Semester VII Economics (H)

6.19 Quantitative Methods

Course title	Credits	Duration (per week)			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical		
Quantitative Methods ECON019	**4**	**3**	**0**	**1**	**NIL**	**NIL**

Learning Objectives

- This course will equip students with the necessary tools to conduct quantitative research, with a strong emphasis on causal inference, regression techniques, time-series analysis and big data applications.
- Students will also gain hands-on experience with empirical datasets related to India and learn how to analyse them using accessible software such as R, Python, STATA etc.

Learning outcomes

- Students will be able to analyse data patterns and answer questions about causality in observed data correlations.
- Students will get a foundation for independent research using the tools taught in the course.

Syllabus

UNIT I: Methods of Causal Inference (15 hours)
Causality vs. Correlation, Potential Outcomes Framework, Randomized Control Trials (RCTs), Instrumental Variables (IV), Regression Discontinuity Design (RDD), Difference-in-Differences (DiD), Matching Methods (Propensity Score Matching, Synthetic Controls), Case Studies and Applications

UNIT II: Regression with Panel Data and Binary Dependent Variables (11 hours)
Pooled OLS vs Panel Data Models, Fixed Effects vs Random Effects Models, Linear Probability Model (LPM) and its Limitations, Logit and Probit Models, High-dimensional and high frequency data and its applications in economic research.

UNIT III: Analysis of Time-Series Data (10 hours)
Stationarity and Unit Roots, Autoregressive(AR) and Moving Average(MA) Models, ARIMA Models and Forecasting, Vector Autoregression (VAR) and Impulse Response Functions, Cointegration and Error Correction Models, Structural Breaks and Policy Impact Analysis

UNIT IV: Data Collection, Textual Data, Network Data and Spatial Data (9 hours)
Primary vs. Secondary Data, Survey Design and Sampling, Understanding Economic and Social Datasets, Introduction to Unstructured Data, Text as Data: Sentiment Analysis, Topic Modeling, Network Analysis in Economics, Spatial Data and Geographic Information Systems (GIS), Applications in Development Economics and Political Economy.

(Practical: 30 Hours)
Practical & Lab Sessions: Introduction to a software like R/Python etc (Data Wrangling, Visualization, Regression Analysis), Working with Large Datasets (Census, NSS, NFHS, Satellite Data, etc.), Empirical Project: Analyzing a Research Question Using Real Data, Replication of Empirical Papers Using Indian Data Sources

Recommended Readings:

- Angrist, J. D., & Pischke, J. S, Mastering Metrics (2014)
- Angrist, J. D., & Pischke, J. S. Mostly Harmless Econometrics, Princeton University Press. (2014)
- Athey & Imbens : Machine Learning Methods that Economists Should Know About (2019)
- Census of India, NSS, NFHS Data
- Chernozhukov, Hansen, Kallus, Splindler and Syrgkanis: Applied Causal Inference Powered by ML and AI (2025)
- Cunningham, S. Causal inference: The Mixtape (2018)
- Donaldson & Storeygard: The View from Above: Applications of Satellite Data in Economics (2016)
- Gelman, Hill & Vehtari: Regression and Other Stories (2021)
- Glennerster & Takavarasha: Running Randomized Evaluations (2014)
- Huntington-Klein, N. The effect: An introduction to research design and causality. Chapman and Hall/CRC (2021)
- Irizarry: Introduction to Data Science with R (2024)
- RBI, IMF, and World Bank Datasets
- Remote Sensing and Satellite Data for Economic Research
- Sargent & Stachurski, A First Course in Quantitative Economics with Python
- Stock & Watson:Introduction to Econometrics (2020)
- Wooldridge: Introductory Econometrics (2019)

Semester VIII Economics (H)

6.20 Economic Development and Policy in India

Course title & Code	Credits	Duration (per week)			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical/ Practice		
Economic Development and Policy in India – ECON020	**4**	**3**	**1**	**0**	**Class 12th**	**NIL**

Learning Objectives

The Learning Objectives of this course are as follows:

- This course will provide an introduction to economic issues related to the Indian economy by familiarizing them with the research studies on in the area of economic development and policy in India with an emphasis on contemporary debates.
- In particular, the course will help students to understand the application of economic theory, and the statistical and econometric techniques that they are taught in other courses.
- The readings provided are indicative. They would depend each year on the nature of current policy discourse.

