Chapter 23
Business Cycles: Outline

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23.1 Introduction

23.2 Before Probability: Early Views of Economic Fluctuations (pre-1930s)

23.2.1 Early Cycle Theories

23.2.2 The NBER Program and Descriptive Business-Cycle Measurement

23.2.3 From Regular Cycles to Impulse–Propagation

23.2.4 The First Econometric Cycle Models

What aged well

- NBER-style documentation of cycle facts (co-movement, timing, duration).
- The trend vs. cycle distinction.
- Impulse–propagation (Frisch–Slutsky) as a lasting organizing framework.

What did not age well

- Deterministic cycle theories without stochastic foundations.

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- Description without probability: weak inference and no credible counterfactuals.
- Mechanical detrending without a model of persistence or uncertainty.
- No identification: shocks not separated from propagation.

Lessons

- Probability is needed to separate shocks from propagation and enable inference.
- The lasting value is measurement and concepts, not specific early models.
- These gaps set up Cowles: probabilistic structural models + identification.

23.3 The Structural Ambition: Macroeconometrics After the Cowles Commission (1930s–1960s)

23.3.1 Simultaneous Equation Models

23.3.2 Large-Scale Models Macroeconometrics

23.3.3 Policy Counterfactuals and Emerging Fragilities

What aged well

- Explicit use of probability, estimation, and identification.
- Clear distinction between structural equations and reduced forms.
- Counterfactual policy analysis as a central empirical objective.

What did not age well

- Heavy reliance on exclusion restrictions and ad hoc dynamics.
- Weak theoretical foundations for expectations and adjustment.
- Structural parameters not invariant to policy regimes.

Lessons

- Structural interpretation requires both identification and behavioral discipline.
- Policy analysis based on empirically estimated equations is fragile without policy invariance.
- These weaknesses motivated the equilibrium turn and the Lucas critique.

23.4 The Equilibrium Turn in Business-Cycle Theory (1970s–1980s)

23.4.1 Rational Expectations and the Critique of Policy Analysis

23.4.2 Real Business Cycle Models and the Rise of Calibration

23.4.3 Empirical Tensions and Limitations of Early RBC Models

What aged well

- Rational expectations and policy-invariant structural parameters.
- Explicit microfoundations and general equilibrium discipline.
- Quantitative evaluation of dynamic stochastic models.

What did not age well

- Overreliance on technology shocks as the sole driver of cycles.
- Weak internal propagation and limited persistence.
- Calibration without formal estimation or statistical fit.

Lessons

- Policy evaluation requires models invariant to regime changes.
- Microfoundations alone are insufficient without empirical discipline.
- Data-driven benchmarks are needed to assess equilibrium models.

23.5 Re-Centering on the Data: The Reduced-Form Revolution and Cycle Measurement (late 1970s–1990s)

23.5.1 From Structural Systems to Agnostic Dynamics

23.5.2 Structural VARs (SVARs) and the Search for Interpretation

23.5.3 High-Dimensional and Bayesian VARs in Forecasting

23.5.4 VAR-Based Permanent–Transitory Decompositions (Beveridge–Nelson)

23.5.5 Statistical Filters and Their Limitations

What aged well

- Minimal assumptions and strong empirical discipline.
- VARs as flexible descriptions of joint macroeconomic dynamics.
- Forecasting performance and transparency relative to large structural models.

What did not age well

- Lack of intrinsic economic interpretation of shocks.
- Identification based on ad hoc or fragile restrictions.
- Sensitivity of structural conclusions to ordering and specification choices.

Lessons

- Reduced-form methods are powerful empirical benchmarks but insufficient for policy analysis.
- Identification cannot be avoided; it can only be deferred or externalized.
- The reduced-form revolution re-centered macroeconometrics on data, but not on causality.

23.6 Identification and Measurement After VARs (1990s–2000s)

23.6.1 Narrative and High-Frequency Identification

23.6.2 External Instruments (Proxy SVARs)

23.6.3 Local Projections

23.6.4 State-Space Models

23.6.5 Mixed-Frequency and Real-Time Measurement

What aged well

- Recognition that credible causal inference requires information beyond VAR structure.
- Use of institutional detail, timing, and market reactions to isolate shocks.
- Shift toward transparent identification assumptions that can be debated and tested.
- Model-based decompositions that define trends and cycles through explicit stochastic processes.
- Multivariate approaches (VARs, state-space models) that exploit comovement across series.
- Real-time and mixed-frequency methods that acknowledge data limitations faced by policymakers.

