Chapter 1: The Subject Matter

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What Is Macroeconomics?

Defining the Field

Several definitions of macroeconomics, each with caveats:

1. **Study of aggregates**: GDP, inflation, unemployment, interest rates
    - But: macroeconomics today is deeply concerned with *distributions* (income, wealth), not just aggregates
2. **Quantitative study of general equilibrium**
    - But: full GE is not always necessary; single-country analysis is inherently partial
    - Key insight: behavior of consumers and firms given prices often matters more than market clearing
3. **Study of dynamics**: investment, expectations, transitions
    - But: static analysis can shed fundamental light too

Additionally: Macroeconomics tracks current events—the field follows the major issues of the time (Great Recession, COVID-19, 2025 tariffs).

Goals of This Chapter

Two main goals:

1. Introduce the **central questions** that macroeconomists study
2. Emphasize a key theme: macroeconomics is fundamentally an **empirical** field
    - **Measurement** and **theory** are intertwined
    - They have evolved in tandem: new data inspires new theory, and new theory creates demand for new data

Approach: Walk through important events in the development of the field, illustrating how measurement and theory responded to the major needs of the time.

The chapter also motivates the empirical and theoretical methods used throughout the textbook.

The Great Depression: What Is Going On?

The Birth of National Accounts

About 100 years ago: macroeconomists had virtually **no systematic data**—only scattered accounts of production figures and prices.

The Great Depression made systematic measurement urgent:

- National income and product accounts began in the 1920s
- Major research achievements: Colin Clark, Simon Kuznets, Richard Stone
- Newly available data helped Keynes and others analyze the macroeconomy

Keynes: Emphasized market imperfections (sluggish wages and prices), leaving room for demand declines to affect production. Simple theories connecting output, consumption, and investment were developed and remain influential today.

What Do We Measure? GDP and Price Indices

GDP: Measure of how much the market economy is producing.

- Does not count leisure, amenities, illegal transactions
- Can be measured three ways: sum of final expenditures, sum of incomes, sum of value added
- Income splits into labor income (wages/salaries) and capital income (profits, interest, dividends)

Price indices: Needed to separate nominal changes into quantities and prices.

- Weighted averages of prices. Weights = expenditure shares
- Choices: arithmetic vs. geometric; base-year vs. evolving weights (e.g., Törnqvist)
- Often guided by microeconomic theory

Capital treatment: Expenditures on capital are final expenditures (counted in GDP), though capital is in some sense an intermediate good used in future production.

The Pandemic: "What Is Going On?" Redux

A parallel to the Great Depression occurred during COVID-19:

- Economies changed massively overnight
- Economists needed **high-frequency, real-time** measures of activity
- Used transaction and commercial data (e.g., credit card spending patterns)
- Credit card data also valuable for measuring marginal propensities to consume out of government transfers

Lesson: "What is going on?" is a question that recurs whenever the economy is hit by unprecedented shocks. New data needs arise each time.

Long-Run Growth

Solow and Growth Accounting

By the mid-1950s: enough data to analyze growth performance.

Solow's two papers:

- 1956: The neoclassical growth model
- 1957: Growth accounting—decompose aggregate growth into contributions of each input plus a residual ("Solow residual" = technical change)

Key finding: Technical change is of great, and direct, importance for US growth.

Reaction: Was the residual overstated?

- Workers' skills improving (schooling, on-the-job learning)
- Mincer (1958): one more year of schooling $\approx$ 10% higher wage $\Rightarrow$ "human capital"
- Hall and Jorgenson (1969): user cost of capital—measuring the year-by-year price of capital

Cross-Country Comparisons and Endogenous Growth

Measurement across countries:

- Kravis, Summers, and Heston (1978): comparable data for 100 countries $\Rightarrow$ Penn World Tables
- Maddison: GDP estimates going back to early 19th century
- PPP adjustment: purchasing power varies across countries

Key question: What makes some countries grow fast and others stagnate?

