Classical Economics

• Say’s Law
  • Supply creates its own demand
  • Saving is irrational
  • Products are paid for with products, so money has only a momentary function

• Bastiat’s Fallacy
  • Destruction and repair is not a net benefit
  • Opportunity costs of repair have economic consequences
Keynesian Revolution

• Business cycle literature vs. Growth literature

• Refutes Say’s Law
  • supply creates its own demand

• Stable relationships: Keynes (1936)
  • Consumption function of total income \( C = c(Y) \)
    • Fiscal multiplier
  • Phillips curve \( \pi = f(u) \) between inflation and unemployment

• Unstable money demand + Liquidity trap
  • Monetary policy ineffective - focus on fiscal policy
Monetarism

- Stable relationship: money demand
  - Quantity theory of money $vM = PY$
  - Quantity of money $M$ is exogenous

- Consumption is a function of *permanent* income
  - Fiscal intervention only provides temporary income

- Economic instability was caused by inept monetary policy – Friedman & Schwartz (1963)
Neo-Keynesianism

• Hicks’ (static) IS/LM model, Alvin Hansen

• Synthesis of neoclassical and Keynesian ideas
  • Samuelson, Tobin, Modigliani

• Short vs. Long Run
  • Market failures only in the short run, as current prices are essentially predetermined
  • Price and wage rigidities

• Large scale equation by equation behavioral models

• Financial sector is a veil – no financial frictions
Post-Keynesianism

• Neo-Keynesianism (IS/LM model) is a misinterpretation of Keynes’ ideas

• Heterogeneous group
  • Financial frictions, speculation
    • Minsky
  • Irrational expectations, animal spirits
  • Disequilibrium analysis
    • Mark-up pricing, Eichner
    • ...

Rational Expectations

- Rational Expectations
  - Sargent & Wallace show that systematic monetary policy aimed at stabilizing economy is doomed to fail
  - Phillips curve was empirically rejected

- Micro-foundations are key for policy analysis
  - Lucas critique
  - Structural instead of reduced-form relations

- Fully dynamic models (of business cycles)
  - Time inconsistency problem
Real Business Cycle Theory

• Real shocks to technology cause economic fluctuations
  • Supply side focus – TFP shock only
  • Quantitative macro
  • Shocks induce substitution of consumption and leisure

• Model selection: calibration exercises

• Instantaneous price adjustment – no financial frictions
  • Monetary policy plays a secondary role
New Keynesian Theory

• DSGE models imposing rational expectations
  • Large number of shocks

• Sticky prices
  • Transaction costs and market power
  • Resource allocation and expectations in the absence of market clearing
  • Many regimes, but the Keynesian regime of excess supply in goods and labor market is most common

• Model selection
  • VAR - impulse response of linearized DSGE models
Macroeconometrics

• Tindelbergen’s book included first multiple equation time series model
  • Keynes questioned whether this could test a theory

• Haavelmo highlighted importance of a probabilistic approach
  • Precise numerical predictions
  • Internal consistency

• Models must characterize the nature of their errors
  • This allows for model testing
Keynesian vs. Monetarist

• Large-scale models with hundreds of variables
  • Unbounded likelihood functions

• Friedman, Schwartz focus on few variables
  • Correlation between money growth, prices and real activity
  • Money growth “leads” changes in income
Model Selection

- These Keynesian and monetarist models did not address Haavelmo’s concerns
  - Not able to test model fit

- Further, did not incorporate government behavior into the model
  - Policy taken as exogenous
  - Cannot predict results of policy changes
What’s Exogenous?

• Monetarist regressions
  \[ y_t = \alpha_0 + \beta_0 M_t + \beta_1 M_{t-1} + \cdots + (\gamma_1 M_{t+1} + \gamma_2 M_{t+2} + \cdots) \]
  • Showed that money stock was exogenous to income, i.e. \( \gamma_k \) insignificant

• Money demand equations
  \[ M_t = \beta_0 + \beta_1 y_t + \beta_2 i_t \]
  • Mehra (1978) showed that income and interest rates were also explaining money causally
Vector Auto-Regression

- Only explanation was a multiple-equation model
  - Sims (1980) found that money was predicted by rates, which was predicted by past production
  - Hard to argue that money was “erratic”

- Structural VARs can predict effects of policy interventions
  - However, not widely used because SVARs only allow conditioning on future policy
  - Modern DSGE models allow for this type of conditioning
Calibration

• Finding a set of model parameters that will induce descriptive statistics that match the data
  • This is an “in-sample” match
  • Policy experiments are always “out-of-sample”

• Other problems
  • Weak identification, i.e. which parameters are taken as given and which ones are calibrated?
  • Parameters taken from different environments
  • Calibration vs. estimation vs. verification
Saltwater vs Freshwater

- Saltwater approach
  - Stylized tractable models (e.g. 3-period models with H, L states) to isolate and *illustrate* particular mechanism
  - Closed form solutions
  - Model cannot be brought to data
  - Frictions are allowed

- Freshwater approach
  - Large scale microfounded models (many effects are mixed)
  - Numerical simulations
  - Quantification through calibration
Present Challenges

• DSGE models are “ripe for improvement”
  • Forecast errors during recession were of a size that should practically never occur
  • Log-linearization around steady state
  • Micro foundation is typically weak

• Belief distortions

• Macroeconomics and financial frictions
  • Interaction between price and financial stability
  • Liquidity and systemic risk
  • Heterogeneity
  • Interaction between rates and macroprudential policy
Stability

- Price stability
  Monetary policy
  - Short-term interest
  - Policy rule (terms structure)

- Financial stability
  Macroprudential policy
  - Reserve requirements
  - Capital/liquidity requirements
  - Collateral policy
  - Margins/haircuts
  - Capital controls

- Output (gap)
Methodology: Macro vs. Finance

• **Verbal Reasoning** *(qualitative)*
  - Fisher, Keynes, ...

**Macro**

- Growth theory
  - *Dynamic (cts. time)*
  - *Deterministic*

- Introduce stochastic
  - *Discrete time*
    - Brock-Mirman, Stokey-Lucas
    - DSGE models

**Finance**

- Portfolio theory
  - Static
  - Stochastic

- Introduce dynamics
  - *Continuous time*
    - Options Black Scholes
    - Term structure CIR
    - Agency theory Sannikov

- Cts. time macro with financial frictions
Rates vs. Quantity Aggregates

• In favour of rates – Wicksell (1898), Woodford (2003)
  • New Keynesian Theory
    • interest rate has a first-order impact, while money supply plays a secondary role (after calibration)
  • Empirically
    • correlation between money supply, output, and inflation is weak
    • Goodhart’s law
  • Communication policy
• In favour of quantity aggregates
  • Price stability (inflation) - Monetarists
  • Financial stability
Currency vs. Banking School

• Currency school – Ricardo
  • Species money (e.g. gold)
  • Mixed paper-gold currency should vary with outflow of gold (FX should determine value not BoE)
  • Quantity theory of money, fixed multiplier

• Banking school – John Law, Adam Smith
  • Real bills doctrine, i.e. issuing money for real bills is not inflationary
  • Banks are concerned that depositors withdraw gold
  • ‘Need of trade’ acted as a natural regulator
Money View

- Financial sector’s primary role is to create money
- Connection between money growth and inflation
- Outside and inside money are perfect substitutes
Credit View

- Credit view focuses on stimulating
  - Printing money will not lead to credit unless banks lend
Credit View: Frictions

- Balance Sheet Channel
- Lending Channel

Lenders’ friction
Borrowers’ friction

Borrowers’ balance sheet channel
Lending channel
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