

STTP - Econometrics phase II

IPS Academy
Institute of Business Management & Research, Indore
is Organizing

AICTE Sponsored Online Short Term Training Program (STTP)

on
ECONOMETRICS

Venue: Virtual Platform- ZOOM, Duration - 6 Days
THERE IS NO REGISTRATION FEES



Phase I
Feb 08- 13, 2021

Phase II
Mar 01-06, 2021

Phase III
May 03-08, 2021

Resource Persons



Dr. C.P. Gupta
Professor, Department of
Finance & Business Economics
University of Delhi



Dr. Ganesh Kawadia
Retired Professor & Ex Head
School of Economics
DAVV Indore



Dr. Pritee Sharma
Associate Professor
Department of Economics
IIT Indore



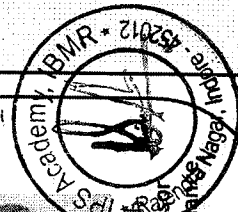
Dr. Joyshankar Bhattacharya
Associate Professor
Economics Area
IIM Indore



Dr. Arindam Laha
Associate Professor
Department of Commerce
Burdwan University, West Bengal



Dr. Kulbir Singh
Associate Professor
Department of Finance
IMT Nagpur



Program Overview

The present workshop aims to impart knowledge of Econometrics and its applications in the context of empirical research in the field of Business, Commerce, Economics, Management and other Social Sciences. To introduce key concepts of Econometrics through hands on experience in using software in concrete management situations. Expose participants to a selected set of econometrics tools that help in taking key management decision in Research/ Industry.

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Program Details

- ❖ Introduction to Econometrics using Software, Basics of Linear Regression and Regression Diagnostics
- ❖ Structural Break, Dummy Variable Model & Difference in Difference Model
- ❖ Time Series Data and Econometrics, Stationarity and Unit Root Test, Granger Causality Test
- ❖ Logit Model, Probit Model & ARIMA Modeling
- ❖ Co-integration and Error Correction Models Volatility Models: ARCH and GARCH
- ❖ Panel Data, Random Effects and Fixed Effects model

Learning Outcomes

On successful completion of this program, participants will be able to:

- ❖ Understand the concept of integration of Mathematics and Economics.
- ❖ To empirically confirm economic theories
- ❖ Apply IT based tools for econometrics analysis.
- ❖ Analyze time series real time data and create forecasting models.

Key Highlights

- No registration fees.
- The number of seats are limited
- This STTP is for faculty members, research scholars, participants from industry.
- The STTP will be conducted in online mode on Zoom platform.
- Participants should have relevant resources viz., laptop/desktop with adequate internet connectivity.
- The participants who have attendance 80% or more and also score minimum 60% in the online test will be issued certificate.
- Intimation to the participants about registration confirmation shall be given through email.
- The STTP is organized in three Phases, however similar content will be delivered in each STTP, hence participants shall only participate in one of the Phases (1, 2 or 3) of STTP.
- The 6 days STTP will have sessions of five hours each day (Tentative Timings: 10 A.M - 11.30 A.M, 12 Noon - 1.30 P.M, 2.30 P.M - 4.30 P.M).

Important Information

The soft copy of completely filled registration form should be sent to the course coordinator on or before:

1st of February, 2021 for Phase 1
22nd of February, 2021 for Phase 2
and 26th of April, 2021 for Phase 3

Email id: sttpibmr.eco@ipsacademy.org

Program Registration

Click on the following Link:

<http://forms.gle/AoM7d1oi2Has3iq7>

STTP Dates

Phase -1: Feb 08 -13, 2021
(Mon -Sat)

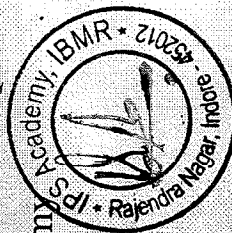
Phase -2: Mar 01-06, 2021
(Mon -Sat)

Phase -3: May 03-08, 2021
(Mon -Sat)

Program Chair

Dr. Vivek Singh Kushwaha
Director

IBMR, IPS Academy,
Indore, M.P.



Program Coordinator

Dr. Sachin Mittal
Professor
IBMR, IPS Academy
Indore, M.P.

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Institute of Business Management
& Research, Indore

Program Co-coordinators

Ms. Pallabi Mukherjee
+919039635978

Dr. Sunita Jatav
+919826727637

Dr. Tarika Nandedkar
+919826388092

All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg, Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org



STTP- Sanction Letter

Ref. No. 34-66/199/FDC/STTP/Policy-1/2019-20

Date 10 AUG 2020

From

Director,
Faculty Development Cell,
AICTE, New Delhi-110070

To

The Drawing and Disbursing Officer,
All India Council for Technical Education,
Nelson Mandela Marg,
Vasant Kunj, New Delhi - 110070

Sub: Release of grant for conduct of Short Term Training Programme (STTP) under AQIS 2019-20 during the financial year 2020-21- reg.

Sir,

This is to convey the sanction of the Council for payment of Rs. 309167 /- (Rupees Three Lakh Nine Thousand One Hundred SixtySeven Only) for conduct of Short Term Training Program as per details given below:

1.	Name and address of the beneficiary University / Institution	IPS ACADEMY, INSTITUTE OF BUSINESS MANAGEMENT AND RESEARCH, INDORE, (M.P.) HUKMAKHEDI RAJENDRA NAGAR A B ROAD INDORE Madhya Pradesh 452011
2.	Permanent ID of Institute	1-3930783
3.	Institute type	Unaided - Private
4.	Name of Coordinator	Dr. VIVEK KUSHWAHA
5.	Amount sanctioned	Rs. 309167/-
6.	Amount to be released	Rs. 309167/- Full & final payment
7.	Head of account	601.15(a) Gen. Short Term Training Programme (Plan)
8.	The authorized officer in whose favour Cheque/ Demand Draft/ RTGS is to be made	REGISTRAR / DIRECTOR / PRINCIPAL
9.	Title of the programme	STTP on Econometrics

1. The amount of the grant shall be drawn by the Drawing and Disbursing Officer, All India Council for Technical Education on the grant-in-aid bill and shall be disbursed to and credited to the Registrar/ Director/Principal of the institute through RTGS.

This grant-in-aid is being released in conformity with the terms & conditions as well as norms of the scheme as already communicated, and also being communicated in this letter.

The Principal of the Institute and the Coordinator of the Program are requested to verify the correctness of the under-mentioned Bank Account / RTGS Details submitted by them alongwith the proposals, in which the grant is being released.



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PAN No.	Bank Name	Bank Branch Name	Bank Branch Address	Account Holder Name	Account Type	Account Number	IFSC Code
AAATB3186K	HDFC BANK LTD	INDORE	UPPER GRD FLB COMMERCE HOUSE 7 RACE COURSE ROAD	IPS ACADEMY	Current Account	50200012278632	HDFC0001240

Instructions/Guidelines to be followed by the University/Institution

I. Disbursement of funds to University/Institutions

- The full amount of the grant sanctioned is being released as advance to the University/Institute.
- The amount spent by the institute on the conduct of STTP shall be adjusted on the basis of utilization certificate and detailed expenditure statement submitted by the University/Institution on the prescribed format along with other mandatory documents viz feedback form, copy of proceedings and completion report etc.
- The above said amount of grant shall be refunded back to AICTE if the Letter of Approval (LOA) / Extension of Approval (EOA) is not issued by AICTE to the institute for the academic year 2020-21.

II Maintenance of Accounts

- The Institute shall strictly follow the provisions laid down in the scheme document as available on the portal.
- Funds covered by this grant shall be kept separately and would not be mixed up with other funds so as to know the amount of interest accrued on the grant.
- The University/College/Institute shall maintain proper accounts of the expenditure out of the grants, which shall be utilized only on approved items of expenditure.
- The grant is intended to cover items of expenditure connected with the Short Term Training Programme such as Boarding & Lodging to the participants, TA to outstation participants, Honorarium to Course Coordinator, reading material to participants, Honorarium to resource persons, IA/DA to resource persons including two outstations resource persons & working expenses (reprographic services, postage, transport, daily wages, tea/coffee etc.

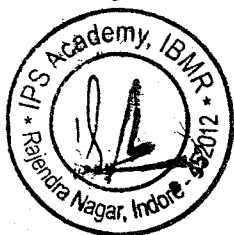
III. Conduct of test and issuance of certificate

A test shall be conducted by Program Monitoring Committee (PMC) at the end of the program and joint certificates shall be issued (by AICTE & conducting institute) to those participants who have attended the program and have scored minimum 60% marks in the test.

IV. Submission of Documents by the University/Institutions to AICTE

- The following mandatory relevant documents are required to be submitted by the University/Institution within one month of the completion of the program:-

- Original Statement of actual expenditure & Utilization Certificate in the prescribed proforma duly signed by the Head of the institution and countersigned by Registrar/Finance Officer/Govt. Auditor. In case of self financing/private institutions, Statement of actual Expenditure & Utilization Certificate are required to be audited & signed and sealed by a Chartered Accountant endorsing the membership number and complete postal address. Format for the same is available on AICTE web portal.



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The University/Institution is not required to submit bills/vouchers/invoices etc for the expenditure incurred out of recurring grants. However, such copies of bills/vouchers/invoices shall be digitized by respective institutions receiving grant and uploaded scanned copies of such bills/vouchers/invoices etc on the portal for availability and view at any point of time.

- (ii) Feedback form in the prescribed proforma.
- (iii) Copy of the proceedings and completion report.
- (iv) List of candidates who have successfully completed the program on the basis of the test conducted by Program Monitoring Committee (PMC).
- (v) Report submitted by Program Monitoring Committee (PMC).

- b. The amount of the grant shall be adjusted on submission of utilization certificate & detailed expenditure statement by University/Institution. On receipt of these documents, the total amount of financial assistance, admissible as per the norms, shall be worked out and grant-in-aid adjusted.