Endogenous growth literature (late 1980s–1990s):

- Endogenous nature of technological change (incentives to innovate)
- Human capital accumulation
- Patent data: Who becomes an inventor?

Structural Change

Structural change: Some sectors shrink, others grow.

- Typical development: agriculture $\rightarrow$ manufacturing $\rightarrow$ services
- Agriculture: $\sim$1% of US workforce vs. 80% in poorest countries
- Manufacturing overtaken by services

Current concerns:

- Automation and AI: implications for performance, inequality, firm competition
- Women's labor-force participation: steady rise in US postwar
- Government sector size and role
- International trade patterns

These are slow-moving trends, never causing immediate media attention, but crucial for economic welfare. Research on growth has come in waves.

The 1970s: Stagflation and the Lucas Critique

The 1970s: An "Oops"

Post-war period to early 1970s: steady growth, Keynesian "fine tuning."

Then: The 1973 oil crisis (OPEC) and a sharp recession.

- **Productivity slowdown**: appeared permanent to many
- **Rising inequality**: different expressions in different countries
  - US and UK: sharply rising wage inequality
  - EU countries: very high and persistent unemployment
- Expansionary monetary policy $\Rightarrow$ limited success; high inflation (10–20%)
- **Stagflation**: simultaneous stagnation and inflation

Search Theory and the Lucas Critique

Search models (McCall, 1970; Mortensen, 1972):

- Developed in early 1970s, before the crisis
- Became cornerstone of unemployment theory (Chapter 20)
- Generated new data needs (e.g., time spent job searching, JOLTS)

The Lucas Critique:

- Reduced-form relationships between aggregates can **break down** if policy changes
- Case in point: the **Phillips curve** (u vs. π)
- Lucas (1972): exploiting this trade-off with monetary policy would make the relationship itself break down
- When it did break down in the 1970s, Lucas's critique gained added force
- Marked a clear break in the development of macroeconomics

Labor Market Data

Much of our labor market information comes from **surveys**:

- **CPS** (Current Population Survey): monthly, BLS + Census Bureau; measures employment, unemployment, hours, wages; limited panel feature
- **PSID** (Panel Study of Income Dynamics): University of Michigan since 1968; follows individuals over time
- **NLS, SIPP**: other individual panel datasets (BLS, Census Bureau)
- **JOLTS** (Job Openings and Labor Turnover Survey): BLS; data on labor market flows (vacancies, hires, separations); invaluable for search models
- **ATUS** (American Time Use Survey): BLS since 2003; detailed daily activities including job search time
- **Firm-level surveys**: Annual Survey of Manufactures (Census Bureau); report work hours for employees

The 2021–2022 Inflation Echo

2021–2022: Sharp rise in inflation, amplified by Russia-Ukraine war energy shock. Fears of a new stagflation period.

Response: Central banks raised interest rates sharply (2022–2023).

Outcome: Inflation fell back (energy costs eased, supply bottlenecks decompressed), labor markets stayed tight. Feared stagflation did not materialize.

Lesson: Macroeconomists are better equipped today, but every challenge has unique properties.

Kydland and Prescott: Quantitative Theory

Kydland and Prescott (1982)

Lucas's critique was not just destructive—he suggested building on **microeconomic theory**.

Kydland and Prescott (1982) showed how to do this with **quantitative theory**:

- Base microeconomics on empirical studies in applied fields (labor economics, consumption)
- Import parameter values from empirical microeconomic literatures
- Compare model output systematically with data
- Data must be **filtered** before comparison (separate trend from cycle)

Result: An explosion in macroeconomic studies.

Filtering

Macroeconomic models define stochastic processes. To compare with data, must extract the aspect of the data under study.