Learning outcomes

The Learning outcomes of this course are as follows:

- Students will have ability to explore current policy debates and contribute to policy- making in an informed way using relevant databases.
- They will also learn how to conduct independent research in these areas.

Syllabus

UNIT I: Development Policy and Experience (10 hours)
Inequalities, health and nutrition, education

UNIT II: Policies and performance in agriculture (15 hours)
Growth; productivity; agrarian structure and technology; pricing, procurement and farm incomes; food security; agricultural trade.

UNIT III: Policies and performance in industry and services (10 hours)
Growth; productivity; structural changes; diversification; industrial labour

UNIT IV: Globalization, International agreements and climate change (10 hours).

Recommended Readings:

- Kumar, Dharma (2005) ed. CEHI Vol II, revised version, the article on ”The Indian Economy 1970 to 2003”.
- Subramanian, Arvind and Rodrik, Dani (2005). From Hindu Rate of Growth to Productivity Surge: The Mystery of the Indian Growth Transition *IMF Staff Papers* Vol 52, No 2.
- Bhattacharjea, Aditya (2022). Industrial Policy in India Since Independence. Indian Economic Review. Vol.57 pp 567-598.

- Lamba, Rohit and A. Subramanian (2020) “Dynamism with Incommensurate Development: The Distinctive Indian Model” *Journal of Economic Perspectives* Volume 34, Number 1 (Winter 2020), p.3–30.
- Kumar, M. and Jha, P. (2025). "India After 75 Years of Independence: Reflections on Development and Persistent Challenges," Agrarian South: Journal of Political Economy, vol. 14(2)
- Aiyar, A., Rahman, A., & Pingali, P. (2021). India’s rural transformation and rising obesity burden. World Development, 138, 105258.
- Meenakshi, J. V., (2016), “Trends and patterns in the triple burden of malnutrition in India”, *Agricultural Economics*, *47*(S1), 115-134.
- Kingdon, G.G. (2020). The private schooling phenomenon in India: A review. *The Journal of Development Studies*, *56* (10), 1795-1817
- Das, V. K. (2016). Agricultural Productivity Growth In India: An Analysis Accounting For Different Land Types. *The Journal of Developing Areas*, *50*(2), 349–366. http://www.jstor.org/stable/24737407
- CHAND, R. (2012). Development Policies and Agricultural Markets. *Economic and Political Weekly*, *47*(52), 53–63. http://www.jstor.org/stable/41720551
- Ghosh, J. and C.P. Chandrasekhar (2009), The costs of ‘coupling’: the global crisis and the Indian economy, *Cambridge Journal of Economics*, Volume 33, Issue 4, July 2009, p. 725–739.
- Sekhar, C. S. C. & Thapa, N. (2023). Rural market imperfections in India: Revisiting old debates with new evidence. Development Policy Review, 00, e12708. https://doi.org/10.1111/dpr.12708
- Acharya, Rajat (2012), “India’s Trade and Exchange-Rate Policies: Understanding the Bop Crisis and the Reforms Thereafter” in Ghate, Chetan (ed.), *The Oxford Handbook of Indian Economy*, Oxford University Press.
- Dev, M. (2018) *Transformation of Indian Agriculture? Growth, Inclusiveness and Sustainability*. Working paper 2018-026, Indira Gandhi Institute of Development Research, Mumbai.
- Thakur, A. N. (2023). Public Procurement, Land Ownership and Agricultural Price Variation Across States: The Case of Paddy Cultivation in India. Agrarian South: Journal of Political Economy, 12(3), 319-351. https://doi.org/10.1177/22779760231188582
- Birthal, P. Negi, D. Khan, Md. and Agarwal, S. (2015): Is Indian agriculture be- coming resilient to droughts? Evidence from rice production systems, *Food Policy* vol. 56, p. 1-12.
- Nagaraj, R. (2017), Economic Reforms and Manufacturing Sector Growth. *Economic and Political Weekly*.
- Mukherjee, Deeparghya (2021) Is India Moving Up the Global Value Chain? A Sectoral Study of Indian Exports. *Economic and Political Weekly*, 56(20), 12-15.
- Basu, Deepankar and Das, Debarshi, Profitability in India’s Organized Manufacturing Sector: The Role of Technology, Distribution and Demand, *Cambridge Journal of Economics*, Volume 42, Issue 1, January 2018, p. 137–153. https://doi.org/10.1093/cje/bew068
- Nayyar, Gaurav (2013). Inside the black box of services: evidence from India, *Cambridge Journal of Economics*, Volume 37, Issue 1, January 2013, p. 143–170.
- Bhattacharjea, A. (2021), Labour market flexibility in Indian manufacturing: A critical survey of the literature, *International Labour Review*, 160(2), 197-217.
- Das, S.; Ghate, C. and Robertson, P. (2015): Remoteness, urbanization and India’s unbalanced growth, *World Development*, 66, February 2015, 572-287.
- Jayachandran, Seema (2017). Why are Indian children so short? The Role of Birth order and Son Preference *American Economic Review*, September 2017, 17(9):2600- 2629.
- Gangopadhyay, S. Lensink, R. and Yadav, B. (2015): Cash or in-kind transfers? Evidence from a randomised control trial in Delhi, India, *Journal of Development Studies*, 51 (6), 660-673.
- Banerjee, Abhijit, and Rohini Somanathan (2007) “The Political Economy of Public Goods: Some Evidence from India” *Journal of Development Economics* 82 (2): 287–314.

