1 Demand shocks
• old idea: expectations drive business cycle

• uncertainty about the economy's fundamentals, which will determine the long run equilibrium

• partial equilibrium ideas

• consumption: from permanent income hypothesis future income expectations matter for consumption decisions

• investment: high expected returns
1.1 Evidence

- basic fundamental for long-run growth: TFP
- can expectations about long-run TFP drive cycle?
- how to measure expectations?
- Beaudry-Portier (2005): use the stock-market
\[
\begin{bmatrix}
\Delta TFP_t \\
\Delta S_t
\end{bmatrix}
= 
\begin{bmatrix}
    a_{11}(L) & a_{12}(L) \\
    a_{21}(L) & a_{22}(L)
\end{bmatrix}
\begin{bmatrix}
e_{1t} \\
e_{2t}
\end{bmatrix}
\]

Two identification approaches:

1. Short run:
   \[ a_{12,0} = 0. \]

2. Long run:
   \[ a_{12}(1) = 0. \]
B.2 Figures related to section 4

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Figure 8: Impulse Responses to $\epsilon_2$ in the Baseline ($TFP, SP$) VAR

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B.4 Figures related to section 5.2

Figure 17: Impulse Responses to $\epsilon_2$ and $\epsilon_1$ in the in the $(TFP, SP, H)$ VAR, without (upper panels) or with (lower panels) Adjusting TFP for Capacity Utilization

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Main conclusions:

• both identifications give similar shocks

• response of C and Y builds up, then permanent

• response of H has hump then dies out slowly
1.2 Neoclassical growth model

Preferences

\[ E \sum_{t=0}^{\infty} \beta^t U (C_t, N_t) \]

Technology

\[ C_t + K_t - (1 - \delta) K_{t-1} \leq A_t F (K_{t-1}, N_t) \]

- what happens when agents receive news about future \( A_{t+s} \)?

- what type of cycles does this generate?
Basic parametrization

\[ U(C_t, N_t) = \log C_t - \frac{1}{1 + \eta} N_t^{1+\eta} \]

\[ A_t F(K_{t-1}, N_t) = A_t K_{t-1}^\alpha N_t^{1-\alpha} \]

\[ A_t = e^{a_t} \]

\[ a_t = \rho a_{t-1} + \epsilon_t \]

\[ \beta = 0.99 \]
\[ \eta = 1 \]
\[ \alpha = 0.36 \]
\[ \rho = 0.95 \]
\[ \delta = 0.025 \]
• Now introduce news about the future

• Simplest way: agents observe shock realization $T$ periods in advance

$$a_t = \rho a_{t-1} + \epsilon_{t-T}$$

• What happens at the time of the announcement?

• Consumption increases, investment and hours fall!

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1.2.1 Mechanism

Basic mechanism driven by intra-temporal optimality condition

\[(1 - \alpha) \frac{1}{C_t} A_t K_t^{\alpha} N_t^{-\alpha} = N_t^\eta\]

or (in terms of real wages)

\[\frac{1}{C_t} W_t = N_t^\eta\]

together with the resource constraint

\[I_t + C_t = A_t K_t^{\alpha-1} N_t^{1-\alpha}.\]
• If $A_t$ unchanged cannot have $I_t \uparrow, C_t \uparrow$.

• Changing intertemporal elasticity and elasticity of labor supply can change response of $C_t$ and $I_t$, but cannot give right combination.

• Adjustment costs in $K_t$ can give $I_t \uparrow$ but then $C_t \downarrow$. 
• No hope for neoclassical model with news about the future?

• Several attempts

• Jaimovich and Rebelo (2006): three ingredients
  – adjustment costs in investment
  – variable capacity utilization
  – preferences with “weak wealth effects on labor supply”
Figure 1: Response to TFP News Shock, Our Model

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Figure 5: Response to TFP News Shock, Variants of Our Model

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Figure 6: Response of Hours to Permanent TFP Shock at Time One, Standard RBC Model

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Figure 9: The Effects of Noisy Signals
Preferences

\[
\sum \beta_t \frac{(C_t - N_t^\theta X_t)^{1-\sigma}}{1-\sigma} - 1
\]

- \( X_t \) is a geometric discounted average of past consumption levels
  \[
  X_t = C_t^\gamma X_{t-1}^{1-\gamma}.
  \]

- The parameter \( \gamma \in [0, 1] \): speed at which the wealth effect kicks in

- Suppose \( X_t \equiv 1 \) then quasi-linear (GHH)
  \[
  W_t = \theta N_t^{\theta-1}
  \]

Cite as: Guido Lorenzoni, course materials for 14.462 Advanced Macroeconomics II, Spring 2007. MIT OpenCourseWare (http://ocw.mit.edu/), Massachusetts Institute of Technology. Downloaded on [DD Month YYYY].
no income effect here. Inconsistent with LR growth

- Here income effect that phases in slowly

- In the long run

\[ W_t = \theta N_t^{\theta-1} C_t \]
Simplistic interpretation:

1. quasi-linear in short run: no income effect

2. log in the long run: income and substitution cancel

but 1 is wrong!
Decomposition: income effect

\[ \sum \beta^t \left( C_t - N_t^\theta X_t \right)^{1-\sigma} - 1 \]

\[ \sum R^{-t} (C_t - WN_t) = B_0 \]

- Suppose real wage constant at \( W \), interest rate constant at \( R = 1/\beta \)

- Effects of an increase in \( B_0 \)
Figure 2: Response of Hours - Income Effect

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Mechanism

first order condition for labor supply in the following form

$$\xi_t W_t = \theta X_t N_t^{\theta-1},$$

and

$$\xi_t = \frac{(C_t - N_t^\theta X_t)^{-\sigma} - \mu_t \gamma C_t^{\gamma-1} X_t^{1-\gamma}}{(C_t - N_t^\theta X_t)^{-\sigma}},$$

where $\mu_t$ is a complicated forward looking object.
Christiano, Motto and Rostagno

\[
E \sum_{t=0}^{\infty} \beta^t \left( \log (C_t - bC_{t-1}) - \frac{1}{1 + \eta} N_t^{1+\eta} \right)
\]

\[
Y_t = A_t K_t^\alpha N_t^{1-\alpha}
\]

\[
K_t = (1 - \delta) K_{t-1} + \left( 1 - \frac{a}{2} \left( \frac{I_t}{I_{t-1}} \right)^2 \right) I_t
\]

\[
I_t + C_t = Y_t
\]

\[
A_t = e^{\alpha_t}
\]

\[
a_t = \rho a_{t-1} + \epsilon_{t-T}
\]
Figure 3: Real Business Cycle Model with Habit and CEE Investment Adjustment Costs
Baseline - Tech Shock Not Realized, Perturbation - Tech Shock Realized in Period 5

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Figure 4: Real Business Cycle Model without Habit and with CEE Investment Adjustment Costs

Technology Shock Not Realized in Period 5

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Figure 5: Real Business Cycle Model with Habit and Without Investment Adjustment Costs

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Importance of habit formation

$$\lambda_t W_t = N_t^n$$

$$\lambda_t = \frac{1}{C_t - bC_{t-1}} - bE_t \left[ \frac{1}{C_{t+1} - bC_t} \right]$$

- high consumption in the future increases incentive to work today.
- no strange wealth effects here
- but behavior of asset prices is wrong