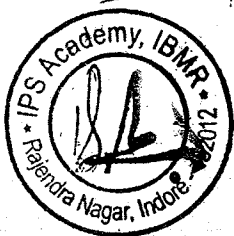
V. General instructions

- a. Preferably 10% of the participants may be industry professionals deputed by industry. Further, not more than 2 participants shall be from the host institution/group of institutions.
- b. The grant released/or part thereof, if remains unutilized for any reason after expiry of stipulated time period (for any reasons to include unspent amount, interest, penalty if imposed) shall be refunded back to AICTE in the form of RTGS payable to Member Secretary, AICTE, New Delhi. The bank details of AICTE are as under:-

Account No	: 55113199952
Name of the Account Holder	: Member Secretary, AICTE, New Delhi
Bank Name	: State Bank of India
Branch Name	: Shastri Bhawan, New Delhi
IFSC Code	: SBIN0050203

- c. The STTP is a residential program of a duration of six days with minimum 40 participants. The approved STTP shall be conducted within six months from the date of release of funds.
- d. If programme is not conducted within the period of six months of the release of the 100% grant, the released amount, alongwith interest accrued thereon, has to be necessarily returned back to AICTE within a month through RTGS.
- d. The expenditure under the Heads 'Honorarium to Course Coordinator' and 'Honorarium to Resource Persons' shall not exceed 1% & 20% respectively of the total sanctioned grant for the Programme. However, overall expenditure shall not exceed the funds sanctioned for the Programme.
- g. Any extra money required to complete the programme must be borne by the institute from their own resources. But the quality of the activities should not be compromised.
- h. Any unavoidable circumstantial change in the program with respect to name of Project Coordinator, Venue and date for organizing STTP would mandatorily require prior approval of the Council. All such requests should be addressed to AICTE, in advance, recording the specific reasons for proposed changes, failing which the offer for the grant already issued would be treated as automatically withdrawn and the financial assistance released in favour of the beneficiary institution shall be refunded immediately to the Council. Kindly mention the File No 34 66/199/IDC/STTP/Policy 1/2019-20 in your future correspondence.
- i. Steering Committee/Project Monitoring Committee (PMC) is required to be constituted at institutional level. The constitution of the PMC shall be as under:

- (i) Principal/Director/Registrar of the **IQAC** (Chairperson)
- (ii) (i) Coordinator of the program **IPS Academy** (Secretary)
- (iii) Two HoDs and one subject expert **Institute of Business Management & Research, Indore**



The members of the said PMC shall not be below the rank of Associate Professor. A test shall be conducted by Project Monitoring Committee (PMC) at the end of the program and the certificates shall be issued to those participants who have attended the program and have qualified in the test. The minutes of the meetings, along with PMC report, are to be submitted to the Council at end of the program along with other mandatory documents.

- j. GoI GFR rules (@<https://doe.gov.in/order-circular/general-financial-rules2017-0>) should be followed during utilization of grant.
- k. This Sanction Order may be treated as Offer Letter for all purposes.

NOTE:- Any deviation from the above will invoke serious action against the Institute.

Yours sincerely,

(Col. B Venkat)
Director (FDC)

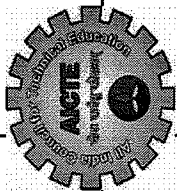
10 AUG 2020

Copy forwarded for information and necessary action to:

1. Name and Address of the Coordinator
Dr. VIVEK KUSHWAHA
IPS ACADEMY, INSTITUTE OF BUSINESS MANAGEMENT AND RESEARCH, INDORE, (M.P.)
HUKMAKHEDI RAJENDRA NAGAR A B ROAD INDORE
Madhya Pradesh 452011
2. The Registrar / Director / Principal
IPS ACADEMY, INSTITUTE OF BUSINESS MANAGEMENT AND RESEARCH, INDORE, (M.P.)
HUKMAKHEDI RAJENDRA NAGAR A B ROAD INDORE
Madhya Pradesh 452011
3. Guard File



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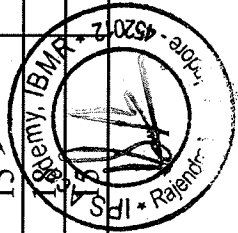
AICTE Sponsored online Short Term Training Program (STTP)

on

"Econometrics"

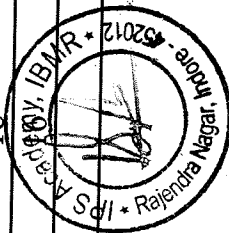
Attendance Sheet: STTP on Econometrics (Phase II: From 1st March to 6th March 2021)

Participants Name	Email	Overall Attendance	% out of 18 session		
1 Alka Narula	alka.davim@gmail.com	18	100		
2 Alka Singh	singhpbau123@gmail.com	18	100		
3 Arjun Naikba Patil	arjun.patil40@gmail.com	18	100		
4 Ashish Sharma	asharma0303@gmail.com	15	83		
5 Ashwini Bhadre	bhadreashu13@gmail.com	18	100		
6 Bandla Prathyusha	prathyusha2003@gmail.com	9	50		
7 Bhanu Pratap Singh	bhanupratapims@gmail.com	18	100		
8 Dharmendra Kumar G	dk.gangeshwar@bitdurg.ac.in	15	83		
9 Debi Prasad Satapathy	dsatapathy5@gmail.com	18	100		
10 Dimple Sukhija	dimple.sukhija@indoreinstitute	15	83		
11 Golakh Kumar Behera	golakhkumar@gmail.com	12	67		
12 Gourab Panja	biltupanja5@gmail.com	18	100		
13 Haldhar Sharma	haldhar.sharma@medicaps.ac.i	18	100		
14 J.Suresh Kumar	jsureshco@gmail.com	15	83		
15 Jaishree	jasssharma1996@gmail.com	15	83		
16 Ketki Kumari	ketkikumari92@gmail.com	15	83		
17 Krishna Murari	krishnamurari9@gmail.com	15	100		
18 Muskan Wadhvani	1005789@emeraldheights.edu.	15	83		



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19	Madhu Kumari	19madhulika@gmail.com	18	100
20	Mukesh Kumar	mukeshb656@gmail.com	15	83
21	Neha Kumar	kumarnaha89@gmail.com	18	100
22	Om Prakash	omprakashnep1@gmail.com	18	100
23	Osheen Modi	osheenmodi@gmail.com	12	67
24	Palak Sukhija	palaksukhija21@gmail.com	15	83
25	Prateek Kumar Tripathi	prateek.94.lee@gmail.com	18	100
26	Priya Saxena	phdpriyasaxena@gmail.com	18	100
27	Pushpendra Kumar Singh	pushpendraraj28@gmail.com	18	100
28	Roli Pradhan	rpradhan@nitttrbpl.ac.in	18	100
29	Sandeep Soni	sandeep.k.sony@gmail.com	3	17
30	Saswati Jena	saswati849@gmail.com	9	50
31	Seema Sharma	seemaashish24@gmail.com	3	17
32	Shalu Pandey	shalu.jssgiw@gmail.com	6	33
33	Shalu Purswani	shalu.purswani@gmail.com	9	50
34	Shaswati Das	shaswati.das2@gmail.com	18	100
35	Shobana D	shobanasahayam@gmail.com	3	17
36	Sk Mujibar Rahaman	skmujibar@gmail.com	18	100
37	Sonia Goyal	soniapanakaj2015@gmail.com	9	50
38	Srawan Kumar KC	srawankc@kusom.edu.np	6	33
39	Sunita Ramchandani	ramchandanisunita04@gmail.c	18	100
40	Tanya Rastogi	tanya.rastogi20@gmail.com	6	33
41	T Triveni	t.triveni87@gmail.com	18	100
42	Vikas Singh	vikassingh@cusb.ac.in	18	100
43	Vikash Kumar	vikash.davv2011@gmail.com	18	100
44	Dr.Jolly Sushma	jolly.sushma@ipsacademy.org	18	100
45	Dr. Kali Charan Modak	kali.modak@gmail.com	18	100
46	Dr.Nidhi Jhavar	nidhijhavar@ipsacademy.org		89





IPS Academy, IBMR Indore

AICTE Sponsored online Short Term Training Program (STTP)

On

"Econometrics"

Phase II (1 March 21- 6 March 21)

Session wise Report

Day 1 (1 March 2021):

The first session 1 was conducted at 10 a.m. to 12 noon. The resource person for session was Dr. Ganesh Kawadia (Retired Professor & Ex Head School of Economics, DAVV, Indore). The introductory session saw Dr. Kawadia shedding light upon the concept of economic theory and the integration of mathematics and economics to create mathematical and econometric models. He explained in detail how to use these models to test the hypothesis for proving the economic theory and how to apply the models for control and policymaking. Dr. Kawadia also provided deep insights into linear regression, least-square method, types of data, econometrical models and forecasting using econometrical models. The average Feedback of the session was 4.51

Session 2 started at 12:30 Noon to 2 pm. The resource person for the session was Dr. Narain (Associate Professor University of Delhi). The topic covered by him was Introduction to Regression. In this insightful session, Dr. Narain gave a detailed introduction about Regression and explained the various aspects of Regression Analysis. He covered topics like Regression Modelling, Classical Linear Regression Analysis and Properties of OLS Estimators. He demonstrated the use of Excel and Stata software for creating Regression Models - Linear as well as Multiple. The average feedback was 4.377

Session 3 was conducted at 2:30 p.m. to 5 p.m. Dr. Narain (Associate Professor University of Delhi) continued this session with the topic Multiple Regression and Regression Diagnostics. The session witnessed Dr. Narain illustrating the use of Stata software to run Regression Diagnostics. He further elucidated how to use the results from Diagnostics to improve the overall model fit. He also explained about Regression Model assumptions and the validity of the Model. The session also covered topics like Homoscedasticity, Heteroscedasticity and Residual Terms in detail. The average feedback for the session was 4.49

Day 2 (2 March 2021)

Session 1 started at 10 a.m. to 11:30 a.m. The resource person for the session was Dr. Karunesh Saxena (Professor, Mohan Lal Sukhadiya University, Udaipur) and the topic covered by him was Time Series Data and Econometrics. Dr. Karunesh Saxena started the session with the statement "Mathematics is Music". He told a story and connect it beautifully with Time Series. He explained the basics of Time series analysis. Dr. Saxena explained the utility of time series in real life. He also shed light on components of time series. He



illustrated how time series is helpful in forecasting. Dr. Saxena provides practical examples and showed videos to explain the above concepts. The average feedback for the session was 4.0

Session 2 began at 11:30 a.m. and ended at 1:30 p.m. Dr Karunesh Saxena (Professor, Mohan Lal Sukhadiya University, Udaipur) continued the session as a resource person and the topic covered by him was Stationarity and Unit Root Test. In the second session, Dr. Saxena elucidates the Stationarity and Unit root concept. He also gave an in-depth insight into the Dickey Fullar test. Dr. Saxena then illustrated BOX JENKIN's Model. The average feedback for the session was 4.414.

Prof. Joysankar Bhattacharya (Associate Professor, IIM, Indore) was the resource person for session 3. Session was conducted from 2:30 p.m. to 4:30 p.m. The topic covered during the session was Diff in Diff Model. He started the session explaining Difference-in-Difference (DID) Model. Prof. Bhattacharya illustrated the pre and post analysis of treatments with treatment group and control groups. He explained the DID assumptions, DID estimator and DID in regression analysis. The average feedback for the session was 4.323

Session 4 was taken by Dr. Pallabi Mukherjee by 4:30 p.m. to 5:30 p.m. She is Associate Professor at IBMR, IPS Academy and has vast knowledge of Econometrics. She took hands of practices and review on session of the day. Dr. Mukherjee has summarised the sessions of entire day taken by Dr. Arup Kumar Chattopadhyay and also took hands on practice of explained concepts on Eviews. She provided the data to the participants and explained the working of Eviews on that particular data. She also handled the queries of participants related to the entire day sessions.