- Stochastic processes can be thought of as sums of sub-processes at different frequencies
- Business cycles: periodicities of $\sim$1.5–8 years
- **Band-pass filters**: remove frequencies outside a specified range
- Kydland and Prescott used the **Hodrick-Prescott (HP) filter**—intuitive, widely used
- Medium/long-run studies: remove high frequencies, retain low/medium
- Financial economics: retain only very high frequencies

From Perfectly Working Markets to New Keynesian Models

First wave: perfectly working markets, no monetary policy ("real business cycle" models).

Subsequent enrichments:

- Added frictions: virtually no practical macro model today is free of market imperfections
- Key friction: **price stickiness** (firms face costs in adjusting prices, adjust infrequently)
- Makes monetary policy have direct effects on the economy
- $\Rightarrow$ **New Keynesian framework**: microfounded + sticky prices (and/or sticky wages)

Measurement response: Bils and Klenow (2004) studied CPI survey data, recorded the frequency of price adjustments $\Rightarrow$ parameterized adjustment-cost models.

Waves of Macroeconometrics

Comparing Models to Data: A Methodological Challenge

"All models are wrong but some can be useful."

A useful model bridges the gap from observable data to the question we want to answer. Knowing which data are important to match is "often argued to be an art. But art, too, can be taught."

Evolution of methods:

- **Keynesian era**: Large estimated systems with ad-hoc dynamics, lags for better fit
- **Post-Lucas critique**: Back to the drawing board
    - Structural estimation: maximum likelihood, Bayesian techniques
    - Generalized Method of Moments (GMM)

Calibration

Calibration (Kydland and Prescott): Select model parameters based on moments of the data *other* than those in focus.

Two sources of parameter values:

1. **Micro data**: risk aversion, intertemporal substitution
2. **Long-run facts**: low-frequency data not in focus for high-frequency questions

Then derive the model's predictions for the phenomenon of interest.

Spirit: Parameters are not chosen to match the target moments. Broad patterns matter more than precise fit. Can the model "at all account for the phenomenon, or are the magnitudes severely off?"

Limitation: Does not lend itself to formal hypothesis testing (shared with Bayesian analysis).

VARs and Natural Experiments

VARs (Sims, 1980): A much less structural approach.

- Focus on identifying causal effects in aggregate data
- Observe plausibly exogenous shocks
- Trace out impulse response functions
- Very common tool in macroeconomics

Natural experiments: Increasingly used to identify causal relationships at the micro level.

- Johnson, Parker, and Souleles (2006): random timing of US tax rebates $\Rightarrow$ measure MPC
- Acemoglu, Johnson, and Robinson (2001): colonial-era institutions $\Rightarrow$ long-run growth
- Romer and Romer (1989): narrative approach to monetary policy (Fed meeting minutes)
- Big-data tools and text analysis entering the field

Intuition vs. Quantitative Use

Kydland and Prescott also changed how macroeconomists build models:

- **Before**: Models aimed at building intuitive understanding of mechanisms (e.g., Lucas 1972)
- **After**: Larger, parameterized models delivering quantitative output
    - Aggregate across many mechanisms within a single model
    - Often nonlinear, impossible with pencil and paper
    - Solve numerically, simulate, compare model output (Chapter 10)

Has **not** replaced the need for small models to build intuition. But the aim is to ultimately have both intuitive understanding *and* quantitative assessments.

Macroeconomics and Inequality

Wage and Income Inequality

Late 1970s: sharply rising wage inequality, continuing (with varying intensity) to the present.

Candidate explanations:

- Technological change (skill-biased, automation, AI)
- Increased exposure to trade
- Changes in unionization

Labor share: Remarkably stable during postwar US, but has trended downward in recent decades (also in other countries). Hypotheses: structural change, technological change, changes in competition.

Additional dimensions: Gender wage gaps, racial and ethnic gaps, relative hours worked across groups.

