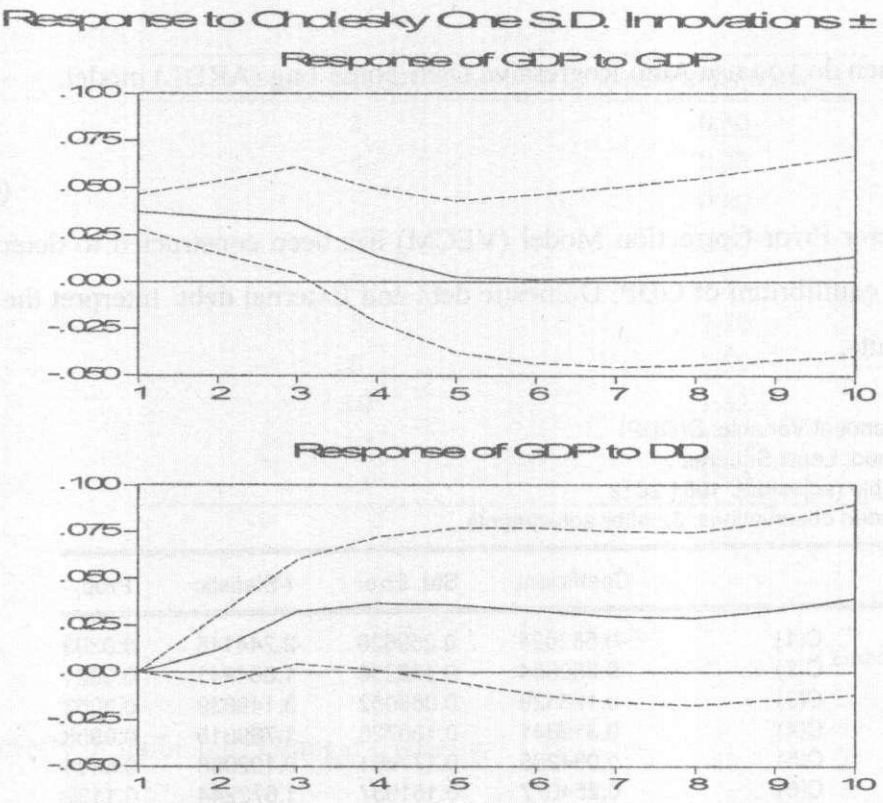
R-squared	0.749128	Mean dependent var	0.137969
Adjusted R-squared	0.513935	S.D. dependent var	0.050610
S.E. of regression	0.035285	Akaike info criterion	-3.543876
Sum squared resid	0.019920	Schwarz criterion	-2.811008
Log likelihood	72.70201	Hannan-Quinn criter.	-3.300951
F-statistic	3.185165	Durbin-Watson stat	2.311027
Prob(F-statistic)	0.013774		

(04 Marks)

viii. What is meant by "Cholesky dof adjusted method"?

(02 Marks)

ix. Interpret the following Impulse Response Functions.



(02 Marks)

(Total 30 marks)

4. i. Explain the volatility clustering of economic and financial data.

(02 Marks)

ii. Why do you use Mean and Variance equations in ARCH family models?

(02 Marks)

iii. A study has been conducted to examine the volatility clustering of return of an industry and the ARCH test for residuals is provided below.

Heteroskedasticity Test: ARCH

F-statistic	10.57459	Prob. F(1,66)	0.0018
Obs*R-squared	9.390479	Prob. Chi-Square(1)	0.0022

What would be your decision about the return?

(03 Marks)

iv. Following table provides GARCH (1, 1) model. Interpret the results.

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Sample: 1 69
Included observations: 69
Convergence achieved after 15 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	23.91561	0.172360	138.7535	0.0000
		Variance Equation		
C	0.171745	0.206710	0.830848	0.4061
RESID(-1)^2	0.215946	0.182151	1.185535	0.2358
GARCH(-1)	0.752524	0.186078	4.044134	0.0001

R-squared	-0.017829	Mean dependent var	24.18130
Adjusted R-squared	-0.064805	S.D. dependent var	2.004453
S.E. of regression	2.068383	Akaike info criterion	3.996987
Sum squared resid	278.0836	Schwarz criterion	4.126500
Log likelihood	-133.8960	Hannan-Quinn criter.	4.048369
Durbin-Watson stat	0.773517		

(04 Marks)

v. Skewness and Kurtosis of the residuals in the above GARCH model are 0.41 and 2.64 respectively. Calculate "Jarque Bera" test statistics and interpret the results.

(04 Marks)

(Total 15 marks)

5. Write short notes on the followings.

   i. Serial correlation

   ii. Log linear Model

   iii. Stationary of data

   iv. Heteroscedasticity

   v. Cointegration

(Total 15 marks)

CRITICAL VALUES for the "F" Distribution, ALPHA = .05.