Day 3 (3 March 2021)

Session 1 of the day 2 started at 10 a.m. and ended at 11:30 am. The resource person for the session was Dr Preeti Sharma (Associate Professor, Department of Economics, IIT Indore). Topic Covered by her in first session was Panel Data and FEM and REM. Dr. Preeti Sharma started the session with the explanation of panel data & cross-sectional data and also touched upon the concepts of parametric and stochastic variables. She then illustrated the method to calculate pooled/panel data. Dr. Preeti used practical examples to explain the concepts, helping the participants grasp them easily. Average Feedback for the session was 4.45.

The second session began with a detailed explanation of Durbin Wattson Statistic. Session 2 was also taken by Dr. Preetin Sharma (Associate Professor, Department of Economics, IIT Indore). from 12:00 p.m. to 1:00 pm. In this session she more elaborately covered the topic Panel Data and FEM and REM. Dr. Preeti then gave in-depth insights into Random effect Model and Fixed Effect Model. She then illustrated the pooled regression OLS in a detailed manner. The average feedback of the session was 4.481

Session 3 conducted from 2:30 p.m. - 4:30 p.m. Dr. Preeti Sharma continued this session with the topic Panel Data and FEM and REM. In this session, Dr. Preeti provided the participants



hands-on knowledge about Eviews software. She taught them how to import the excel files into the software, define variables and estimate Random Effect Model and Fixed Effect Model. Dr. Preeti then illustrated how to apply the Houseman test to compare Random effect & Fixed effect model and showed which model is a better fit between the two. In the same vein, Dr. Preeti explained the testing of hypothesis and interpretation of the above test in detail. Mr. Danish and Dr. Pradhan were the teaching assistants for the session. The average feedback for the session was 4.391.

Session 4 conducted at 04:30 p.m. to 05:30 p.m. Dr. Sunita Jatav has taken this session. Dr. Jatav is an Associate Professor at IBMR, IPS Academy and has vast experience of dealing with data. Dr. Jatav has summarised the sessions taken by Dr. Preeti Sharma and also took hands on practice of explained concepts on Eviews as well as on Stata. She explained how to write a good research paper by incorporating all the tools explained during previous sessions.

Day 4 (4 March 2021)

Session 1 was held on 10:00 am to 11:30 am. The Resource Person for the session was Prof Kulbir Singh (Associate Professor, Department of Finance, IMT Nagpur). The topic covered by him was Introduction to ARIMA. Dr. Kulbir Singh started the session with the introduction of auto-correlation in time series analysis. He explained the concept in great detail covering topics like reasons for auto-correlation in time series and regression models with auto-correlation disturbance. He then illustrated auto-regression, from first order to higher order. He explained the models theoretically and then practically with the help of Stata software. The average Feedback for the session was 4.517.

Session 2 started at 1:00 and ended at 2:00 pm. Prof Kulbir Singh (Associate Professor, Department of Finance, IMT Nagpur), continued the session with the topic ARIMA modelling and co integration. The second session was based on testing auto-correlation between variables using the Durbin Wattson Test. Dr. Kulbir Singh explained the Durbin Wattson Test covering every big and small detail like its assumptions, how to run the test in Stata, how to interpret its result and also its drawback. He then illustrated the Durbin Alternative Test and showed how this test solves the drawback of Durbin Wattson test. The average Feedback for the session was 4.455

Session 3 was also continued by Prof Kulbir Singh (Associate Professor, Department of Finance, IMT Nagpur) from 2:00 to 4:30 pm. This session covered the topic Error Correction Models. The final session of Prof. Kulbir was centred on the ARMA model. Dr. Kulbir Singh explained this model comprehensively using Stata and underlined this model's high relevance in the business world. He then provided deep insights into White Noise, General Linear Model and LAG Operators. He also illustrated how to construct a general linear process by using LAG operator. The average feedback for the session was 4.597

Session 4 was conducted by Dr. Tarika Nandedkar from 4:30 to 5:00. She is an Associate Prof. At IBMR, IPS Academy Indore Dr. Tarika has summarised the sessions taken by Prof. Kulbir Singh and also took hands on practice for the topics covered by Prof. Kulbir on



STATA. Data was provided by her to participants in advance. Participants learn how to applied tools on particular data with the help of Stata.

Day 5 (5 March 2021)

Session 1 started at 10:00-11:30 am. Dr. C P Gupta (Professor, Department of Finance and Business Economics, South Campus, University of Delhi.) was the resource person for the session. He covered Granger Causality in this session. Dr. C. P. Gupta started the session by explaining the time series concept with multiple variables. He illustrated how one can estimate the models for multiple time series with the examples of GDP and Inflation. He shed light upon the two approaches to achieve the above objective - Bottom Up Approach and Top Down Approach. He then explained the Causality concept in great detail. In continuation to this, Dr. Gupta illustrated the Granger Causality Test with the help of Eviews software. He also touched upon the VAR Model concept. The average feedback for the session was 4.659

Session 2 was also taken by Dr. Gupta (Professor, Department of Finance and Business Economics, South Campus, University of Delhi.) from 12:00-1:30 pm. In this session he covered Logit and Probit Model – 1. The second session began with the explanation of Linear Probability Model. Dr. Gupta detailed the nature of this model, its limitations, and how to calculate & interpret the model. Dr. Gupta also explained the concepts of Logit and Probit models. He taught how to run and interpret these models in Eviews as well as in Stata software. The average feedback for the session was 4.609.

Session 3 was the extension of session two from 2:30 – 4:30 pm taken by Dr. C P Gupta (Professor, Department of Finance and Business Economics, South Campus, University of Delhi.) on the same topic Logit and Probit Model – 2. In the third session, Dr. Gupta did a comparative analysis of the Logit and Probit model. He also explained the concept of Pseudo R-Squared covering all its measures viz. MC Fadden R- Square, Cox and Snell R- Square and Nagelkerke. He illustrated these test on Stata and also explained the interpretation as well the utility of different measures in different situations. The average feedback for the session was 4.615.

Day 6 (6 March 2021)

Session 1 of the last day was taken by Dr. Arindam Laha from (Associate Professor Department of Commerce Burdwan University, West Bengal) from 10:00-11:30 am. topic covered by him was Dummy Variable Model. The session of Dr. Arindam Laha was centred on a very important concept of Econometrics - Dummy Variables. He explained the application of dummy variable in the regression analysis and also covered the topics Intercept and Dummy Variables, Dummy Variable Trap and Seasonal Dummy Variable. Dr. Laha then illustrated the concepts of ANOVA & ANCOVA model and explained how to use dummy variables in these models. He shed light upon the cautions which one should exercise while using Dummy variables. The average feedback for the session was 4.567.

Session 2 was taken by Dr. Arindam Laha from (Associate Professor Department of Commerce Burdwan University, West Bengal) from 12:00-1:30 pm. Topic Covered by him during



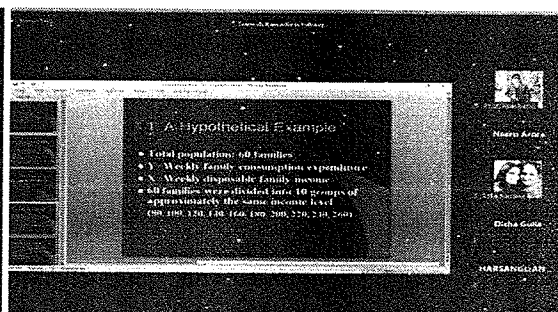
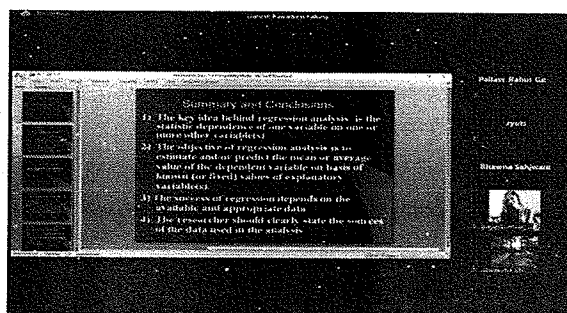
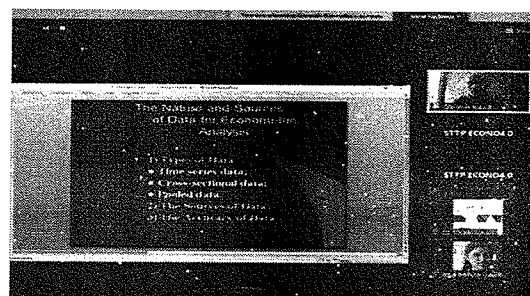
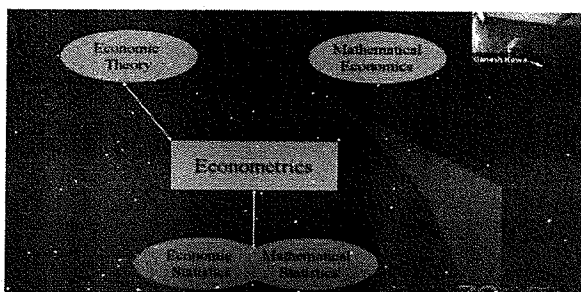
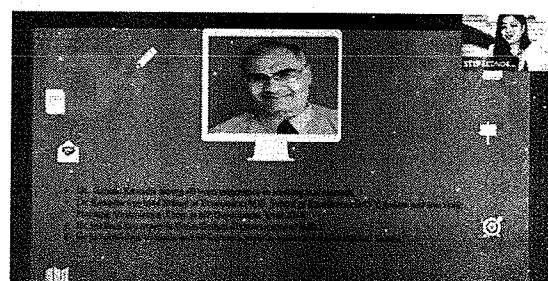
the session was Difference in Difference Model, Structural Break. The second session Dr. Arindam Laha started by explaining Difference-in-Difference (DID) Model and Structural Break. He then talked about the concept of experimentation and its importance in research. He also illustrated the concept of Difference-in-Difference Model. He explained the DID assumptions, DID estimator, DID in regression analysis and how to estimate the DID model in STATA. Dr. Laha also illustrated Structural Break model with the help of STATA. Dr. Laha also introduced a new open source software to participants viz. "GRETTL- GNU Regression, Econometrics and Time Series Library". Dr. Laha demonstrated how to run DID in GRETL and how to interpret the result using GRETL. The average feedback for the session was 4.603.

Session 3 of the day was Test & Valedictory session and held from 2:30 – 4:30 pm. In the third session, a test was conducted to gauge the learning and understanding of the participants from the programme. The test was held on the online platform - Testmoz. Online test link with password was provided to the participants. There were 50 multiple choice questions and the participants had to solve them within an hour. There was no negative marking for the test. The minimum criteria of passing the test was 60% marks. After the completion of the test, there was a valedictory session. In the valedictory session, the participants shared their views and gave feedback about the STTP. Participants were extremely satisfied with the learning outcomes of the programme. Participants expressed that the concepts explained by the resource persons, the study material provided by them, the way they clarified their doubts, had greatly enriched their knowledge. The participants were also impressed by the quality of invited speakers. They were also satisfied with the way STTP was conducted by the organizers. Dr. Sachin Mittal expressed gratitude towards all the participants for their active participation and support in making this STTP a great success. Overall Average Feedback of the STTP was 4.591.

