ECON 310 - MACROECONOMIC THEORY

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# Chapter 13: Business Cycle Models with Flexible Prices and Wages

Topics

- Construct the **real business cycle model**, explain how it matches the key business cycle facts, and use the model to analyze other problems.
  - ▶ Show how the real business cycle model could be consistent with the observed co-movements of money and output
  - ▶ Discuss criticisms of the real business cycle model.
- Construct the **Keynesian coordination failure model**, explain how it matches key business cycle facts, and use the model to analyze other problems.
  - ▶ Discuss criticisms of the Keynesian coordination failure model.
  - ▶ Explain how the business cycle models in this chapter are, or are not, consistent with the observed behavior of U.S. time series during the 2008–2009 recession.
- How does each model fit the data?
- What is the role for government policy in each model?

Real Business Cycle (RBC)

- RBC introduced by Kydland and Prescott (1982)

- Business cycles are caused by fluctuations in TFP (check graph)

- There is no role for the government in smoothing business cycles-cycles are just optimal responses to the technology shocks.

- Original model, no money this model based on Cooley and Hansen (1989) has money

- Similar results and model fits the data well

Solow Residual and GDP

- TFP shocks are persistent
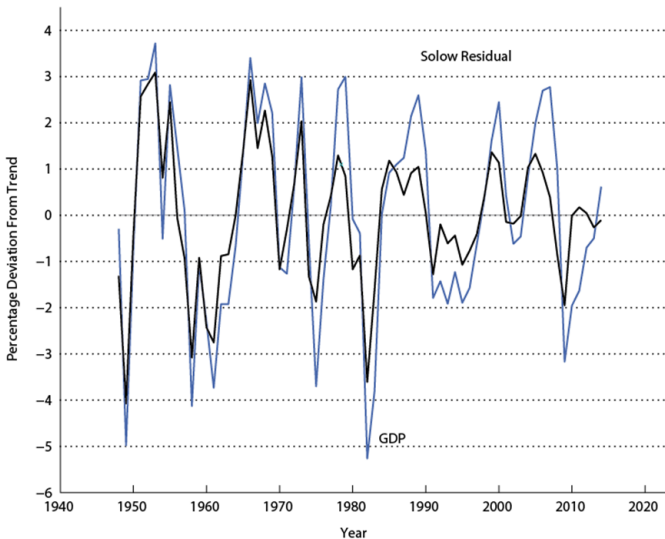
Persistent Increase in TFP in RBC Model

In data we just saw that TFP shocks are persistent, in model this means:

1. Both z and z' $\uparrow$
2. $z\uparrow \Rightarrow$ MPN$\uparrow \Rightarrow N^d$ shifts right
3. Y^s shifts right
4. Anticipated increases in z' :
   1. $I^d\uparrow$
   2. Higher future income $\Rightarrow we \uparrow \Rightarrow C^d\uparrow$
   3. Both of these shift Y^d to the right
5. $Y \uparrow$ but $r \uparrow$ or $\downarrow$
   1. Argue that $r \downarrow$
   2. $z' \uparrow$ is smaller than $z \uparrow$ so so future income is less than todays
   3. Want to smooth consumption $\Rightarrow s \uparrow \Rightarrow r \downarrow$
6. Money demand M^d shifts out (as $Y \uparrow$ and $r \downarrow$)
7. $P \downarrow$
8. N^s shifts left because of $r \downarrow$ but

Persistent Increase in TFP in RBC Model (cont.)

