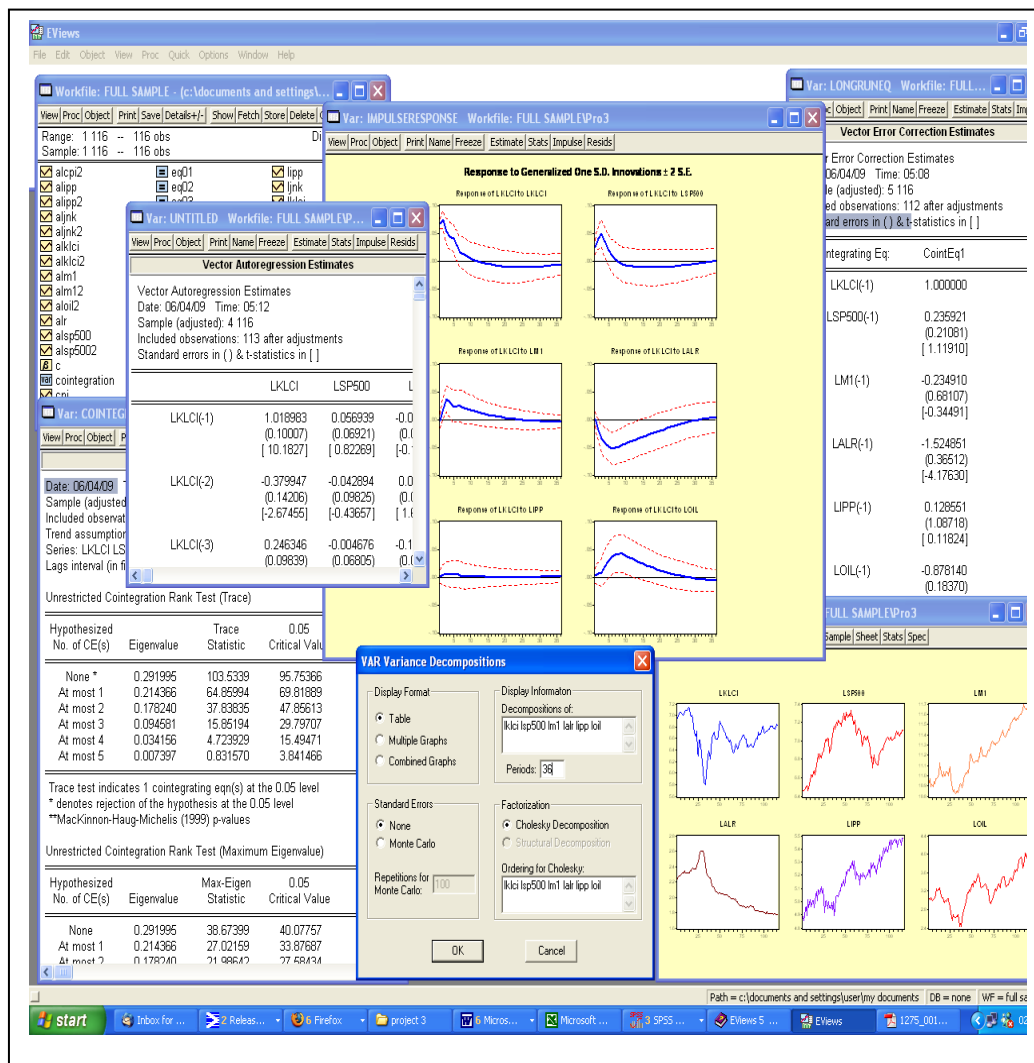# ECONOMETRICS SHORT COURSES

@ COMP LAB 3, SCHOOL OF MATHEMATICAL SCIENCES, USM PENANG

LONG PANEL DATA ANALYSIS

20 (Sat) & 21 (Sun) MARCH 2021

The **OBJECTIVE** of panel course is to introduce participants with core skills in analyzing techniques for time series panel data. Another objective is to introduce participants with techniques for modeling univariate time series

COURSE CONTENTS

LONG PANEL DATA ANALYSIS
✓ Panel Unit Root/Cointegration
✓ Panel ARDL: MG & PMG
✓ Cross Sectional Dependence
✓ Panel VAR, Panel Causality

TIME SERIES DATA ANALYSIS:
✓ Identification: ACF & PACF
✓ ARIMA Models,
✓ GARCH-type Models
✓ Seasonality: SARIMA Models

WHO SHOULD ATTEND

Academics and Graduate Students as well as Researchers, Analysts and Consultants in various business disciplines that may include Private & Public Sector Organizations, Regulatory Authorities, Banks & Financial Institutions.