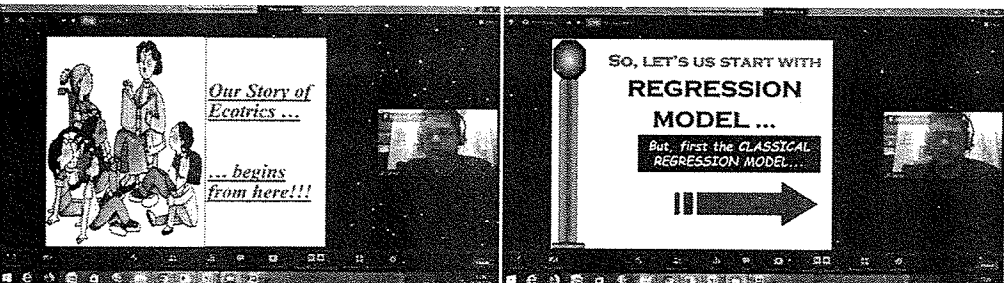
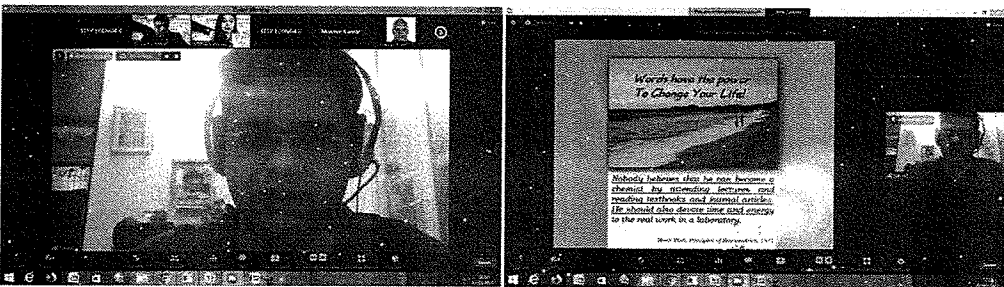
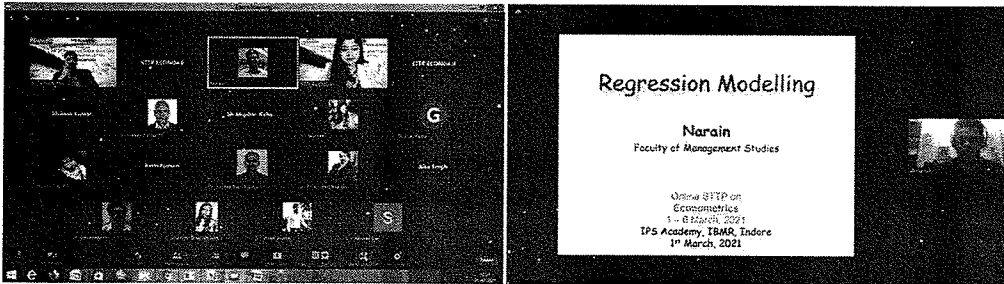
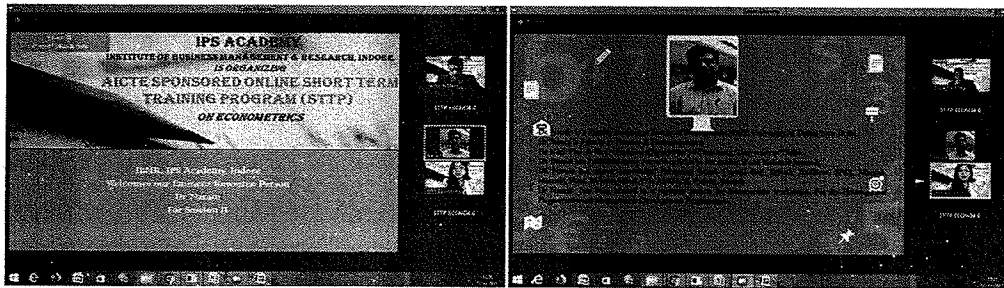
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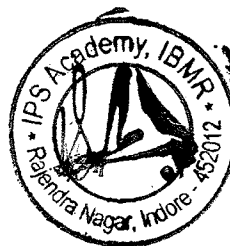
Day 1: 1 March 2021
Session: 1
Time: 10 a.m. to 11:30 a.m.
Speaker: Dr. Ganesh Kawadia



Day 1: 1 March 2021
 Session: 2
 Time: 12:00 pm to 1:30 pm
 Speaker: Dr. NARAIN



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CLASSICAL LINEAR REGRESSION MODEL

The General Form of the Classical Linear Regression Model:

$$Y_i = \alpha + \beta X_i + \epsilon_i$$

Where:

- ϵ_i is the error term
- α is the intercept
- β is the slope

- The above equation is called Classical Linear Regression Model
- And, Model is Two-Variable Linear Regression Model

CLASSICAL LINEAR REGRESSION MODEL

The general form of the Classical Linear Regression Model is:

$$Y = a + bX + e$$


Where:

- Y = dependent variable
- X = independent variable
- a = intercept
- b = slope
- e = error term

The above equation is called the **Simple Linear Regression Model**.


- Also, known as the **Two-Variable Linear Regression Model**.
- It is called the **Simple Regression Model** because it involves two variables, Y and X.
- It is called the **Error Term** or **Disturbance Term** or **Noise Term**.

[illegible]



ASSUMPTIONS OF REGRESSION MODEL

- BASIC ASSUMPTIONS:
 - Zero Mean of the Disturbance;
 - Homoscedasticity;
 - No autocorrelation;
 - Exogeneity;
 - Normality;
 - No multi collinearity;
 - No Specification Bias



PROPERTIES OF OLS ESTIMATES

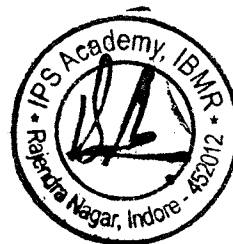
GAUSS - MARKOV THEOREM : This theorem says that given the assumptions of the classical regression model, the OLS estimators, in the class of unbiased linear estimators, have minimum variance. That is, they are BLUE.

- Best - - - - - Minimum Variance
- Linear - - - - - Linear Functions of variables
- Unbiased - - - - - Their expectations are equal to population parameters.
- Estimators - - - - - Estimates from the sample information.

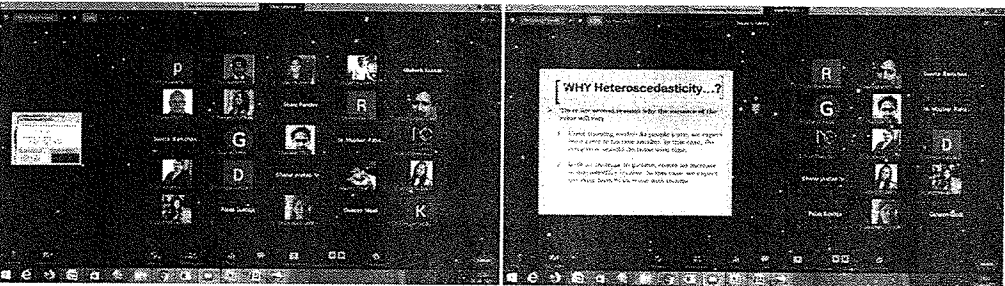
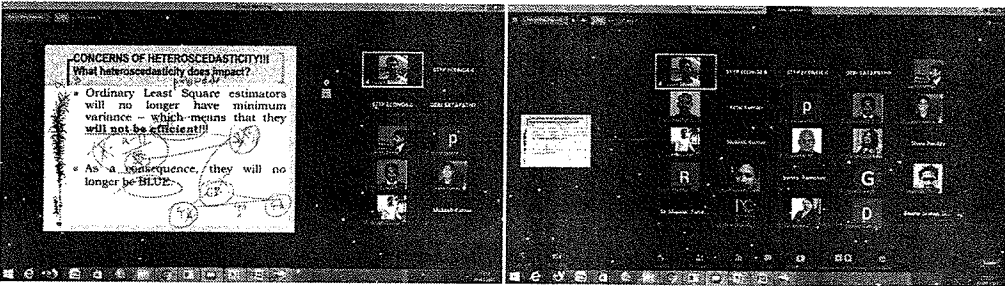
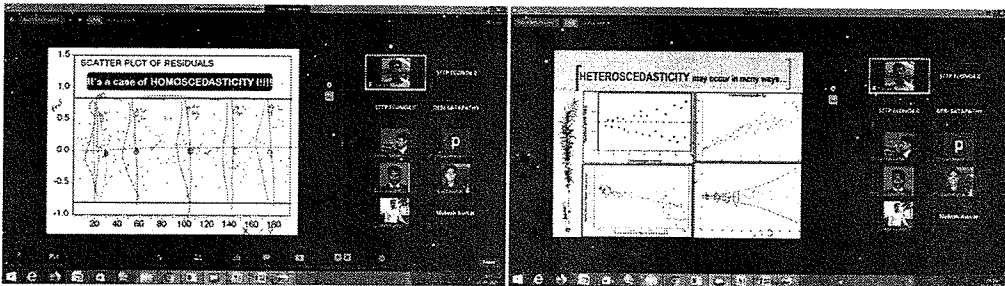
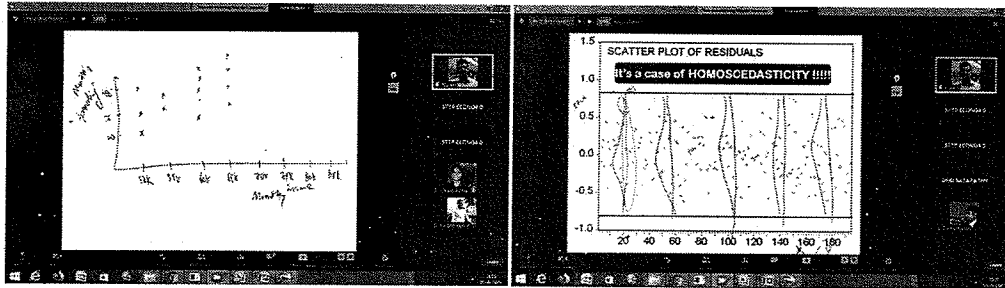
PROPERTIES OF OLS ESTIMATES

- GAUSS - MARKOV THEOREM: The theorem that the OLS estimators in the classical regression model are BLUE
- Best Minimum Variance
- Linear Linear Functions of variables
- Unbiased their expectations are equal to population parameters.
- Estimators Estimates from the sample information.