9 $|\Delta N^s| < |\Delta N^d| \Rightarrow$ supply shifts less than demand $\Rightarrow N \uparrow$ and $w \uparrow$
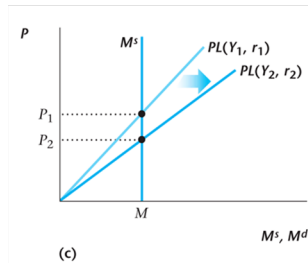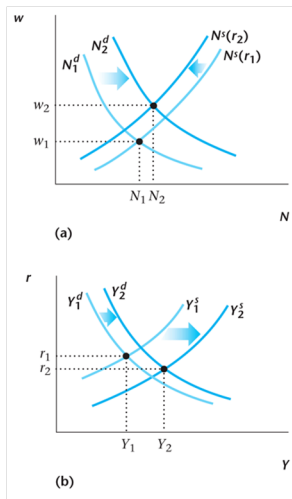
Average Labor Productivity with Total Factor Productivity Shocks

- Average labor productivity $\frac{Y}{N}$ ↑ despite the higher level of N
- If N ↑ by a lot $\frac{Y}{N}$ could ↓ but in RBC model the shift in N is not large enough

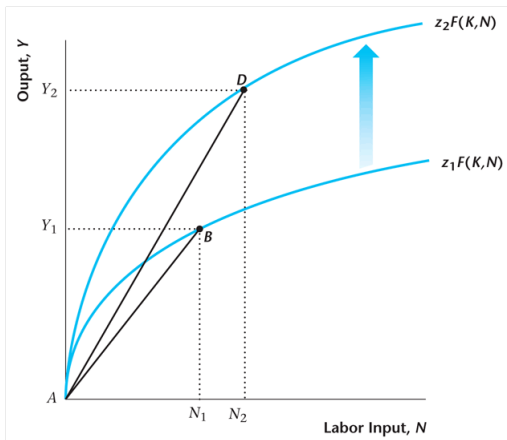**Table 12.1** Data Versus Predictions of the Real Business Cycle Model with Productivity Shocks

Variable	Data	Model
Consumption	Procyclical	Procyclical
Investment	Procyclical	Procyclical
Price Level	Countercyclical	Countercyclical
Money Supply	Procyclical	-
Employment	Procyclical	Procyclical
Real Wage	Procyclical	Procyclical
Average Labor Productivity	Procyclical	Procyclical

- Also: C is less volatile than Y
- I is more volatile than Y

Real Business Cycles and the Behavior of Nominal Variables

Pro-cyclical Money Supply in the RBC Model with Endogenous Money

- The nominal M^s is procyclical
  - In model we make it "endogenous"
  - CB reacts to $\uparrow$ in M^d in attempt to stabilize price level and therefore
  - $M^s \Rightarrow$ procyclical

- M^s tends to lead real GDP
  - Due to preemptive CB measures
  - Banking leads econ in general $\Rightarrow$ deposits$\uparrow$ before $Y \uparrow$

Pro-cyclical Money Supply in the RBC Model with Endogenous Money (cont.)
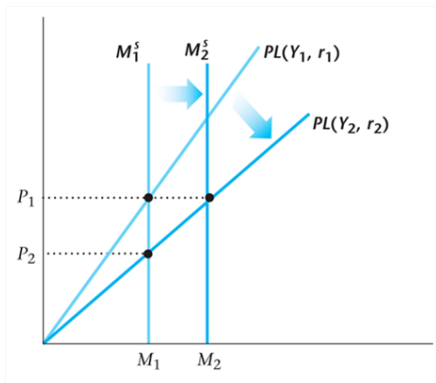
Implications of RBC Theory for Gov't Policy

No role for gov't stabilization policy

- Level changes in M^s are neutral $\Rightarrow$ cannot smooth business cycle with MP

- Since all markets clear, no inefficiencies in model that gov't could fix

- In basic model, business cycles are optimal responses to fluctuations in TFP $\Rightarrow$ no gov't
 - Pareto optimal outcome

Critique of RBC Models

- TFP Measurement problems due to underutilization of labor and capital during recessions ("hoarding")

- If N is underutilized then $Y \downarrow$ and we'd think that $TFP \downarrow$ when in fact we didn't fully employ labor or capital