HANDS-ON & EXERCISE: EVIEWS & STATA

FACILITATORS: Dr Elya Nabila Abdul Bahri (UM)
Dr Zainudin Arsad (USM)

UNIVERSITI SAINS MALAYSIA — USM — APEX

School of Mathematical Sciences

TIME SERIES DATA ANALYSIS

27 (Sat) & 28 (Sun) MARCH 2021

PANEL DATA: COURSE DESCRIPTION / OBJECTIVES

PANEL DATA (also known as longitudinal or cross-sectional time series data) is a dataset in which the behavior of entities is observed across time. These entities could be individuals, companies, states, countries, markets, etc. **Advantages** of using Panel Data over individual time series or cross section data are that it:

- ✓ Creates large dataset & Increases degree of freedom
- ✓ Introduces more variability in data, Improves efficiency of estimates
- ✓ Reduces collinearity, account individual heterogeneity
- ✓ Controlling omitted/missing/unobserved factors

Even though panel data presents considerable advantageous over 1-dimensional cross-sectional or time series data, its analysis requires different treatments. The **OBJECTIVE** of this course is to familiarize participants with panel data structures and equip them with core skills in panel data analyzing techniques. This will be achieved through a combination of short lecturers and hands-on sessions, with greater emphasis on giving participants on experience in handling different data sets.

COURSE OUTCOMES

After completion of this course, participants should be able (or know) to:

- ❖ Elaborate the advantages and limitations of panel data structure
- ❖ Formulate static and dynamic econometric models for panel data estimations
- ❖ Identify potential estimation biases due to heterogeneity in individual characteristic and behaviour
- ❖ Perform empirical analysis, involving construction of models using STATA & EViews
- ❖ Intepret empirical results of static and dynamic single equation panel data models

Traditionally economic panels had large number of cross-section units and relatively few time periods (i.e **Short Panel**) and econometric methods were developed for such large N small T data. More recently panels with observations for a large numbers of time periods (**LONG PANEL**) have become available on cross-section units like Firms, industries, regions or countries. The work of Pesaran (1999) explore the econometric methods developed for such **large N large T** data. Such data and modelling technique allow more explicit treatment of (a) heterogeneity across units (b) dynamics, including unit roots and cointegration and (c) cross-section dependence arising from spatial interactions or unobserved common factors.

Facilitators

DR ELYA NABILA ABDUL BAHRI is a senior lecturer in Department of Economics, Faculty of Economics and Administration, Universiti of Malaya (UM), Malaysia. She holds a PhD in Economics (specialization in Econometrics) from Universiti Kebangsaan Malaysia in 2018. She obtained her Master in Economics in 2010 and Bachelor of Economics in 2003, both from UM.

Dr. Elya has more than 11 years teaching experience in private universities for both undergraduate and postgraduates at Universiti Selangor (UniSel), UniKL, Open University Malaysia, MAHSA University, and UTAR, before joining UM in 2019. Her expertise is in applied econometrics and has extensively used statistical packages such as SPSS, Matlab and R and also econometric packages such as STATA, EViews and Gauss. She is actively involved in conducting workshop, more than 50 econometric workshops since 2016 for cross-section, time series and panel data.

DR ZAINUDIN ARSAD is a senior lecturer in the School of Mathematical Sciences, Universiti Sains Malaysia (USM). He obtained his BSc. in 1994 and Ph.D. in 2002, both from the Department of Actuarial Mathematics and Statistics, Heriot-Watt University in Edinburgh, UK. His area of research is Time Series and Econometric Analysis and main topic of interest is the application of Kalman Filter estimation technique in various financial issues.

Dr. Zainudin is also active in tourism research was a member of Sustainable Tourism Research Cluster (STRC) in USM that receives RM4.2million research grant. He has successfully conducted more than 150 statistical and econometric related short courses since 2009, including in-house training at Malaysia Palm Oil Board (MPOB), IIUM, UiTM, Monash University and Malaysian Communications and Multimedia Commission (MCMC)

LONG PANEL DATA ANALYSIS

DAY 1 : SATURDAY, 20 MARCH 2021

8:15 AM	**REGISTRATION**
8:45 AM	**SESSION 1 – PANEL TIME SERIES: UNIT ROOT & COINTEGRATION**
	▪ Unit Root: Im, Pesaran Shin (IPS); Levin, Lin Chu (LLC); Cointegration: Kao and Pedroni
11:00 AM	**TEA BREAK**
11:15 AM	**SESSION 2 – DYNAMIC HETEROGENEOUS PANELS**
	▪ Mean-Group (MG) and Pooled Mean-Group (PMG), Long-run & Short-run Estimations
12:45 PM	**LUNCH**
2:00 PM	**SESSION 3 – MORE ON DYNAMIC HETEROGENEOUS PANELS**
	▪ More on Panel Cointegration and estimating MG, PMG, Comparison with DFE and DOLS
3:45 PM	**TEA BREAK**
4:00 PM	**SESSION 4 – CROSS-SECTIONAL DEPENDENCY IN PANEL DATA**
	▪ Panel Unit Root & Panel Cointegration with Cross-Sectional Dependency
5:45 PM	**Q & A (SESSIONS 1 - 4)**

