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BA Economics Honours | Semester V | Calicut University

Environment and Sustainable Development

Course Code: ECO5EJ302 • Module 2

Module II: Externalities and Regulations

Environmental degradation is fundamentally an economic pathology of **Market Failure** resulting from poorly defined property rights, missing markets for public goods, and unpriced technological externalities.

Unit 5, 6, 7 & 8: Typology of Externalities and Market Inefficiency

An externality occurs when the consumption or production activity of one party directly impacts the utility or production possibilities of another without market compensation:

- **Negative Production Externalities (e.g., Chemical Factory Effluents):** The Marginal Social Cost (MSC) exceeds the Marginal Private Cost (MPC) by the Marginal External Cost (MEC):

  $$MSC = MPC + MEC$$

  Unregulated competitive markets produce at $P = MPC$, generating an over-allocation of resources and a deadweight social welfare loss.
- **Positive Externalities (e.g., Afforestation, Watershed Restoration):** Marginal Social Benefit exceeds Marginal Private Benefit ($MSB > MPB$), causing free markets to systematically under-provide the socially optimal output.

Unit 9, 10, 11 & 12: Environmental Policy Instruments and Coase Theorem

- **Pigouvian Taxes (Arthur Pigou):** Internalizes the externality by imposing an environmental tax on polluters exactly equal to the Marginal External Cost evaluated at the socially optimal output level ($t^* = MEC$).
- **Command-and-Control Regulations:** Statutory setting of mandatory emission standards, technology mandates, and discharge caps. While legally enforceable, they lack cost-effectiveness across heterogeneous abatement-cost firms.
- **Market-Based Instruments: Tradeable Emission Permits (Cap-and-Trade):** The regulatory authority caps aggregate permissible emissions and distributes or auctions tradeable emission allowances. Low-cost abatement firms reduce pollution beyond their quota and sell excess permits to high-cost abatement firms, achieving the target pollution reduction at minimum aggregate social cost.
- **Ronald Coase and Property Rights (Coase Theorem, 1960):** If property rights are clearly defined and enforceable, and **transaction costs are zero**, private bargaining between the polluter and affected parties will lead to the socially efficient allocation of resources, regardless of which party is originally assigned the legal property right. In practice, high transaction costs and free-rider problems limit pure private bargaining in large-scale environmental disputes.

Advanced Theoretical Formulations and Empirical Frameworks (Analytical Division 1)

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Empirical Methodology, Identification Strategies, and Econometric Estimation

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Consider the structural estimation of policy impacts across decentralized economic agents. When evaluating macroeconomic interventions or microeconomic regulatory changes, parameters estimated from observational datasets must account for expectations formation and structural parameter stability in accordance with the Lucas Critique. Consequently, contemporary applied economics bridges micro-foundations with aggregate macroeconomic phenomena through dynamic stochastic general equilibrium (DSGE) modeling and micro-econometric panel estimations.

Comparative Institutional Analysis, Market Failures, and Policy Governance

Economic outcomes are fundamentally mediated by institutional architectures, legal property rights regimes, and regulatory governance. In emerging market economies such as India, market imperfections—including asymmetric information, transaction costs, infrastructural bottlenecks, and credit constraints—often necessitate nuanced policy interventions that differ substantially from textbook laissez-faire predictions.

Analytical Dimension	Orthodox / Classical Perspective	Heterodox / Institutional Framework	Empirical Policy Manifestations in India
Market Efficiency	Markets clear instantaneously; price mechanism allocates resources optimally without systemic friction.	Markets are prone to structural failures, information asymmetry, and coordination coordination failures.	Targeted regulatory oversight, public investment in infrastructure, and social safety nets.
Behavioral Motivation	Hyper-rational agents maximizing expected utility with complete cognitive computational capacity.	Bounded rationality, behavioral heuristics, loss aversion, and institutional anchoring effects.	Choice architecture, behavioral nudges (NITI Aayog initiatives), and consumer financial protection mandates.
State Intervention	State role restricted to core public goods, contract enforcement, and national defense (minimalist state).	State acts as developmental catalyst, risk-absorber of last resort, and promoter of equitable distribution.	Strategic industrial policy (PLI schemes), counter-cyclical fiscal intervention, and universal public services.
Distributional Equity	Factor rewards reflect marginal productivity; distribution is secondary to allocative efficiency.	Power asymmetries, bargaining power, and historical wealth accumulation shape distribution.	Progressive fiscal transfers, land reforms, and affirmative human capital investments.
Technological Progress	Exogenous technological shocks arriving randomly	Endogenous technological innovation driven by R&D, human capital, and	National Innovation Foundation, Startup India, and public digital

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	(Solow neoclassical growth model).	intellectual property institutions.	infrastructure (India Stack / UPI).

Comprehensive Empirical Analysis: The Kerala Model and Sub-National Development

In the context of the Indian economy and sub-national development paradigms, the Kerala Model of Development provides a seminal empirical case study illustrating the complex trade-offs between social development and economic growth. Characterized by high physical quality of life indicators—including near-universal adult literacy, high life expectancy, and low infant mortality rates comparable to advanced Western economies—achieved despite historically modest per capita state domestic product, Kerala demonstrates the transformative power of public social expenditure, agrarian land reforms, and decentralized local governance (Panchayati Raj institutions).

However, contemporary economic analysis also highlights structural challenges confronting this development paradigm: high educated unemployment, fiscal constraints stemming from escalating public debt servicing and pension obligations, and heavy reliance on external remittance inflows from migrant workers in the Persian Gulf. Sustaining this high-welfare equilibrium necessitates transitioning toward a knowledge-driven economy, incentivizing high-tech manufacturing, and mobilizing sustainable sub-national fiscal resources.

Policy Synthesis and Analytical Evaluation

Policy formulation in dynamic economic environments must therefore synthesize foundational deductive reasoning with robust inductive empirical inquiry. Economists must continuously evaluate the balance between market incentives and regulatory governance, ensuring that institutional frameworks promote both productive efficiency and distributive social justice.

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