

The Transformation of Macroeconomic Policy and Research

2004 Nobel Address in Economics

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Exciting Times in Macroeconomics

Can use our methodology

- To address quantitatively important questions
- To resolve open puzzles

Some of these Questions

- Why did Japan lose a decade of growth?
- Why did Great Depression persist after TFP recovered?
- What does theory predict for the stock market value?

I will return to these questions

The Transformation of Macroeconomic Policy

Models Before the Transformation

- System-of-equations macroeconomic models
 - Dealt with each equation separately
 - Solved system given policy actions and predetermined variables, for current outcomes
- Assume equations policy-invariant

Models After the Transformation

- Dynamic, fully articulated model economies
 - People maximize given price processes
 - Firms maximize
 - Markets clear
- Preferences and technology policy-invariant

Policy Before and After

- Before: Given situation, what policy action is best?
- After: What is a good policy rule to follow?

The Time Inconsistency of Policy

**“Rules rather than discretion:
The inconsistency of optimal plans”**

The Time Inconsistency Problem

- Question: What policy rule is best?
- Problem: Principle of optimality fails
- Why? Because people think and anticipate
- Outcome: Time consistent policy rule is not best
- Solution: Pick a good rule and follow it

Time Inconsistency and Central Bank Independence

- Suppose nominal wage set so real wage too high
- Problem:
 - Ex post, can undo distortion with inflation
 - If anticipated, result is high inflation and distortion
- Solution:
 - Independent central bank committed to low inflation

An Important By-product: Recursive Competitive Equilibrium

- Methods developed in “Rules rather than discretion”
- Used in “Time to build and aggregate fluctuations”