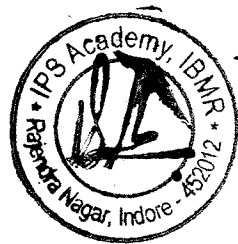
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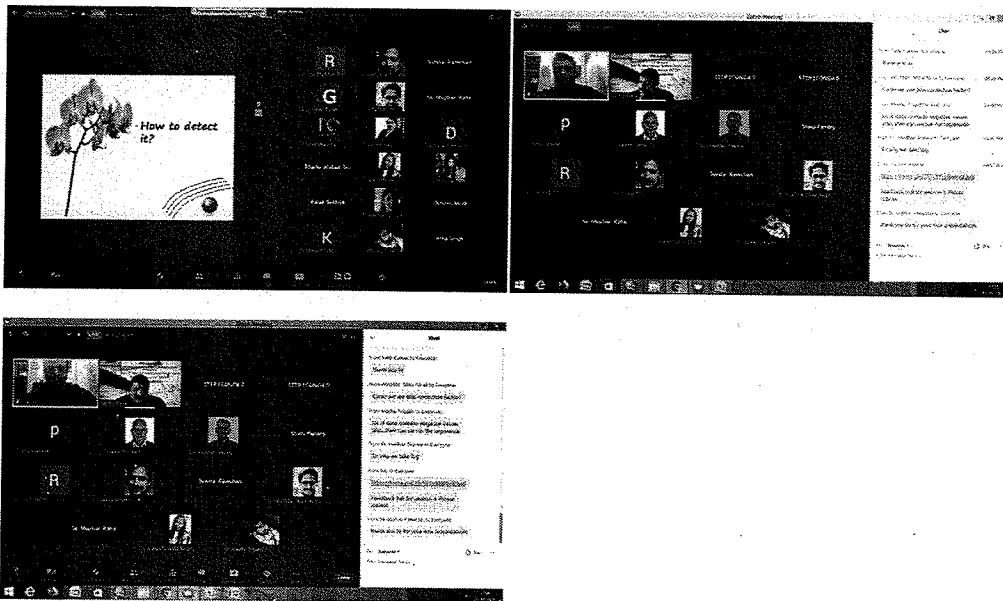


Day 1: 1 March 2021
 Session: 3
 Time: 2:30 pm to 4:30 pm
 Speaker: Dr. NARAIN

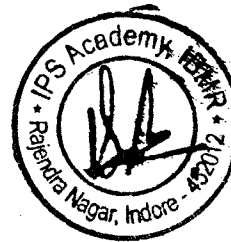


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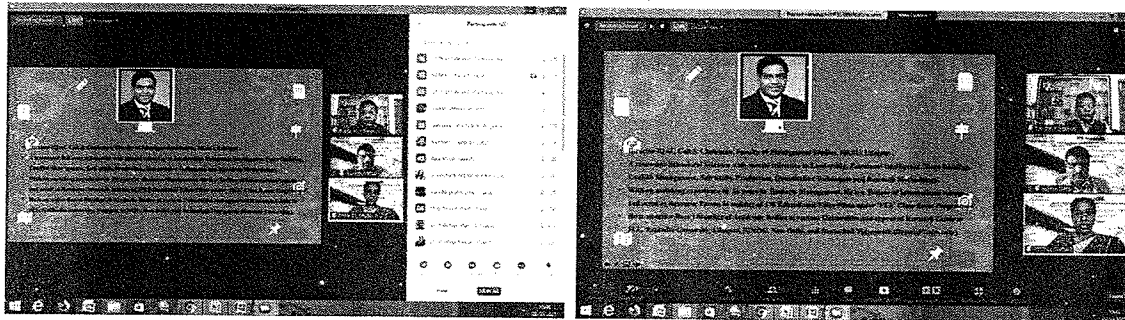
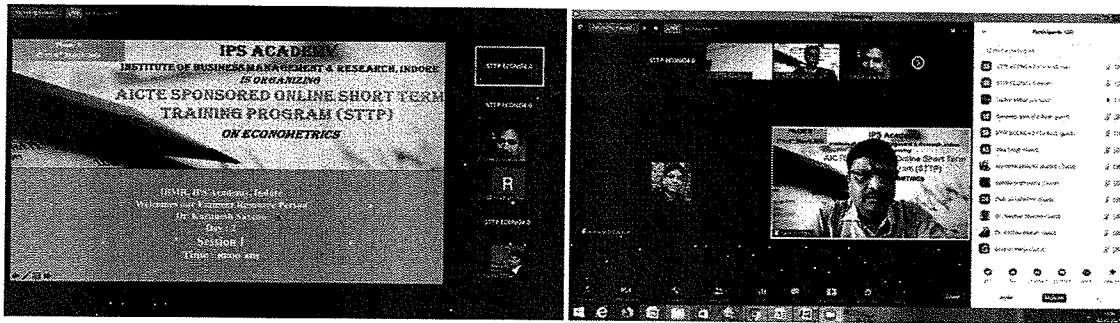




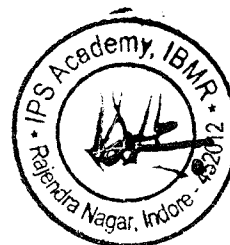
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Day 2: 2 March 2021
Session: 1
Time: 10:00 am to 11:30 am
Speaker: Dr Karunesh Saxena



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WHAT IS A TIME SERIES?

- A time series is a collection of data recorded over a period of time weekly, monthly, quarterly or yearly.
- A set of data depending on the time.
- Collection of magnitudes belonging to different time periods of some variable or composite of variables such as:
 - Production of steel, per capita income, gross national income, price of tobacco, index of industrial production.

Time is not a device to set in common stable reference point.
In time series, time is an independent variable to estimate dependent variables.

STEP ECONO4.2

EXAMPLES OF TIME SERIES

- Monthly data on sales.
- Monthly Inventory.
- Daily customers.
- Monthly interest rates, costs.
- Monthly employment rate.
- Weekly measurement of money supply.
- Dow Jones Industrial Averages.
- Daily opening & closing prices of stocks and so on.

STEP ECONO4.3

MATHEMATICAL PRESENTATION OF TIME SERIES

- A time series is a set of observation taken at specified times, usually at equal intervals.
- Mathematically a time series is defined by the values Y_1, Y_2, \dots, Y_n of a variable Y at times t_1, t_2, \dots, t_n . Thus $Y = f(t)$.

STEP ECONO4.4

STEP ECONO4.5

STTP ECONO4.0

UTILITY OF TIME SERIES ANALYSIS

On the basis of Time series Analysis businessmen can predict about the changes in economy. Following points clear its importance:

1. Profit of experience.
2. Safety from future.
3. Utility Studies.
4. Sales Forecasting.
5. Budgetary Analysis.
6. Stock Market Analysis.
7. Yield Projections.

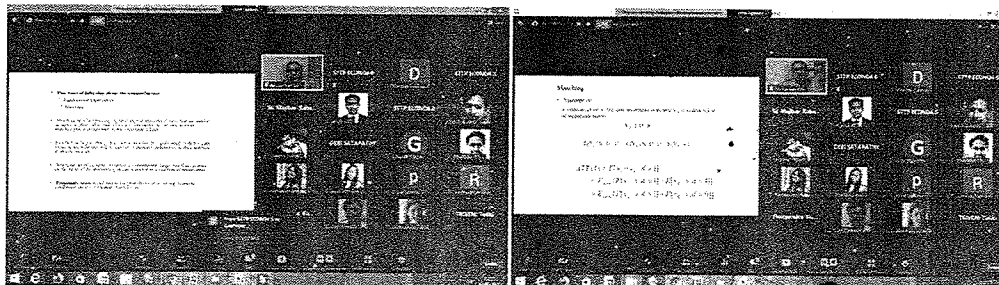
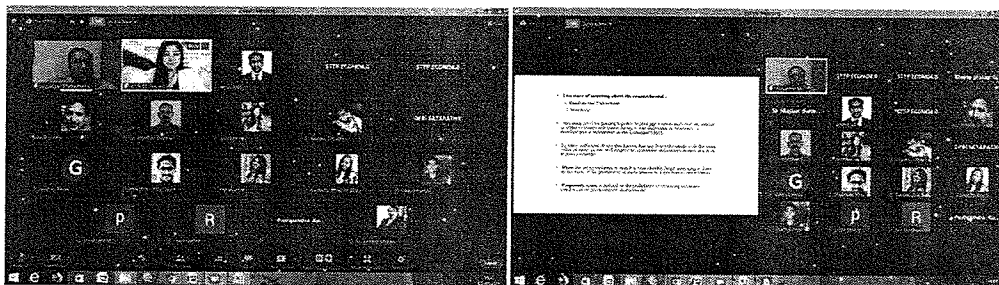
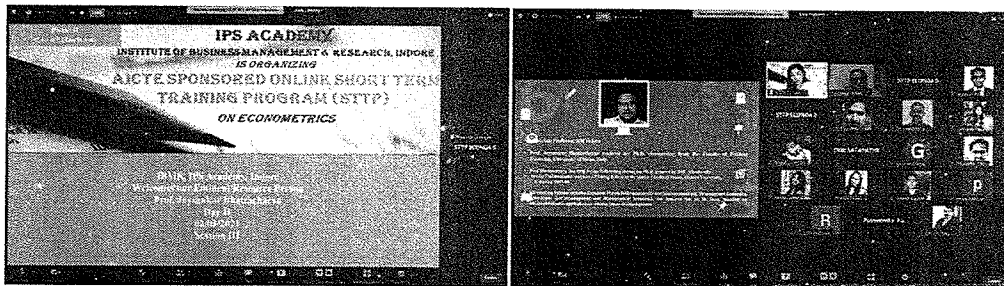
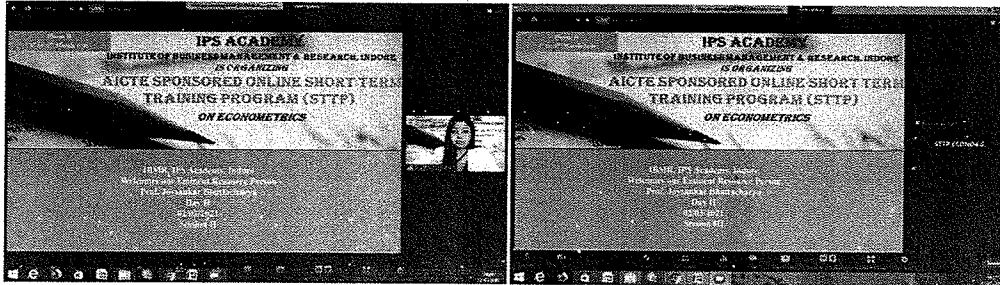
STEP ECONO4.6

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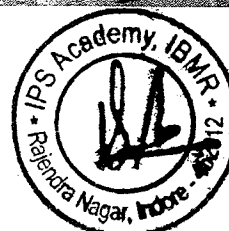