Denominator DF	Numerator DF									
	1	2	3	4	5	6	7	8	9	10
1	161.448	199.500	215.707	224.583	230.162	233.986	236.768	238.883	240.543	241.882
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845	8.812	8.786
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964
5	6.608	5.786	5.409	5.192	5.050	4.950	4.876	4.818	4.772	4.735
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.060
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.726	3.677	3.637
8	5.318	4.459	4.066	3.838	3.687	3.581	3.500	3.438	3.388	3.347
9	5.117	4.256	3.863	3.633	3.482	3.374	3.293	3.230	3.179	3.137
10	4.965	4.103	3.708	3.478	3.326	3.217	3.135	3.072	3.020	2.978
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849	2.796	2.753
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671
14	4.600	3.739	3.344	3.112	2.958	2.848	2.764	2.699	2.646	2.602
15	4.543	3.682	3.287	3.056	2.901	2.790	2.707	2.641	2.588	2.544
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591	2.538	2.494
17	4.451	3.592	3.197	2.965	2.810	2.699	2.614	2.548	2.494	2.450
18	4.414	3.555	3.160	2.928	2.773	2.661	2.577	2.510	2.456	2.412
19	4.381	3.522	3.127	2.895	2.740	2.628	2.544	2.477	2.423	2.378
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447	2.393	2.348
21	4.325	3.467	3.072	2.840	2.685	2.573	2.488	2.420	2.366	2.321
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397	2.342	2.297
23	4.279	3.422	3.028	2.796	2.640	2.528	2.442	2.375	2.320	2.275
24	4.260	3.403	3.009	2.776	2.621	2.508	2.423	2.355	2.300	2.255
25	4.242	3.385	2.991	2.759	2.603	2.490	2.405	2.337	2.282	2.236
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321	2.265	2.220
27	4.210	3.354	2.960	2.728	2.572	2.459	2.373	2.305	2.250	2.204
28	4.196	3.340	2.947	2.714	2.558	2.445	2.359	2.291	2.236	2.190
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278	2.223	2.177
30	4.171	3.316	2.922	2.690	2.534	2.421	2.334	2.266	2.211	2.165
31	4.160	3.305	2.911	2.679	2.523	2.409	2.323	2.255	2.199	2.153
32	4.149	3.295	2.901	2.668	2.512	2.399	2.313	2.244	2.189	2.142
33	4.139	3.285	2.892	2.659	2.503	2.389	2.303	2.235	2.179	2.133
34	4.130	3.276	2.883	2.650	2.494	2.380	2.294	2.225	2.170	2.123
35	4.121	3.267	2.874	2.641	2.485	2.372	2.285	2.217	2.161	2.114
36	4.113	3.259	2.866	2.634	2.477	2.364	2.277	2.209	2.153	2.106
37	4.105	3.252	2.859	2.626	2.470	2.356	2.270	2.201	2.145	2.098
38	4.098	3.245	2.852	2.619	2.463	2.349	2.262	2.194	2.138	2.091
39	4.091	3.238	2.845	2.612	2.456	2.342	2.255	2.187	2.131	2.084
40	4.085	3.232	2.839	2.606	2.449	2.336	2.249	2.180	2.124	2.077
41	4.079	3.226	2.833	2.600	2.443	2.330	2.243	2.174	2.118	2.071
42	4.073	3.220	2.827	2.594	2.438	2.324	2.237	2.168	2.112	2.065
43	4.067	3.214	2.822	2.589	2.432	2.318	2.232	2.163	2.106	2.059
44	4.062	3.209	2.816	2.584	2.427	2.313	2.226	2.157	2.101	2.054
45	4.057	3.204	2.812	2.579	2.422	2.308	2.221	2.152	2.096	2.049
46	4.052	3.200	2.807	2.574	2.417	2.304	2.216	2.147	2.091	2.044
47	4.047	3.195	2.802	2.570	2.413	2.299	2.212	2.143	2.086	2.039
48	4.043	3.191	2.798	2.565	2.409	2.295	2.207	2.138	2.082	2.035
49	4.038	3.187	2.794	2.561	2.404	2.290	2.203	2.134	2.077	2.030
50	4.034	3.183	2.790	2.557	2.400	2.286	2.199	2.130	2.073	2.026

CRITICAL VALUES for the "F" Distribution, ALPHA = .05.