Bottom Line on Policy

- Rules rather than discretion
- Need good theory to quantitatively assess rules

**The Transformation of
Macroeconomic Research into a
Quantitative, Scientific Discipline**

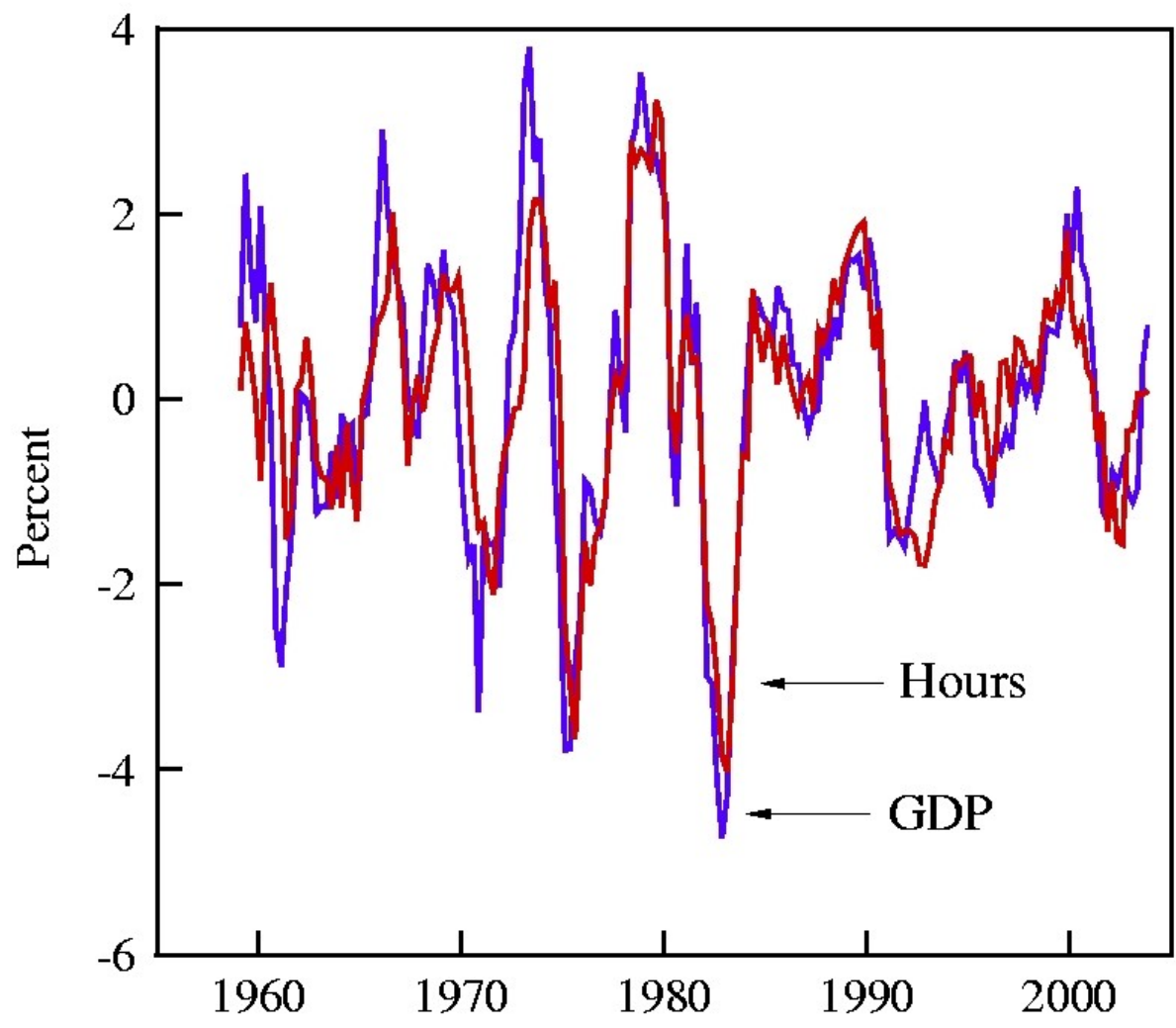
Business Cycles

“Time to build and aggregate fluctuations”

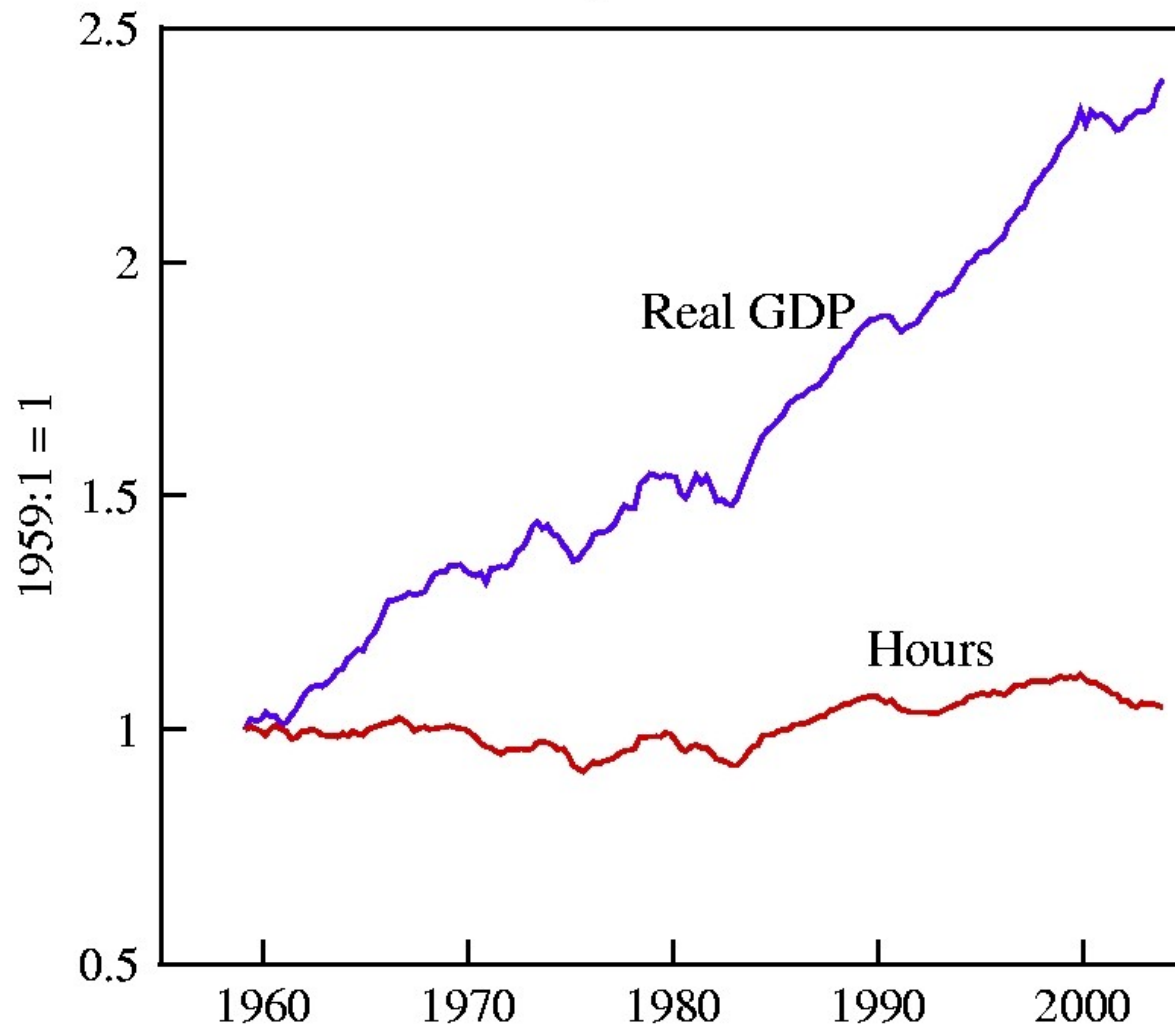
Theory Driven by Key Business Cycle Facts