Day 2: 2 March 2021
Session: 3
Time: 2:30 pm to 4:30 pm

Speaker: Prof. Joysankar Bhattacharya



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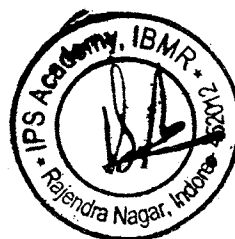
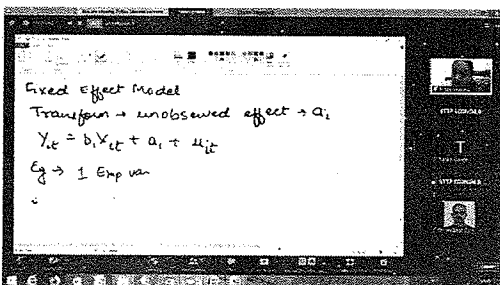
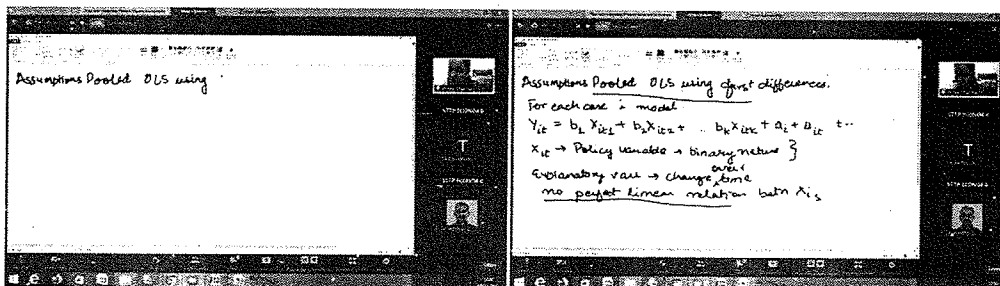
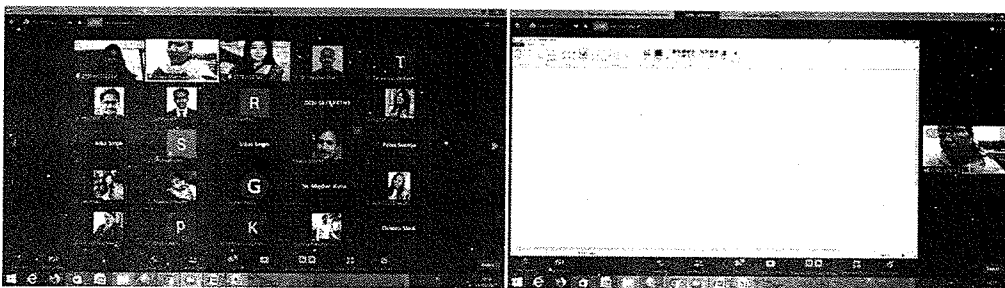
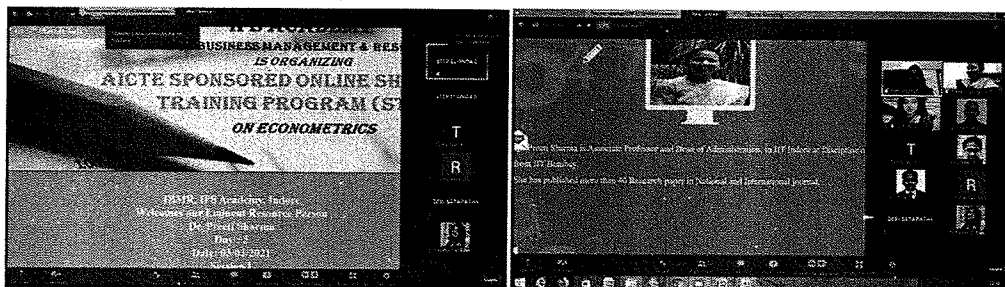


Day 3: 3 March 2021

Session: 1

Time: 10:00 a.m. to 11:30 a.m.

Speaker: Dr. Preeti Sharma



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Day 3: 3 March 2021

Session: 2

Time: 12:00 p.m. to 1:30 p.m.

Speaker: Dr. Preeti Sharma

The screenshot shows a Zoom meeting interface. On the left, a presentation slide titled "INSTITUTE OF BUSINESS MANAGEMENT & RESEARCH AT CHANDIGARH" is visible. On the right, a whiteboard contains the following text:

$$\text{Var}(u_{it} | x_i, a_i) = \text{Var}(u_{it}) = \sigma_a^2$$
$$t \neq s \quad \text{Cov}(u_{it}, u_{is} | x_i, a_i) = 0$$
$$E(u_i | x_i) = 0$$
$$\text{Var}(u_i | x_i) = \sigma_a^2$$

Correlated RE Approach

$$a_i \text{ correlated to exp var}$$
$$y_{it} = b_1 x_{it} + a_i + u_{it}$$

allow a_i time varying

$$a_i = \alpha + \gamma x_i + \epsilon_i$$

The screenshot shows a Zoom meeting interface. On the left, a presentation slide contains the following text:

Subtract

$$(y_{it} - \bar{y}_i) = b_1(x_{it} - \bar{x}_i) + (u_{it} - \bar{u}_i) \quad t \dots$$

time-demeaned data \rightarrow Pooled OLS

Exogeneity $x_i \rightarrow$ FE estimator is unbiased

On the right, a whiteboard contains the following text:

5 RE \rightarrow low RE \rightarrow low \rightarrow exp.

Example

airline industry $i = 1, 2, \dots, 15$ } 90 obs

Linear Cost fn $t = 1, 2, \dots, 15$

$$C_{it} = \beta_1 + \beta_2 Q_{it} + \beta_3 PF_{it} + \beta_4 LF_{it} + u_{it}$$

if they are output Fuel Price Load factor } Stochastic

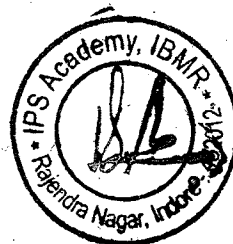
Non-Stochastic

not cov with u_{it}

The screenshot shows a Zoom meeting interface. On the left, a presentation slide contains the following text:

$$C_{it} = \beta_1 + \beta_2 Q_{it} + \beta_3 PF_{it} + \beta_4 LF_{it} + u_{it}$$

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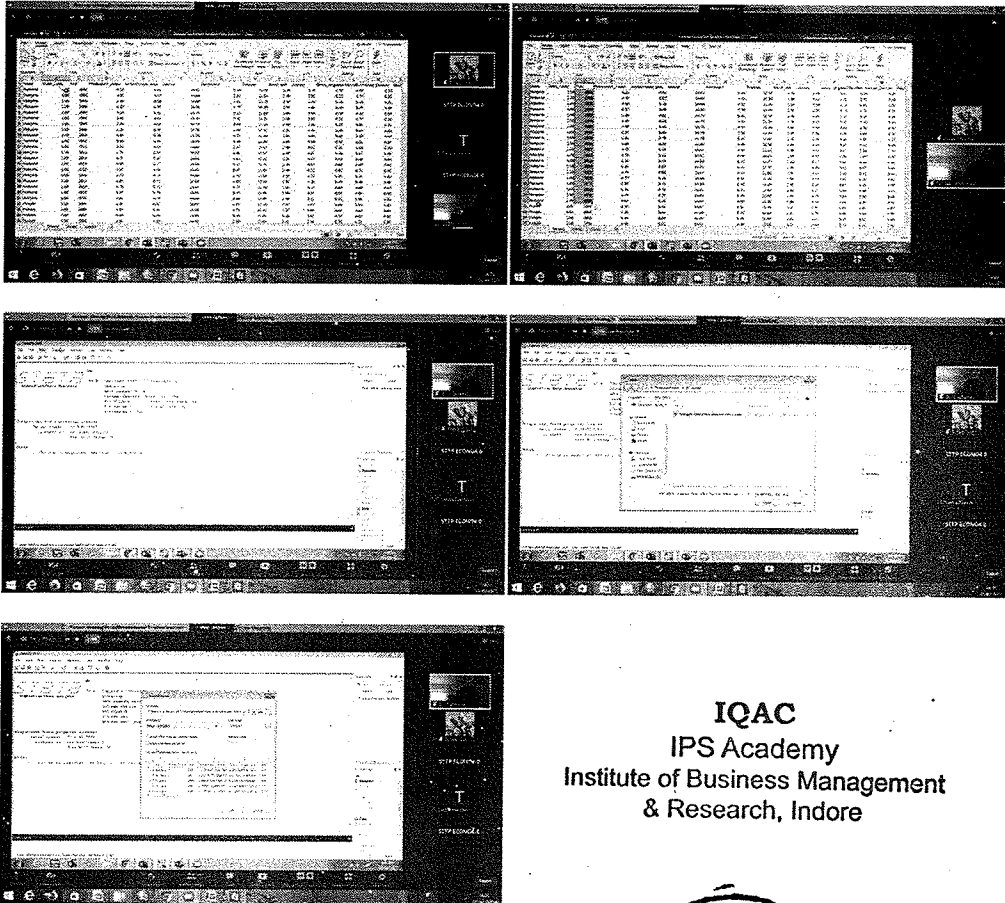


Day 3: 3 March 2021

Session: 3

Time: 2:30 p.m. to 4:30 p.m.

Speaker: Prof. Dr. Preeti Sharma



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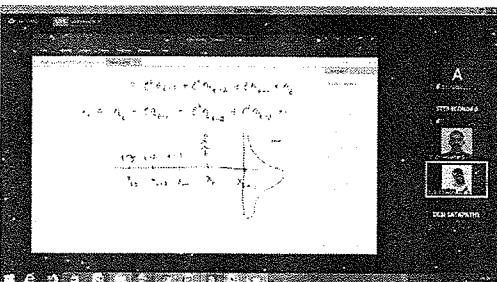
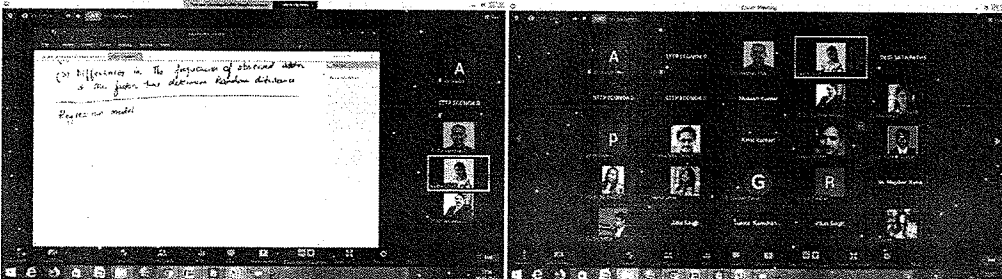
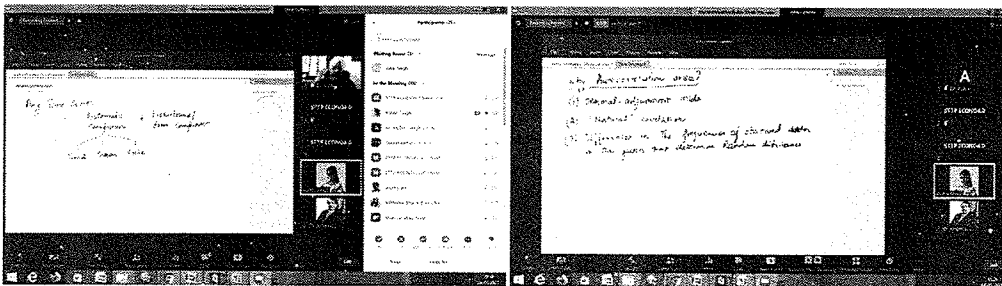


Day 4: 4 March 2021

Session: 1

Time: 10:00 a.m. to 11:30 a.m.