DAY 2 : SUNDAY, 21 MARCH 2021

8:45 AM	**SESSION 5 – MORE ON CROSS-SECTIONAL DEPENDENCY IN PANEL DATA**
	▪ Cross-sectional dependency Autoregressive Distributed Lag (CSD-ARDL)
10:30 AM	**TEA BREAK**
10:45 AM	**SESSION 6 – PANEL VAR & PANEL VECM**
	▪ Lag Length Selection, VAR Stability, Panel Cointegration and Maximum Likelihood Estimation,
12:45 PM	**LUNCH**
2:00 PM	**SESSION 7 – PANEL CAUSALITY**
	▪ Panel causality based on VAR and VECM, Heterogenous Panel Causality - Dumitrescu Hurlin
3:45 PM	**TEA BREAK**
4:00 PM	**SESSION 8 – MORE ON PANEL VAR-VECM AND PANEL CAUSALITY**
	▪ More exercises on Panel VAR-VECM and Panel Causality
5:30 PM	**Q & A (followed by CERTIFICATE PRESENTATION at 5.45pm)**

For more information on content of courses and brochure, kindly contact:
Dr. Zainudin Arsad (013-5159571 or zainudin.arsad@usm.my) or Ms. Noor Farhana Fazil (nfarhana.stat17@gmail.com)

Course Fee (including SST)

The fees cover course materials/handouts, luncheons and a Certificate of Attendance.

Group Discount: 20%/10% off is given to registration by a group of 3-6 participants (in bracket, per person)

Course	LONG PANEL DATA ANALYSIS	TIME SERIES DATA ANALYSIS	NORMAL FEE	
Choice	Sat 20 & Sun 21 March 2021	Sat 27 & Sun 28 March 2021	Normal	Student
1	Yes		650 (520)	500 (400)
2		Yes	450 (405)	350 (315)

Accommodation

Recommended nearby hotel is U Hotel (RM175 - RM225, reservation at 04-658-1000, only 300m walk from USM). Alternatively, stay at AC Hotel by Marriott (formerly Vistana Hotel Penang) (RM225 - RM350, reservation at 04-646-8000, 3km from USM, 10mins by taxi. Lower rate during Covid-19 starts at RM165!!!).

Muslims can try to get a room at the USM Pusat Islam (only RM70 per night, limited rooms, enquiry at 04-653-3753). Another possibility is Anggerik Villa (rate starts from RM85 per night, enquiry at 04-656-4428). For other listings please visit www.penang-hotels.com.

TIME SERIES DATA ANALYSIS

DAY 1 : SATURDAY, 27 MARCH 2021

8:15 AM	**REGISTRATION**
8:45 AM	**SESSION 1 – INTRODUCTION TO FUNDAMENTAL CONCEPTS**
	▪ White noise processes; Autocorrelation and Partial Autocorrelation Functions (ACF & PACF)
10:30 AM	**TEA BREAK**
10:45 AM	**SESSION 2 – MODEL IDENTIFICATION**
	▪ Autoregressive (AR), Moving Average (MA) and ARMA processes
12:45 PM	**LUNCH**
2:00 PM	**SESSION 3 – PARAMETER ESTIMATION & MODEL DIAGNOSTICS**
	▪ AIC & BIC; Residual Analysis and Overfitting, ARCH-LM test
3:45 PM	**TEA BREAK**
4:00 PM	**SESSION 4 – MORE ON ESTIMATING ARIMA MODEL & FORECASTING**
	▪ More practices on developing ARIMA model, a look into Forecasting
5:30 PM	**Q & A (SESSIONS 1 - 4)**

DAY 2 : SUNDAY, 28 MARCH 2021

8:30 AM	**SESSION 5 – VOLATILITY MODELS**
	▪ ARCH and GARCH models, EGARCH, GARCH-M, Half-life, Leverage Effect
10:45 AM	**TEA BREAK**
11:00 AM	**SESSION 6 – TIME SERIES REGRESSION**
	▪ Autocorrelation - Detection and Remedy, Durbin-Watson statistic
12:45 PM	**LUNCH**
2:00 PM	**SESSION 7 – SEASONAL TIME SERIES**
	▪ Identification, Estimation and Diagnostic Checking, Seasonal Lags
3:45 PM	**TEA BREAK**
3:45 PM	**SESSION 8 – MORE ON VOLATILITY & SEASONAL TIME SERIES MODELS**
	▪ More hands-on exercises on developing GARCH-type & SARIMA models
5:00 PM	**Q & A (followed by CERTIFICATE PRESENTATION at 5.30pm)**

TIME SERIES: WHY SEPARATE DISCIPLINE?