- Recurrent fluctuations about trend
 - Most output variation due to labor input

Deviations From Trend of U.S. GDP and Hours



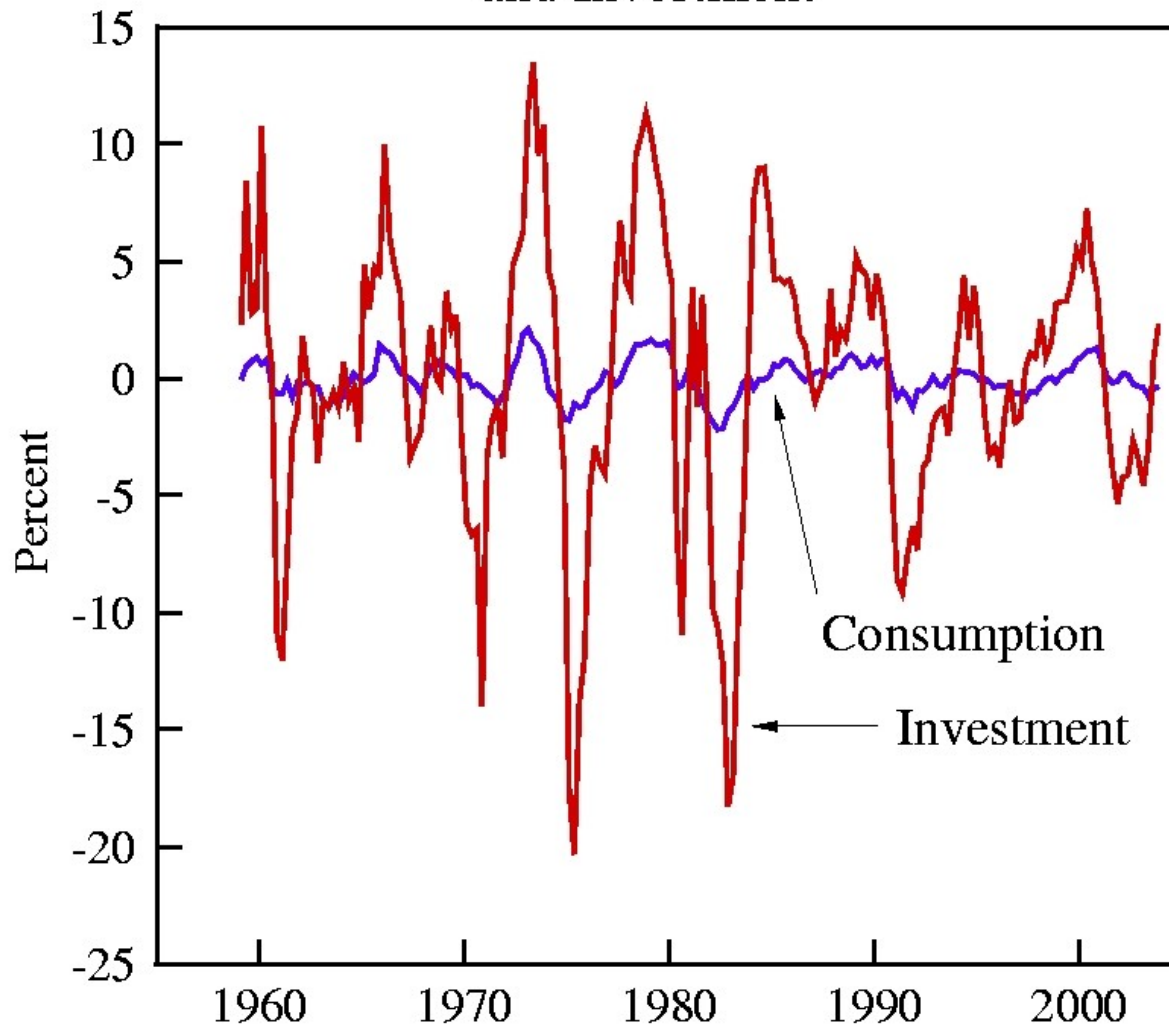
Indices of Per Capita Real GDP and Hours