Wealth Inequality and Heterogeneous-Agent Models

Why macroeconomists care about wealth inequality:

1. **Intrinsic interest**: inequality is undesirable; political stability concerns (Piketty, 2014)
2. **Heterogeneity matters for policy**: cash-constrained households spend tax rebates; rich households save them $\Rightarrow$ distributional data determines efficacy of interventions

Heterogeneous-agent models (began 1990s):

- Response to both reasons above
- Now a major workhorse for business cycles, inequality, and government policy
- Generated a very large literature

Data: Various sources indicate significant increase in US wealth inequality since late 1970s. Similar trends documented in other countries.

Microeconomic and Administrative Data

- **Survey data**: CPS, PSID, SCF—long the main source of micro data
- **Administrative data** (tax records, government programs):
  - More accurate than self-reported surveys
  - Often much larger (sometimes entire population)
  - But narrow in scope and tightly controlled for privacy
- **Business data**: payroll companies (e.g., Grigsby, Hurst, Yildirmaz, 2021), custom surveys
- **Matched employer-employee data**: which firms match with which workers; how wages are set

Firm data: Census Bureau, BLS, commercial vendors (Compustat, Orbis, NETS). Includes entry/exit dynamics, R&D expenditures, patent data.

Measuring Individual Wealth

- US does not tax wealth $\Rightarrow$ no direct administrative data
- **Survey of Consumer Finances (SCF)**: Federal Reserve Board, every 3 years since 1983; voluntary but efforts at representativeness
- **Capitalization method**: Use IRS capital income data + assumed rate of return to estimate wealth
- **World Inequality Lab**: Combines national accounts, balance sheets, surveys, tax data, and "rich lists" (`https://wid.world/`)
- Small set of countries have taxed wealth and therefore have administrative data

Taxes, Government, and Time Consistency

Taxes and Government Activities

Many western countries have experienced slow, long-run increases in the role of government:

- Share of GDP, employment, and transfers (Social Security, welfare)
- US marginal tax rates peaked before Reagan, then progressivity lowered; corporate tax rates have also changed

Key questions:

- How have tax changes affected hours worked, economic activity, and inequality?
- Choice between different tax bases: capital income, labor income, corporate, sales, property, seignorage
- Intersection of macroeconomics and public finance
- Public debt: crowding out of private investment, debt sustainability, sovereign stress

Time Inconsistency

Tax policy: Efficient to levy taxes on already-installed capital (non-distorting). But if investors know future capital will be taxed, current investment is distorted.

$\Rightarrow$ Government would like to promise not to tax future capital, but ex post wants to change its mind: **time inconsistency problem** (Kydland and Prescott, 1977).

Monetary policy: Similar tensions—promise to be tough on inflation to shape expectations, but temptation to renege.

$\Rightarrow$ **Central bank independence** and inflation-targeting strategies designed to enhance commitment power. Shaped by lessons of the 1970s–80s.

More broadly: interaction between macroeconomics and politics is an active sub-field.

The Great Recession

The Great Moderation and Its End

- 1979: Volcker's tight monetary policy $\Rightarrow$ recessions in early 1980s, but inflation came down
- 1999: Euro created (ten currencies replaced)
- Mid-1980s to 2008: The **Great Moderation**—healthy growth, low volatility
    - Attributed to: transparent Fed policy, changes in technological shocks, New Keynesian framework at central banks

Then, 2007: A severe, worldwide economic downturn.

- Not as deep as the Great Depression, but: unemployment rose sharply, recovered very slowly
- 2009: Eurozone debt crisis (Greece, Cyprus, Ireland, Portugal, Spain)
- Significant uncertainty about government policy paths

Causes and Consequences

Consensus: Combination of excessive risk-taking in housing markets + severe frictions in financial markets.

Research response:

- Research on financial markets, institutions, and regulation
- Asset markets, debt buildups, and risk-taking intricately intertwined with macroeconomy
- Downward trend in real interest rates $\rightarrow$ more severe asset-price fluctuations, bubbles, cryptocurrency
- Financial frictions now play a prominent role in macro models

Basic framework not abandoned, but enriched in the direction of financial frictions.

