

Macroeconometrics

Chapter One - Introduction and Overview

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Overview of This Chapter

01

What is Macroeconometrics?

Definition, Role, and Importance

02

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Three Main Stages of Development

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How to Effectively Study This Course

"Macroeconometrics is not only a tool for analyzing data, but also a bridge connecting macroeconomic theory with the real world."

1. What is Macroeconometrics?

01 / Definition

Macroeconometrics is an interdisciplinary field that combines macroeconomic theory, statistical methods, and real-world economic data to analyze macroeconomic phenomena, test economic theories, evaluate policy effects, and forecast economic trends.



Theory Testing

Verify the validity of macroeconomic theories and their consistency with real-world data.



Policy Evaluation

Quantify the impact of fiscal and monetary policies on key economic variables.



Economic Forecasting

Build models to predict future trends of economic variables like GDP and inflation.



Risk Assessment

Identify potential risks in the economic system and provide early warnings.

Disciplinary Positioning: A Bridge between Theory and Empirics — Macroeconometrics serves as a key link connecting abstract economic theory with complex real-world economies, providing scientific quantitative support for policy-making and strategic decisions.

2. Disciplinary Development: Three Stages

01 Traditional Macroeconometrics

1930s - 1970s



Representatives: Tinbergen, Klein



Core Method: Simultaneous Equation Models (SEM)



Characteristics: Emphasized structural modeling based on economic theory for policy analysis and forecasting

02 Modern Macroeconometrics

1980s - 2000s



Representatives: Sims, Engle, Granger



Core Methods: Vector Autoregression (VAR), Unit Root and Cointegration, ARCH/GARCH



Characteristics: Data-driven, focused on statistical properties and dynamic analysis

03 Frontier Macroeconometrics

2010s - Present



Core Methods: Mixed-Frequency Data Models, Bayesian Methods, Machine Learning, High-dimensional VAR Models, High-dimensional Factor Models



Characteristics: Addressing big data challenges, integrating machine learning, focusing on nonlinearity and time-varying features

3. Dual Challenges of Contemporary Research

01 / Data Challenges



Big Data Era

Emergence of massive, high-frequency, multi-source data



Mixed-Frequency Data

Integration of data at different frequencies (e.g., annual GDP vs. monthly CPI)



Data Quality

Issues of data revision and measurement errors

02 / Theoretical Challenges



Model Complexity

How to handle high-dimensional, nonlinear, time-varying parameter models



Structural Changes

Sudden and gradual changes in economic structure



Identification Problem

Causal inference without clear theoretical guidance

Core Insight: Only by promoting paradigm innovation in econometric methods and integrating modern statistical theory with machine learning technology can we break through the dual constraints of data and theory, and improve the accuracy and forward-looking nature of macroeconomic analysis.

4. System and Features of This Book

01 System Structure: A Progressive Ladder



Foundation: Econometric Fundamentals
Data processing, classical time series models



Core Methods
VAR, Nonlinear Models, State Space Models



Frontier Expansion
Mixed-Frequency Data Models, Big Data Econometrics

02 Main Features: Deep Integration of Theory and Practice



Theoretical Depth

Complete derivation of theoretical foundations



Local Perspective

Extensive use of Chinese macroeconomic data



Application-Oriented

Emphasizing the complete "Data-Model-Conclusion" analysis chain



Teaching Support

Exercises and practical cases in each chapter

5. Learning Suggestions and Objectives

01 / Learning Suggestions



Emphasize Mathematical Foundations

Calculus, Linear Algebra, Probability and Statistics



Balance Theory and Practice

Understand theory and implement through programming



Focus on Chinese Reality

Combine with actual Chinese economic issues



Progress Step by Step

Start with simple models and gradually move to complex ones

02 / Learning Objectives



Master Theoretical Foundations

Master basic theories and methods of macroeconometrics



Enhance Empirical Abilities

Acquire ability to analyze Chinese macroeconomic issues using econometric models



Deepen Academic Understanding

Be able to read and understand academic literature in related fields



Lay a Solid Research Foundation

Lay a solid foundation for further research or practical work