- Chakrabarti, Saumya (2013) Interrogating inclusive growth: formal-informal duality, complementarity, conflict *Cambridge Journal of Economics*, Volume 37, Issue 6, November 2013, p. 1349–1379.
- Sanga, P. and Shaban, A. (2017): Regional divergence and inequalities in India, *Economic and Political Weekly*, 52 (1), January 7, 102-110.
- Suryanarayana, M (2012), Estimating Rural Poverty: Distributional Outcomes, Evaluations, and Policy Responses in Ghate, Chetan (ed.), *The Oxford Handbook of Indian Economy*, Oxford University Press.
- Jayaraj and Subramanian (2010), "Distribution of household wealth in India" in, Jayaraj and Subramanian (eds.) *Poverty, Inequality and Population* Oxford University Press.
- Jayaraj and Subramanian (2010) *Poverty, Inequality and Population*. Oxford University Press.
- Juneja, R., Roy, R., & Gulati, A. (2021). Indian Agriculture@ 75: Past achievements and future challenges. Indian Public Policy Review, 2(6 (Nov-Dec)), 1-18.
- Jha, P., Verma, S., & Kumar, M. (2021). Contours of food security challenges in neo-liberal India. In T. Lima & A. Costantino (Eds.), Food security and international relations: Critical perspectives from the Global South (pp. 25–56). ibidem-Verlag. Brazil.
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- Minten B, Reardon T, Sutradhar R(2010) Food price and modern retail. World Development 38(12), 1775-1787
- Chandra SR Nuthalapathi, Sutradhar R, Reardon T and Qaim M(2020)Supermarket prices and farmgate prices in India World Development, pp1-14
- Sutradhar R, Nuthalapati C S R, Bellemare, M(2019)Whither the pin factory? Modern food supply chains and specialization in India, Agricultural Economics, 50(4), 395-405
- Jayadev, A., & Narayan, A. (2020). The Evolution of India's Industrial Labour Share and Its Correlates. *Development and Change*, *51*(4), 998-1017.
- Deshpande, A., & Singh, J. (2021). Dropping out, being pushed out or can't get in? Decoding declining labour force participation of Indian women.
- Chatterjee, E., Desai, S., & Vanneman, R. (2018). Indian Paradox: Rising Education, Declining Womens' Employment. *Demographic Research*, *38*, 855.