"The next recession will rarely have the same characteristics as the most recent one"—theories grow richer, rather than cycling back and forth.

Financial Data

- **Key question**: Financial stability—domino effects from interdependencies in portfolios and liabilities
- The Great Recession: small mortgage-market shock had outsized effects due to opaque packaging and distribution of mortgage liabilities
- **Flow of Funds** (Federal Reserve Board): quarterly Financial Accounts of the US—assets and liabilities of households, businesses, governments, financial institutions
    - Aggregate data; useful for tracking indebtedness trends
    - Not quite sufficient for detecting inter-institution interdependencies
- Asset prices for publicly traded firms: widely available
- Non-traded firms: much harder (private equity, venture capital increasingly important)
- Individual portfolio decisions: limited to surveys (e.g., SCF)

Global Interactions

International Transmission and Sovereign Default

The Great Recession was global:

- Stresses from US housing/banking spread through funding markets, cross-border exposures, trade collapse
- Highlighted importance of open-economy models
- Shocks propagate via capital flows and relative price movements (terms of trade, real exchange rates)

European sovereign-debt crisis (2011–12):

- Exposed fragilities in euro-area financial system
- Greece, Cyprus restructured debt; Ireland, Portugal, Spain saw spreads spike
- Brought sovereign-default models (originally for Latin American crises of the 1980s) back to center stage

Post-pandemic: Rising public debt ratios worldwide keep these topics salient.

Climate Change and Energy Economics

Climate Change and Energy

Climate change: Intersection of macroeconomics and environmental economics was near-empty until late 20th century.

Macroeconomists' contributions:

- **Damage measurement**: studying how aggregates react to weather and climate
- **Integrated assessment models**: examining how different policies influence both economic and climate outcomes jointly
- Upsurge in quantitatively oriented modeling of global macro-climate interactions

Energy economics: Attention from the 1970s oil shocks, underscored by recent events (Ukraine war).

- Nature of energy supply; how the economy reacts to shortages
- Potential for technological change in energy
- Research result communication to policymakers is valuable

Where Do We Stand?

Self-Criticism and Progress

Question: Are macroeconomists better positioned today to meet the next challenge?

- Macroeconomists do admit mistakes—multiple changes in thinking described above
- Sometimes theories lacked relevant features $\Rightarrow$ added as swiftly as possible
- Sometimes surprised by non-economic shocks that generated economic downturns

Guided by research, macroeconomic policy has been increasingly successful over time.

- Responses to the Great Recession and 2020 pandemic benefited in major ways from macroeconomic research
- Lessons from one recession are typically useful in the future

Combining Insights, Not Cycling

We do not cycle back and forth between models. Rather, we combine insights as they arrive.

Example: Keynes's insights were crucial, but the 1970s brought a break in foundations. Keynesian insights have since been **added back** into newer, more sophisticated models. These models are clearer on the circumstances under which Keynes's ideas apply.

Ongoing developments:

- Rational expectations may evolve as we get more data on how forecasts are actually made
- Financial frictions are now recognized as potentially critical
- How to identify key frictions and prevent crises is still open
- Rich models are not an end in themselves—simplification for communication and teaching remains essential (IS-LM, RBC models can still build understanding)

Looking Ahead

Next: Chapter 2 dives into macroeconomic data and introduces Solow's framework.

The **neoclassical growth framework** is the core setting used in macroeconomics:

- Precisely motivated by long-run facts that are hard to explain without this theory
- Parameters Solow treated as exogenous (saving rates, hours) are better understood as conscious choices in a market environment

Virtually every subsequent chapter builds directly on the market version of the neoclassical growth model:

- Growth, business cycles, asset prices, labor markets, inequality, fiscal and monetary policy, international macro, climate. . .