Speaker: Dr. Kulbir Singh



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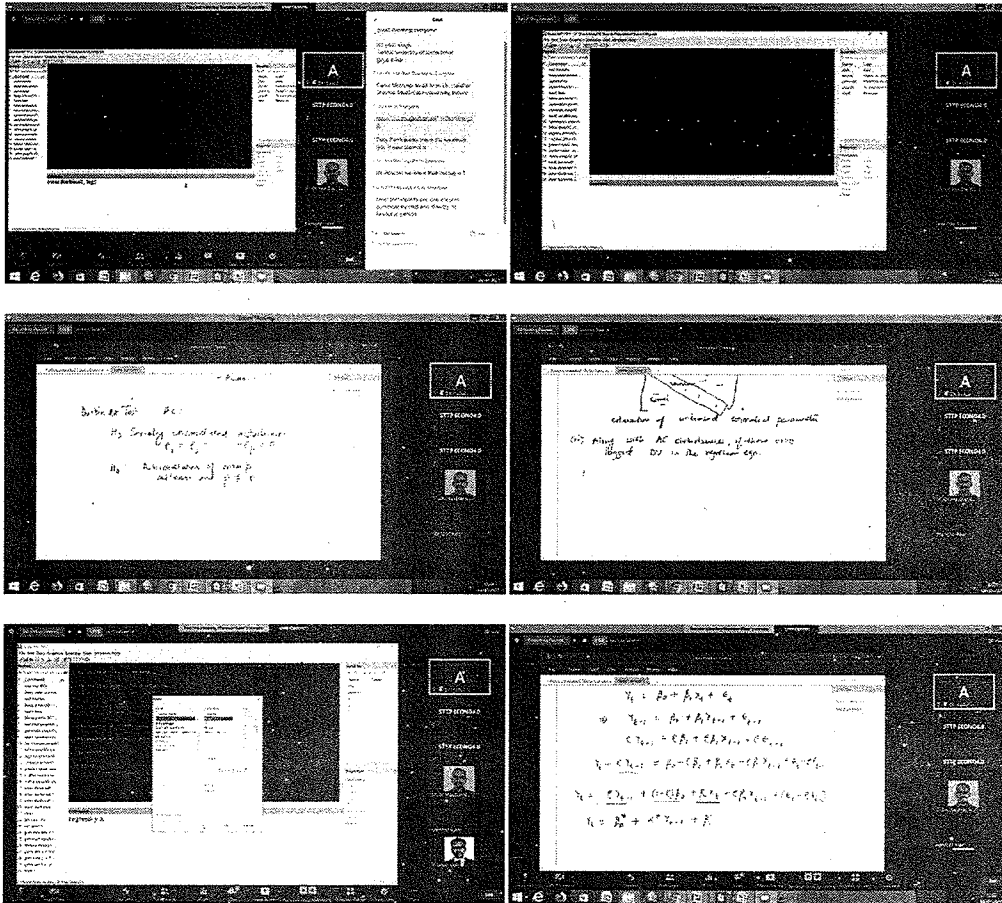


Day 4: 4 March 2021

Session: 2

Time: 12:00 p.m. to 1:30 p.m.

Speaker: Dr. Kulbir Singh



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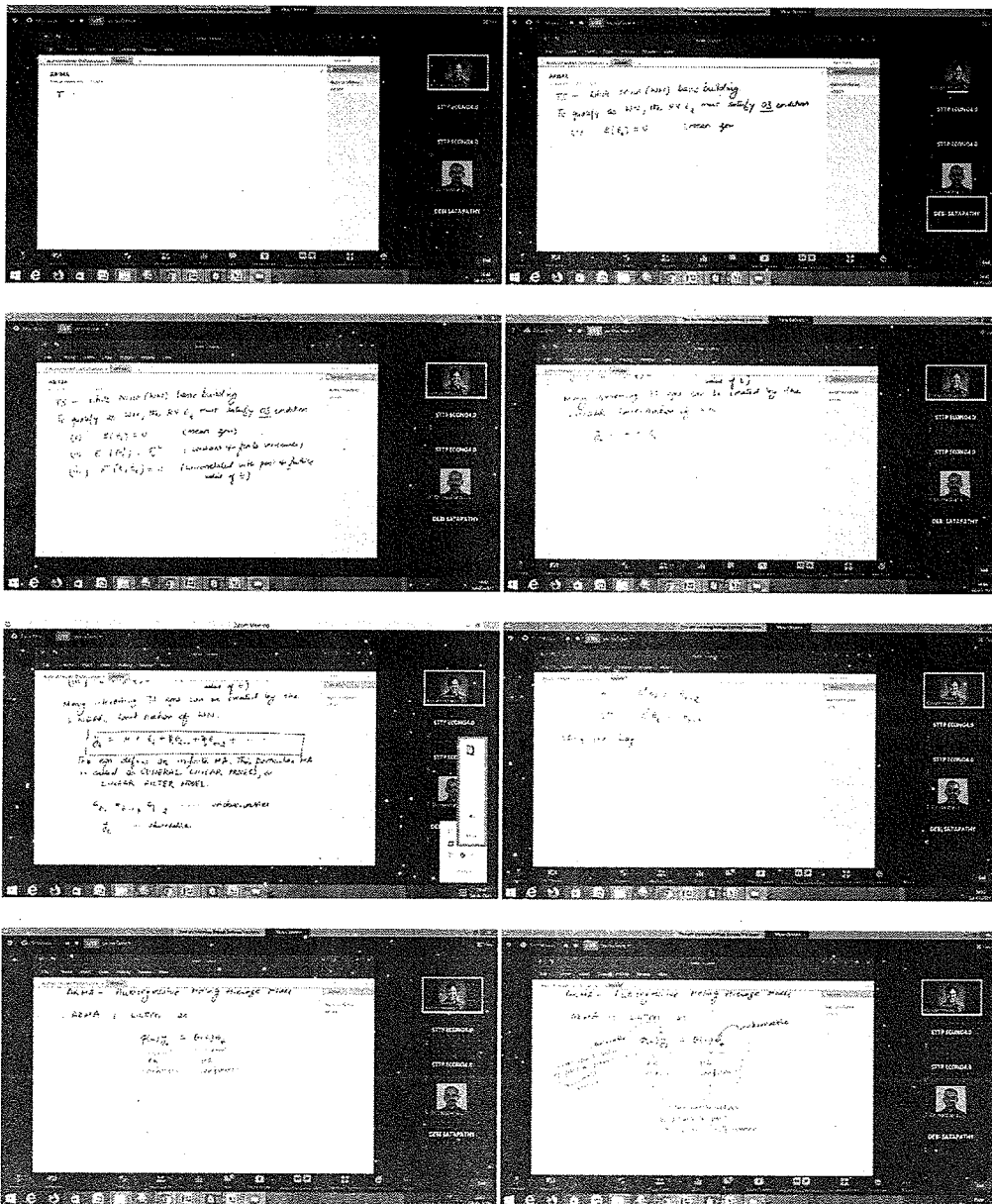


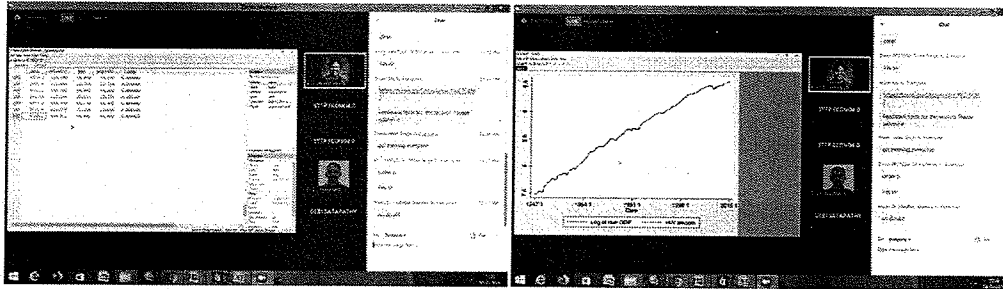
Day 4: 4 March 2021

Session: 3

Time: 2:30 p.m. to 4:30 p.m.

Speaker: Dr. Kulbir Singh





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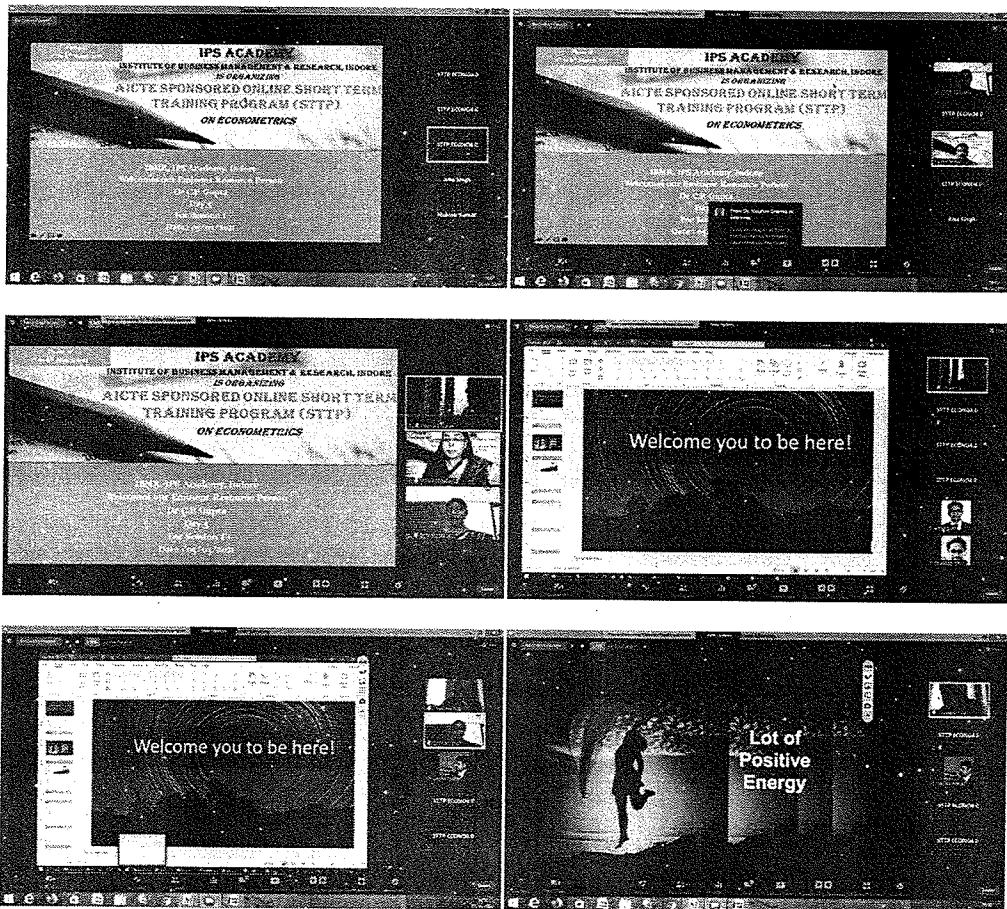