# Business Cycle Theories and the 2008-2009 Recession

Business Cycle Theories and the 2008-2009 Recession

- Real Business Cycle Model and Coordination Failure Model fit average business cycle behavior well
- But the fit to the 2008-2009 recession is not so good.
    - ▶ Small drop in Solow residual.
    - ▶ Price level procyclical.
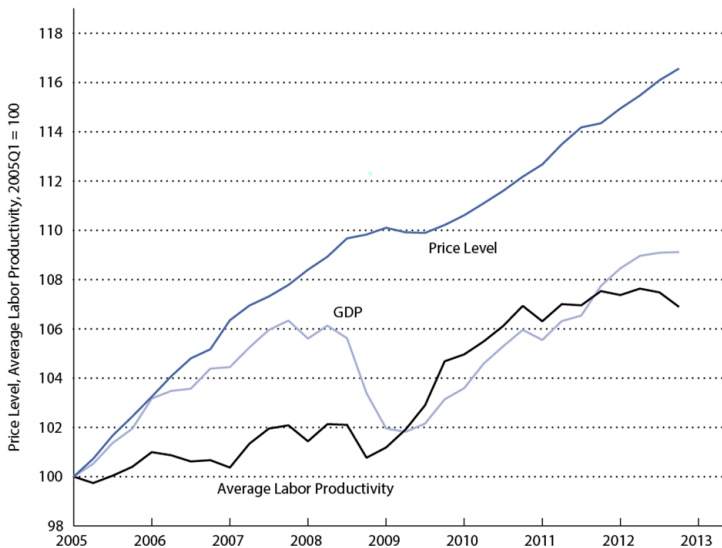   - ▶ Obvious importance of financial factors, which play no role in either model.

Solow Residual and Real GDP
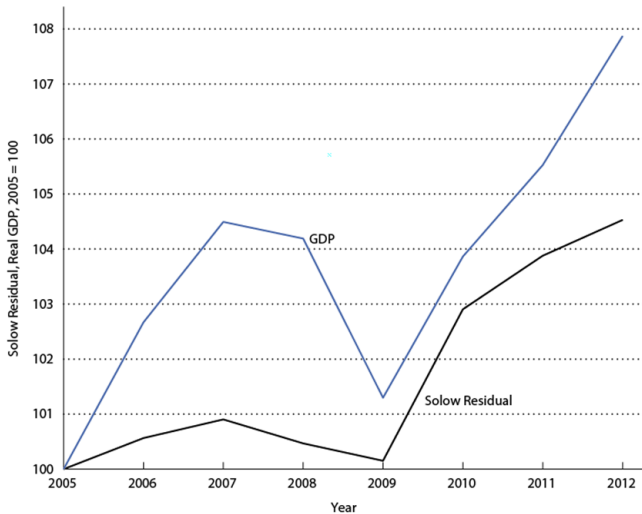
C, I and real GDP
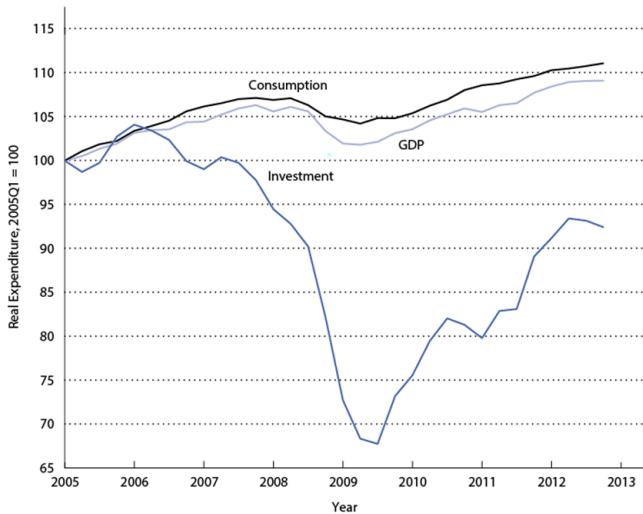
Price Level, Average Labor Productivity and Real GDP

References

Cooley, Thomas F.Hansen and Gary Hansen. 1989. "The Inflation Tax in a Real Business Cycle Model." *American Economic Review* 79:733–748.

Kydland, Finn E. and Edward C. Prescott. 1982. "Time to Build and Aggregate Fluctuations." *Econometrica* 50(6):1345–1370.