Outline

- 1 Lecture: A dynamic IS-LM model with the yield curve
- 2 Lecture: A dynamic IS-LM model with the stock market
- Mentorium: Output, the Stock Market and Interest Rates: effects of Fiscal and Monetary policy
- 3 Lecture: The dynamic theory of investment: set up of the problem
- 4 Lecture: The dynamic theory of investment: solution of the Abel model
- Mentorium: Effects of taxes, news and uncertainty on investment

Slides available at:
http://economia.unipv.it/pagp/pagine_personali/gascari/ascari_ff.htm
Introduction

Pricing a share

How do economists price an asset?

**Price of an asset = present discounted value of expected returns**
Stock Prices as Present Values

The Nominal Price (ex-dividend) of a Stock:

\[ 
\epsilon Q_t = \frac{\epsilon D_{t+1}^e}{1 + i_t} + \frac{\epsilon D_{t+2}^e}{(1 + i_t)(1 + i_{t+1}^e)} + \ldots 
\]

- \( \epsilon D_t = \) Dividend this year
- \( \epsilon D_{t+1}^e = \) expected dividend next year

- Higher expected future dividends lead to a higher stock price.
- Higher current and expected future one-year interest rates lead to a lower stock price.

A dynamic IS-LM model with the stock market

Blanchard, AER, 1981 (same notation)
Simplified version in Bagliano and Bertola, p. 92-98
A dynamic IS-LM model with the stock mkt

**AD** => \[ d(t) = a \cdot q(t) + \beta \cdot y(t) + g(t) \]
\[ \beta < 1, \ a > 0 \]
- Aggregate demand now depends positively on \( q \)
- The stock prices affect investment => the Tobin \( q \) => the market valuation of the capital stock of the economy is incorporated in the level of stock prices
- Stock prices can also influence consumption (wealth effect => permanent income)

\[ AD \]  
\[ LM \]  
\[ r(t) = c \cdot y(t) - h \cdot m(t) \quad c,h > 0 \]
\[ AD \]  
\[ d(t) = a \cdot q(t) + \beta \cdot y(t) + g(t) \quad a>0, \ \beta<1 \]
\[ \text{Output Dynamics} \]  
\[ y(t) = \sigma(d(t) - y(t)) \]
\[ \text{Yield Curve} \]  
\[ R = \bar{R}(R - r) \]
A dynamic IS-LM model with the stock mkt

- Similar as before…but now we have 1 more vbl: $q$
- We need an equation for $q$ to close the model
- Same reasoning as before for LR bonds:
  - Think about the (instantaneous) expected rate of return on holding a stock
  - Then arbitrage with SR bond

This equation implies that the price of a stock is equal to the present discounted value of future (expected) dividends

$$q(t_0) = \int_{t_0}^{\infty} \pi(t) e^{-\int_{t_0}^{s} r(s) ds} dt$$
A dynamic IS-LM model with the stock mkt

- **LM** => \( r(t) = c y(t) - h m(t) \quad c, h > 0 \)

- **Output Dynamics** (subs. \( d(t) \), and set \( b=1-\beta \)) =>
  \[
  y(t) = \sigma \left( a q(t) - b y(t) + g(t) \right)
  \]

- **Yield Curve** => \( R = \bar{R} (R - r) \)

- **Stock prices dynamics** =>
  \[
  r(t) = \frac{\alpha_0 + \alpha_1 y(t)}{q(t)} + \frac{q(t)}{q(t)}
  \]

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A dynamic IS-LM model with the stock mkt

- As before substitute the static equations into the dynamic ones
- Substitute LM into stock prices dynamics eq.

\[
ct(t) - hm(t) = \frac{\alpha_0 + \alpha_1 y(t)}{q(t)} + \frac{q(t)}{q(t)}
\]
A dynamic IS-LM model with the stock mkt

- 2-equations dynamic system in the space 
  \((q,y)\) which are the two endogenous vbls, 
  and two policy instruments \((g,m)\)

\[
\begin{align*}
q(t) &= q(t) \left( cy(t) - hm(t) \right) - \left( \alpha_0 + \alpha_1 y(t) \right) \\
y(t) &= \sigma \left( aq(t) - by(t) + g(t) \right)
\end{align*}
\]

Building the phase diagram

- Find the **stationary loci**: lines so that the two 
  vbls. do not move \(\Rightarrow \dot{y} = 0\) and \(\dot{q} = 0\)
- **Equilibrium** = crossing of the two loci
- Describe qualitatively the dynamics outside the 
  stationary loci
- Find the **stable manifold** of the **saddle point**: 1 
  forward-looking vbl an1 **backward-looking** 
  vbl.
Stationary loci

- ‘Pseudo’-IS
  \[ y = 0 \iff q(t) = \frac{1}{a} \left( by(t) - g(t) \right) = \frac{dq}{dy} = \frac{b}{a} > 0 \]

- ‘Pseudo’-LM
  \[ q = 0 \iff q = \frac{\pi}{r} = \frac{\alpha_0 + \alpha_1 y}{cy-hm} \quad \frac{dq}{dy} = \frac{\alpha_1 - cq}{r} \begin{cases} > 0 & \text{ambiguous} \\
\end{cases} \]

The steady state value of \( q \) is given by the ratio of dividends to the interest rate and both are affected by output. As \( y \) increases, profits and dividends increase, raising \( q \), but also the interest rate (at which profits are discounted) increases, with a depressing effect on stock prices. The slope of the stationary locus for \( q \) then depends on the relative strength of those two effects.

- 2 cases
  - **Good news** \( \Rightarrow \alpha_1 - cq > 0 \Rightarrow \) positive slope
  - **Bad news** \( \Rightarrow \alpha_1 - cq < 0 \Rightarrow \) negative slope
Expansionary Monetary Policy: unanticipated and permanent
Expansionary Monetary Policy: unanticipated and permanent

A. Bad News

B. Good News

In the case of good news, bond and equity prices go in opposite directions along the adjustment path.

Expansionary Monetary Policy: anticipated and permanent

A. Bad News

B. Good News
Expansionary Monetary Policy: anticipated and permanent

A. Bad News

In the case of good news, bond and equity prices go in opposite directions after the implementation of the policy.

Expansionary Fiscal Policy: anticipated and permanent

ANTI-KEYNESIAN EFFECTS OF FISCAL POLICY
Expansionary Fiscal Policy: anticipated and permanent

A. Bad News

B. Good News

\[ \frac{1}{R} = \text{bond price} \]