What did not age well

- Heavy reliance on exclusion, long-run, or sign restrictions internal to VARs.
- Identification schemes sensitive to ordering, detrending, or small specification changes.
- Overconfidence in structural interpretation without external validation.
- Mechanical detrending procedures with arbitrary smoothing parameters and weak statistical foundations.
- Filters that impose frequency-based notions of the cycle without economic interpretation.
- Trend and gap measures treated as "true" objects despite high model sensitivity and revision instability.

Lessons

- Trends and cycles are not directly observable; they are model-dependent constructs.
- Measurement choices embed strong assumptions about persistence, shocks, and adjustment dynamics.
- Credible business-cycle analysis requires transparency about these assumptions and robustness across methods.

23.7 Estimation and Synthesis in New Keynesian DSGE Models (1990s–2010s)

23.7.1 Nominal Rigidities and the Limits of RBC

23.7.2 State-Space Representation and Likelihood-Based Estimation

23.7.3 The Rise of Bayesian Methods

23.7.4 Theory, Estimation, and Policy Use Synthesis in Medium-Scale DSGE Models

23.7.5 Stress Testing DSGE Models: The Great Recession and Financial Frictions

What aged well

- The integration of nominal rigidities and real frictions into dynamic general equilibrium models, which substantially improved empirical performance relative to frictionless RBC frameworks.
- The use of state-space representations and the Kalman filter to connect theory to data in a coherent likelihood-based framework.

- Bayesian estimation as a practical solution to weak identification and overparameterization, allowing medium-scale DSGE models to be estimated and compared systematically.
- The Smets–Wouters paradigm, which demonstrated that DSGE models could rival VARs in forecasting while retaining structural interpretability, leading to widespread policy adoption.

What did not age well

- Early reliance on linearized models around a unique steady state, which limited the ability of DSGEs to capture large crises, regime shifts, and nonlinear dynamics.
- The interpretation of estimated structural shocks as deep economic primitives, despite their often reduced-form nature and sensitivity to model specification.
- Overconfidence in representative-agent frameworks, which abstracted from distributional dynamics, balance sheets, and heterogeneous responses that later proved empirically important.
- The perception that Bayesian fit implied model correctness, blurring the distinction between statistical adequacy and structural validity.

Lessons

- Empirical success in macroeconometrics requires a balance between theoretical discipline and flexibility in fitting dynamic data.
- Estimation techniques can stabilize models without resolving underlying misspecification; improved fit does not eliminate the need for continual model scrutiny.
- The DSGE estimation revolution succeeded methodologically, but its limitations motivated subsequent advances toward richer frictions, nonlinear solution methods, and heterogeneous-agent frameworks.

23.8 Beyond the Representative Agent (2010s–present)

23.8.1 Household Heterogeneity and Redistribution Channels

23.8.2 Firm Heterogeneity and Production Networks

23.8.3 Micro Data as a New Source of Empirical Discipline

23.8.4 Nonlinear and Simulation-Based Estimation Methods

23.8.5 Computational Innovations: Machine Learning and Approximation Methods

What aged well

- The recognition that cross-sectional heterogeneity in wealth, income, and firm size materially alters aggregate dynamics and policy transmission.
- The integration of production networks as empirically grounded propagation mechanisms, explaining sectoral comovement and amplification from micro shocks.
- The use of rich micro data to discipline macro models beyond aggregate time-series moments.
- Reduced-form tools (distributional IRFs, panel local projections) that document heterogeneous responses in a transparent and credible way.

What did not age well

- The assumption that representative-agent models provide reliable approximations for economies with large inequality and balance-sheet heterogeneity.
- The expectation that adding heterogeneity alone resolves identification and misspecification problems.

Lessons

- Heterogeneity changes not only quantitative magnitudes but also the qualitative transmission of shocks.
- Empirical credibility requires linking heterogeneous-agent models to micro data and reduced-form evidence.
- Advances in computation and estimation are complements—not substitutes—for careful identification.
- The integration of micro heterogeneity represents a structural extension of DSGE models, not a rejection of equilibrium-based macroeconometrics.

23.9 Lessons from the History of Business-Cycle Analysis

23.9.1 What Persisted Across Paradigms

23.9.2 Recurring Tensions Between Theory and Data

23.9.3 Open Questions and Future Directions

References