Day 5: 5 March 2021

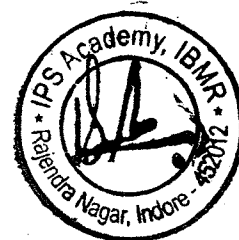
Session: 1

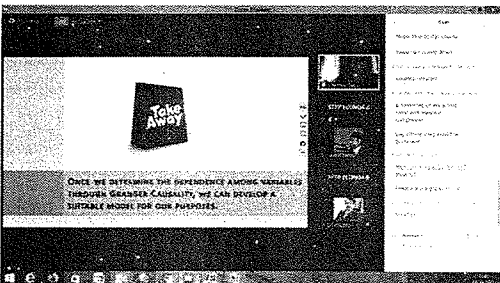
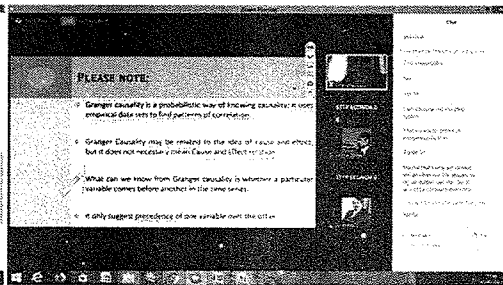
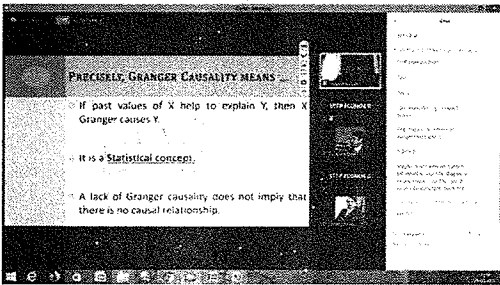
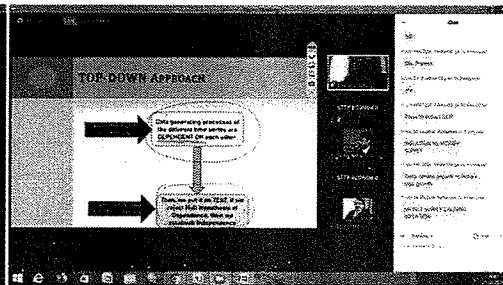
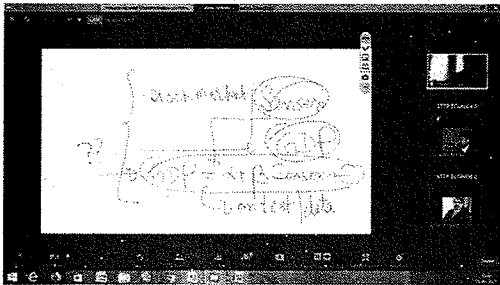
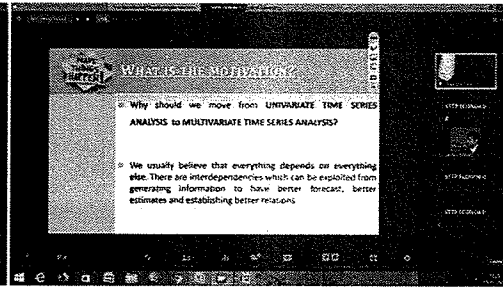
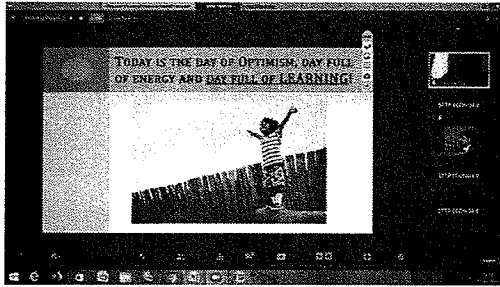
Time: 10:30 a.m. to 11:30 a.m.

Speaker: Dr. C P Gupta

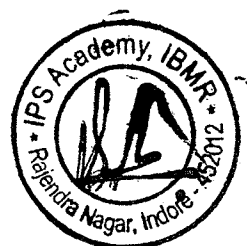


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Day 5: 5 March 2021

Session: 2

Time: 12:00 p.m. to 1:30 p.m.

Speaker: Dr. C P Gupta

The presentation consists of 10 slides, each shown in a screenshot of a video player. The slides cover the following topics:

- Slide 1:** "Imagine ... What if the dependent variable is a BINARY VARIABLE?"
- Slide 2:** "Let's consider a problem..." with a scenario about a researcher Mr. Rajan.
- Slide 3:** "To appreciate the issues involved in a regression model with binary dependent variable, let's consider a model with one explanatory variable." It includes the general model $Y_i = \alpha + \beta X_i + \epsilon_i$ and the conditional expectation $E(Y_i | X_i) = \alpha + \beta X_i$.
- Slide 4:** "The Linear Probability Model - Problem No. 1" discussing the issue of predicted values falling outside the [0,1] interval.
- Slide 5:** "How to ensure the choice of p within interval [0,1]?" It discusses the use of the Logistic Function and the Standard Normal Probability Distribution.
- Slide 6:** A graph showing the S-shaped curve of the Logistic Function.
- Slide 7:** A graph showing the probability density function of the Standard Normal Distribution.
- Slide 8:** "LOGIT Model (continued...)" showing the relationship between the probability and the linear combination of variables.
- Slide 9:** A graph showing the relationship between the probability and the linear combination of variables.
- Slide 10:** A graph showing the relationship between the probability and the linear combination of variables.

LOGIT Model... (continued...)

If p_i can be shown as below -

$$p_i = \frac{1}{1 + e^{-x_i\beta}}$$

then it can be shown that

$$\frac{p_i}{1-p_i} = e^{x_i\beta}$$

This term is called LOGIT and the Model is known as LOGIT Model

Our Standard Normal Distribution

Using LOGIT and PROBIT models...

...can we predict who is going to have value one and who is going to have a value zero?

Yes, for that one has to take a **threshold limit of the probability!**

Normally, such a threshold is taken as $p \leq 50\%$. If probability is more than 50%, it is going to be 1; otherwise it is zero!

Our next challenge was -

Once a Logit or Probit model is fitted, then a question arises - "How best the fit of the model is?"

Within the Brain

Let's begin with a smiling face!

Our next challenge was -

Once a Logit or Probit model is fitted, then a question arises - "How best the fit of the model is?"

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Day 5: 5 March 2021

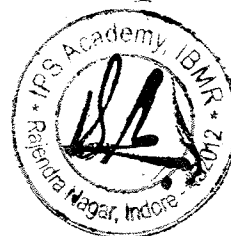
Session: 3

Time: 2:30 p.m. to 4:30 p.m.

Speaker: Dr. C P Gupta



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Day 6: 6 March 2021

Session: 1

Time: 10:30 a.m. to 11:30 a.m.

Speaker: Dr. Arindam Laha



Day 6: 6 March 2021

Session: 2

Time: 12:00 p.m. to 1:30 p.m.

Speaker: Dr. Arindam Laha

Spatial-temporal Difference in Rural Consumption Expenditure: Difference-in-difference

- A general trend of declining rural consumption expenditure across decile groups is noticeable after the rise in food prices in 2008

Digression: Dummy Variables

- Dummy variables: Proxy variable for qualitative data.
- Proxy variable can be constructed for binary (i.e. presence or absence of an attribute) or categorical choices of qualitative variable.
- It is essentially a device to classify data into mutually exclusive categories.
- Dummy variables are also known as indicator variables, categorical variables, qualitative variables, nominal scale variables.
- It is easier to have dummies for cross-section variables, but sometimes we do have for time series as well.
- examples:
 - ✓ Region, gender
 - ✓ Post 2009-1, pre 2009-0
 - ✓ USP method-1, MBP method-0

Regression with Dummy Variables:

- ✓ Dummy Independent Variables: ANOVA and ANCOVA
- ✓ Dummy Dependent Variable: Logit, Probit,
- ✓ Dummy explanatory variables can be used for several purposes
 - ✓ Allow for difference in intercept terms
 - ✓ Allow for difference in slopes
 - ✓ Estimate equations with cross equation restrictions
 - ✓ Test for stability of regression coefficients (i.e. structural break)

ANOVA MODEL: A regression model may contain regressors that are exclusively dummy or qualitative, in nature. Such models are called Analysis of Variances (ANOVA) models.

- ✓ Empirical specification: $Y = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k + \epsilon$
- ✓ ANCOVA MODEL: Regression models containing a mixture of quantitative and qualitative variables are called Analysis of Covariance (ANCOVA) models.
- ✓ Empirical specification: $Y = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k + \epsilon$

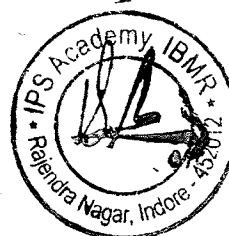
ANOVA and ANCOVA Models using STATA

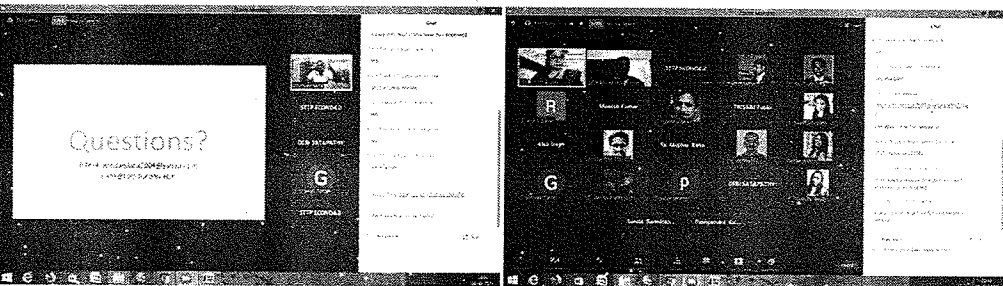
- Import the data:

ANOVA and ANCOVA Models using STATA

STATA output showing regression results for ANOVA and ANCOVA models.

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