Time Series data need special care and methods of analyzing due to its unique nature. Unlike most cross-sectional data, time series observations are not independent thus violating classical assumption of many statistical methods including regression. This nature of time series data presents particular problems not normally dealt in most other statistical techniques. The extent of the problems increases with financial time series which are normally trending and exhibit varying level of volatility. **The primary focus of the Time Series course is to introduce appropriate procedure for building and validating an ARIMA & GARCH-type models**. GARCH is a statistical model that can be used to analyze a number of different type of financial data that include macroeconomic data. Financial institutions typically use the GARCH model to estimate the volatility (risk) of returns for stocks, bonds and stock indices.

This course also looks at technique to deal with trending financial data that invalidates the use of traditional OLS multiple regression. The principle behind **time series regression** in dealing with the autocorrelated residuals provides a good foundation for Autoregressive Distributed Lag (ARDL) modelling approach and subsequently for Long Panel ARDL.

The seasonal autoregressive integrated moving average (**SARIMA**) model is useful in situations when the time series data exhibit **seasonality-periodic fluctuations** that recur with about the same intensity each year. This characteristic makes the SARIMA model to be adequate for studies concerning monthly and quarterly data such as normally observed in social economics and environments.

Please scan and email this registration form (together with a copy of LO/PO/transaction slip, if applicable) to:

Noor Farhana Fazil: nfarhana.stat17@gmail.com
School of Mathematical Sciences, Universiti Sains Malaysia, 11800 USM PENANG.

NAME OF SHORT COURSE (Please tick (✓) short course(s) to be attended)

Long Panel Data Analysis	20 & 21 March 2021	Yes		No	
Time Series Data Analysis	27 & 28 March 2021	Yes		No	

Please register the following name/names: (Please use separate sheet, if required)

Item	Name	Designation
*1.		
2.		
3.		
4.		
5.		
Company:		
Address:		
		Postcode:
*Primary Person:		*Mobile Phone:
*Telephone No.:	*Fax No.	*E-mail:

"I hereby agree that the personal data that I have provided to USAINS, whether now or in future, may be used, recorded, stored, disclosed, or otherwise processed by or on behalf of USAINS in accordance with the Personal Data Protection Act 2010 and USAINS' data protection policy (available at USAINS' website - www.usainsgroup.com), for the purpose of facilitation and organisation of this event, research and audit, and maintenance of a participant database for the promotion of this event, and such ancillary services as may be relevant."

MODE OF PAYMENT

I enclose			Number	Bank		
		Crossed Cheque			No. of Participants:	
		Bank Transfer			Research Institution:	
		Cash on Day			Group Discount:	
		LO/PO			Postgraduate Student:	
					Total Sum:	RM
		Payment must be made payable to **'Usains Holding Sdn. Bhd.'**				

1. **Telegraphic Transfer**. Please note the following:
   Payee Name: Usains Holding Sdn. Bhd.
   Details: Short Course on Long Panel Data Analysis OR Time Series Data Analysis
   Name of Bank: AmBank (M) Berhad, Level 21, Menara Dion, Jalan Sultan Ismail, 50250 Kuala Lumpur.
   Account Number: 888 – 100 – 985 – 0380   Swift Code: ARBKMYKL
   (Please SCAN and EMAIL Bank-in Slip (write name & contact number on slip) to nfarhana.stat17@gmail.com

2. Proof of **Local Order (LO) or Purchase Order (PO)** must be scanned/emailed to Dr. Zainudin/Ms. Noor Farhana for confirmation and secure of place, and it must be presented during morning registration.
   The organizer reserves the right to refrain a registered participant from taking part in the event if no proof of payment can be presented. This only applies to registered participants who have NOT paid the registration fee PRIOR to the event date.

Cancellation / Substitution

Cancellation must be made in writing through fax, e-mail or post **at least 10 working days** before the course. No refunds are available after this period. In the case of cancellation, **an administration charge of RM150** will be applied. However, substitute participants are welcomed at no extra charge provided written notice is given to the organizer at **least 5 working days** before the event.

Date:	Company's Official Stamp
Signature:	