Technical Workshop on Advanced Econometrics including Bayesian and Machine Learning Techniques

VENUE: MERCURE HOTEL
AERC, Nairobi, 7 – 18 October 2024
Time: 09:00 – 17:00hrs (GMT+3)

ZOOM LINK	
https://aercafrica-org.zoom.us/meeting/register/tZIoc-2hpjspHtFswxBtlwo1L3fiV8lxxib4	
Meeting ID: 865 4498 0345	**Passcode: 582253**

WORKSHOP AGENDA

TIME	SESSION AND ACTIVITY
	Week I, Day 1: Monday 7 October 2024
	08.30 – 09.00 **Welcome & Opening Session**
	Opening Remarks Dr. Abbi Kedir, Director of Research, AERC Prof. Victor Murinde, Executive Director, AERC
	Session 1: Static Panel Data Analysis
09.00 – 11.00	Introduction to Panel Data Econometrics 1. Panel data description -Long panels vs Short panels -Balanced panels vs Unbalanced panels -Static panels vs Dynamic panels 2. How to prepare data in panel form 3. Things to note when preparing panel data -Data sources, Variable measurement, etc. -Potential sources of panel data for African researchers Interactive Q & A
11:00 –11:30	**Health Break**
11.30 – 13.00	Dealing with Static Panel Data Models [Fixed Effects] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
13:00 –14:00	**Lunch Break**
14.00 – 15.00	Dealing with Static Panel Data Models [Random Effects] -Specification Issues -Estimation Issues -Interpretation Issues -Diagostics for Static Panel Data Models -Class Demonstration Interactive Q& A
15.00 – 16.00	Class Exercise: Based on the panel data provided and the relationship being examined,

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	participants are expected to: 1. Write and implement codes for estimating both Fixed and Random Effects Static Panel Data models 2. Present the results accordingly. 3. Discuss the results Interactive Q& A
16.00 - 16.30	**Health Break**
End of Day 1	Participants to work towards assignments
Day 2: Tuesday 8 October 2024	
Session 2: Dynamic Panel Data Analysis [Short Panels]	
09.00 – 11.00	A Review of Day 1 Lecture Dealing with Dynamic Panel Data Models [Short Panels - Difference GMM Estimator] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13:00	Dealing with Dynamic Panel Data Models [Short Panels - System GMM Estimator] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
13.00 – 14.00	**Lunch Break**
14.00 - 15.00	Diagnostics for Dynamic Panel Data Models [Short Panels] -Hypothesis Testing -Interpretation Issues -Choosing between Difference and System GMM Estimators -Class Demonstration Interactive Q& A
15.00 – 16.00	Class Exercise: Based on the panel data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for estimating Dynamic Panel Data Models using both Difference and System GMM Estimators 2. Present the results accordingly. 3. Discuss the results Interactive Q& A
16.00 - 16.30	**Health Break**
End of Day 2	Participants work on the assignments.
Day 3: Wednesday 9 October 2024	
Session 3: Dynamic Panel Data Analysis [Long Panels]	
09.00 – 11.00	A Review of Day 2 Lecture Dealing with Dynamic Panel Data Models [Long Panels -

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	Mean Group Estimator] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13.00	Dealing with Dynamic Panel Data Models [Long Panels - Pooled Mean Group Estimator] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
13.00 – 14.00	**Lunch Break**
14.00 – 15.00	Diagnostics for Dynamic Panel Data Models [Long Panels] -Hypothesis Testing -Interpretation Issues -Choosing between Mean Group and Pooled Mean Group Estimators -Class Demonstration Interactive Q& A
15.00– 16.00	Class Exercise: Based on the panel data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for estimating Dynamic Panel Data Models using both Mean Group and Pooled Mean Group Estimators 2. Present the results accordingly. 3. Discuss the results Interactive Q& A
16.00- 16.30	**Health Break**
End of Day 3	Participants work on the assignments.
Day 4: Thursday 10 October 2024	
Session 4: Dealing with Nonlinearities in Dynamic Panel Data Analysis	
9.00 -11.00	A Review of Day 3 Lecture Dealing with nonlinearities [asymmetries] in Panel Data analyses [Long Panels - Mean Group Estimator] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13.00	Dealing with nonlinearities [asymmetries] in Panel Data analyses [Long Panels - Pooled Mean Group Estimator] -Specification Issues -Estimation Issues -Interpretation Issues

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	-Class Demonstration Interactive Q& A
13.00 – 14.00	**Lunch Break**
14.00 – 15.00	Diagnostics for nonlinear [asymmetric] Dynamic Panel Data Models [Long Panels] -Hypothesis Testing -Interpretation Issues -Choosing between Mean Group and Pooled Mean Group Estimators -Class Demonstration Interactive Q& A
15.00 – 16.00	Class Exercise: Based on the panel data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for estimating nonlinearities [asymmetries] in long panels. 2. Present the results accordingly. 3. Discuss the results Interactive Q& A
16.00-16.30	**Health Break**
End of Day 4	Participants work on the assignments.
Day 5: Thursday 11 October 2024	
Session 5: Panel Data Threshold Analysis	
09.00 – 11.00	A Review of Day 4 Lecture Dealing with nonlinearities [threshold effects] in Static Panel Data Models -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13.00	Dealing with nonlinearities [threshold effects] in Dynamic Panel Data Models] -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
13.00 –14.00	**Lunch Break**
14.00 – 16.00	Diagnostics for threshold-based Panel Data Models -Hypothesis Testing -Interpretation Issues -Class Demonstration -Class Exercise: Based on the panel data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for estimating Threshold-based Static and Dynamic Panel Data Models 2. Present the results accordingly. 3. Discuss the results Interactive Q& A
16.00-16.30	**Health Break**