Theory Driven by Key Business Cycle Facts

- Recurrent fluctuations about trend
 - Most output variation due to labor input
 - Investment highly volatile while consumption smooth

Deviations From Trend of U.S. Consumption and Investment



Theory Driven by Key Business Cycle Facts

- Recurrent fluctuations about trend
 - Most output variation due to labor input
 - Investment highly volatile while consumption smooth
 - Moderately high degree of persistence

Theory Driven by Key Facts

- A theory needs
 - Labor/leisure decision
 - Savings/investment decision
 - Propagation mechanism
- As well as quantitative scientific discipline

The Methodology

1. Start with a neoclassical growth model economy
 - Stand-in firm: labor and capital services as inputs; consumption and investment as output
 - Stand-in household: preferences over current and future consumption and leisure

The Methodology

1. Start with a neoclassical growth model economy
2. Modify national accounts to be consistent

Consumer durable expenditures example

- Must be treated as investment
- Must impute services and add to consumption
- Must impute rents and depreciation to income

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3. Restrict model to be consistent with growth facts

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7. Simulate the model economy

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8. Examine key business cycle statistics

The Methodology

8. Examine key business cycle statistics
 - Treat model and actual economy symmetrically
 - In case of amplitude of fluctuations
 - Compute deviations from trend for both
 - Compute standard deviations of deviations
 - Compare model and data statistics

Lessons from “Time to build ...”

- Cannot generate business cycles with
 - Labor supply errors and
 - Time to build propagation mechanism
- Can generate business cycles with
 - Persistent productivity shocks and
 - Highly elastic labor supply

Findings Robust to

- Biased productivity growth
- Some monopoly power
- Nominal contracting
- Age heterogeneity
- Uninsurable idiosyncratic risk

... but need high labor supply elasticity

See Cooley (1995) *Frontiers of Business Cycle Research*

Is Labor Supply Highly Elastic? Yes

- Most variation in hours due to fraction working
- Rogerson developed theory consistent with this fact
 - Important result:
aggregate elasticity \gg individuals being aggregated
 - Key is labor indivisibility
- Hornstein-Prescott provided theoretical foundation

Added Empirical Support for High Labor Supply Elasticity

- The effective marginal tax rates vary a lot both across countries and time
- These tax rates and the business cycle labor supply elasticity predict:
 - The big differences across countries
 - The big reduction in Europe

Bottom Line for Business Cycles

- Kydland and Prescott found

If TFP shocks were the only ones, U.S. economy would have been 70% as volatile as it was in the 1954-88 period.

- Now we can make this type of statement

Beyond Business Cycle Research

Theory has Implications for Other Phenomena

- Japan's lost decade of growth
- The U.S. Great Depression
- U.S. and U.K. stock market values

Japan's Lost Decade of Growth (1992-02)

- Hayashi and Prescott use growth model for Japan
- Found lost decade due to near-zero TFP growth
- Theory accurately predicts path of economy
- Open question: What impeded TFP growth?

The Great U.S. Depression

- Cole and Ohanian (2000) broke the taboo and used this methodology
- Found a big puzzle: Why didn't the economy recover in the last half of the 1930s?
- Labor supply 25% below what theory says absent distorting policies

For many other depression studies see the January 2002 Volume of the *Review of Economic Dynamics* and Kehoe and Prescott forthcoming volume

Valuation of U.S. and U.K. Stock Markets

- McGrattan and Prescott used growth model to predict stock values
- Theory says value = cost of productive assets
- Problem: no direct measure of intangible assets
- Derived a prediction based on tax rates and NIPA data
- Theory predicts the observed huge secular movements

An Open Business Cycle Puzzle

Why did the U.S. Economy boom in the late 1990s?

- No big change in TFP or tax rates
- Yet labor supply was 5% above what theory predicts
- McGrattan and Prescott have a guess based on stock market paper
- It will require innovative measurement and modeling

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 - It will require innovative measurement and modeling
- ...I'm anxious to get to work on this challenging problem**