Denominator DF	Numerator DF									
	1	2	3	4	5	6	7	8	9	10
51	4.030	3.179	2.786	2.553	2.397	2.283	2.195	2.126	2.069	2.022
52	4.027	3.175	2.783	2.550	2.393	2.279	2.192	2.122	2.066	2.018
53	4.023	3.172	2.779	2.546	2.389	2.275	2.188	2.119	2.062	2.015
54	4.020	3.168	2.776	2.543	2.386	2.272	2.185	2.115	2.059	2.011
55	4.016	3.165	2.773	2.540	2.383	2.269	2.181	2.112	2.055	2.008
56	4.013	3.162	2.769	2.537	2.380	2.266	2.178	2.109	2.052	2.005
57	4.010	3.159	2.766	2.534	2.377	2.263	2.175	2.106	2.049	2.001
58	4.007	3.156	2.764	2.531	2.374	2.260	2.172	2.103	2.046	1.998
59	4.004	3.153	2.761	2.528	2.371	2.257	2.169	2.100	2.043	1.995
60	4.001	3.150	2.758	2.525	2.368	2.254	2.167	2.097	2.040	1.993
61	3.998	3.148	2.755	2.523	2.366	2.251	2.164	2.094	2.037	1.990
62	3.996	3.145	2.753	2.520	2.363	2.249	2.161	2.092	2.035	1.987
63	3.993	3.143	2.751	2.518	2.361	2.246	2.159	2.089	2.032	1.985
64	3.991	3.140	2.748	2.515	2.358	2.244	2.156	2.087	2.030	1.982
65	3.989	3.138	2.746	2.513	2.356	2.242	2.154	2.084	2.027	1.980
66	3.986	3.136	2.744	2.511	2.354	2.239	2.152	2.082	2.025	1.977
67	3.984	3.134	2.742	2.509	2.352	2.237	2.150	2.080	2.023	1.975
68	3.982	3.132	2.740	2.507	2.350	2.235	2.148	2.078	2.021	1.973
69	3.980	3.130	2.737	2.505	2.348	2.233	2.145	2.076	2.019	1.971
70	3.978	3.128	2.736	2.503	2.346	2.231	2.143	2.074	2.017	1.969
71	3.976	3.126	2.734	2.501	2.344	2.229	2.142	2.072	2.015	1.967
72	3.974	3.124	2.732	2.499	2.342	2.227	2.140	2.070	2.013	1.965
73	3.972	3.122	2.730	2.497	2.340	2.226	2.138	2.068	2.011	1.963
74	3.970	3.120	2.728	2.495	2.338	2.224	2.136	2.066	2.009	1.961
75	3.968	3.119	2.727	2.494	2.337	2.222	2.134	2.064	2.007	1.959
76	3.967	3.117	2.725	2.492	2.335	2.220	2.133	2.063	2.006	1.958
77	3.965	3.115	2.723	2.490	2.333	2.219	2.131	2.061	2.004	1.956
78	3.963	3.114	2.722	2.489	2.332	2.217	2.129	2.059	2.002	1.954
79	3.962	3.112	2.720	2.487	2.330	2.216	2.128	2.058	2.001	1.953
80	3.960	3.111	2.719	2.486	2.329	2.214	2.126	2.056	1.999	1.951
81	3.959	3.109	2.717	2.484	2.327	2.213	2.125	2.055	1.998	1.950
82	3.957	3.108	2.716	2.483	2.326	2.211	2.123	2.053	1.996	1.948
83	3.956	3.107	2.715	2.482	2.324	2.210	2.122	2.052	1.995	1.947
84	3.955	3.105	2.713	2.480	2.323	2.209	2.121	2.051	1.993	1.945
85	3.953	3.104	2.712	2.479	2.322	2.207	2.119	2.049	1.992	1.944
86	3.952	3.103	2.711	2.478	2.321	2.206	2.118	2.048	1.991	1.943
87	3.951	3.101	2.709	2.476	2.319	2.205	2.117	2.047	1.989	1.941
88	3.949	3.100	2.708	2.475	2.318	2.203	2.115	2.045	1.988	1.940
89	3.948	3.099	2.707	2.474	2.317	2.202	2.114	2.044	1.987	1.939
90	3.947	3.098	2.706	2.473	2.316	2.201	2.113	2.043	1.986	1.938
91	3.946	3.097	2.705	2.472	2.315	2.200	2.112	2.042	1.984	1.936
92	3.945	3.095	2.704	2.471	2.313	2.199	2.111	2.041	1.983	1.935
93	3.943	3.094	2.703	2.470	2.312	2.198	2.110	2.040	1.982	1.934
94	3.942	3.093	2.701	2.469	2.311	2.197	2.109	2.038	1.981	1.933
95	3.941	3.092	2.700	2.467	2.310	2.196	2.108	2.037	1.980	1.932
96	3.940	3.091	2.699	2.466	2.309	2.195	2.106	2.036	1.979	1.931
97	3.939	3.090	2.698	2.465	2.308	2.194	2.105	2.035	1.978	1.930
98	3.938	3.089	2.697	2.465	2.307	2.193	2.104	2.034	1.977	1.929
99	3.937	3.088	2.696	2.464	2.306	2.192	2.103	2.033	1.976	1.928
100	3.936	3.087	2.696	2.463	2.305	2.191	2.103	2.032	1.975	1.927