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End of Day 5	Participants work on the assignments.
WEEK II: **Day 6: Monday 14 October 2024**	
Session 6: Panel Data Multivariate Analysis	
09.00 – 11.00	A Review of Week 1 Lecture Multivariate Modelling with Panel Data I [Panel VAR Analysis]: -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13:00	Multivariate Modelling with Panel Data II [Panel Causality Analysis]: -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
13.00 – 14.00	**Lunch Break**
14.00 – 16.00	Diagnostics for Multivariate Panel Data Models: -Hypothesis Testing -Interpretation Issues -Class Demonstration -Class Exercise: Based on the panel data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for analyzing Panel VAR and Panel Causality 2. Present the results accordingly. 3. Discuss the results Interactive Q& A
16.00-16.30	**Health Break**
End of Day 6	Participants work on the assignments.
Day 7: Tuesday 15 October 2024	
Session 7: MIDAS Modelling	
09.00 -11.00	A Review of Day 6 Lecture Dealing with Mixed-Data Frequencies in Time Series Modelling and Forecasting [Low-High Frequency mix] -Specification Issues -Estimation Issues -Interpretation Issues Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13.00	Dealing with Mixed-Data Frequencies in Time Series Modelling and Forecasting [High-Low Frequency mix] -Specification Issues -Estimation Issues

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	-Interpretation Issues Interactive Q& A
13.00 – 14.00	**Lunch Break**
14.00 – 16.00	Diagnostics for MIDAS-based models: -Hypothesis Testing -Interpretation Issues -Class Demonstration -Class Exercise: Based on the data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for estimating a MIDAS model with a low-high frequency mix. 2. Write and implement codes for estimating a MIDAS model with a high-low frequency mix. 3. Present the results accordingly. 4. Discuss the results Interactive Q& A
16.00 – 16.30	**Health Break**
End of Day 7	Participants work on the assignments.
Day 8: Wednesday 16 October 2024	
Session 8: Modelling with Bayesian Techniques	
09.00 -11.00	A Review of Day 8 Lecture Modelling with Bayesian Methods: Bayesian Econometrics vs. Classical Econometrics Bayesian Linear Regressions: -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
11.00 – 11.30	**Health Break**
11.30 – 13.00	Bayesian Multivariate Analysis: -Specification Issues -Estimation Issues -Interpretation Issues -Class Demonstration Interactive Q& A
13.00 – 14.00	**Lunch Break**
14.00 – 16.00	Diagnostics for Bayesian analysis: -Hypothesis Testing -Interpretation Issues -Class Demonstration -Recent Developments in Bayesian Analysis -Class Exercise: Based on the data provided and the relationship being examined, participants are expected to: 1. Write and implement codes for estimating Bayesian linear regressions and Bayesian multivariate models. 2. Present the results accordingly. 3. Discuss the results Interactive Q&A

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16.00 -16.30	**Health Break**
End of Day 8	Participants work on the assignments.
	Day 9: Thursday 17, October 2024
	Session 9: Predictability Analysis with Machine Learning Techniques
9.00 - 11.00	A Review of Day 7 Lecture A Review of Machine Learning [ML] Techniques – Supervised, Unsupervised and Reinforcement Linear Models and GLS; lasso; elastic-net; nearest-neighbor; Neural Network; trees; boosting; Random Forest; bagging; Support Vehicle Machine; Kernel Regression; piecewise regression; Series Regression. Practical Illustrations
11.00 – 11.30	**Health Break**
11.30 – 13.00	Further Illustrations with ML Techniques
13.00 – 14.00	**Lunch Break**
14.00 – 16.00	Class Exercise: Based on the data provided and the relationship being examined, participants are expected to: 1. Write and implement ML algorithms for tree regression and random forest. 2. Present the results accordingly. 3. Discuss the results Interactive Q&A
16.00 – 16.30	**Health Break**
End of Day 9	Participants work on the assignments.
	Day 10: Friday, 18 October 2024
	Session 10: Lecture Review, Assessment & Agenda for Future Research Collaboration
09.00 -11.00	Review of All Lectures Interactive Q&A
11.00 – 11.30	**Health Break**
11.30 – 13.00	Presentations by Participants/Groups and Discussion
13.00 – 14.00	**Lunch Break**
14.00 – 16.00	Agenda for research collaboration among the participants for the AERC biannual workshop in 2025/publishing in standard academic journals
16.00 – 16.30	**Wrap up of the Workshop and Closing Remarks.**
End of Day 10	