ECON7520 Int'l Macroeconomics and Finance Lecture 07

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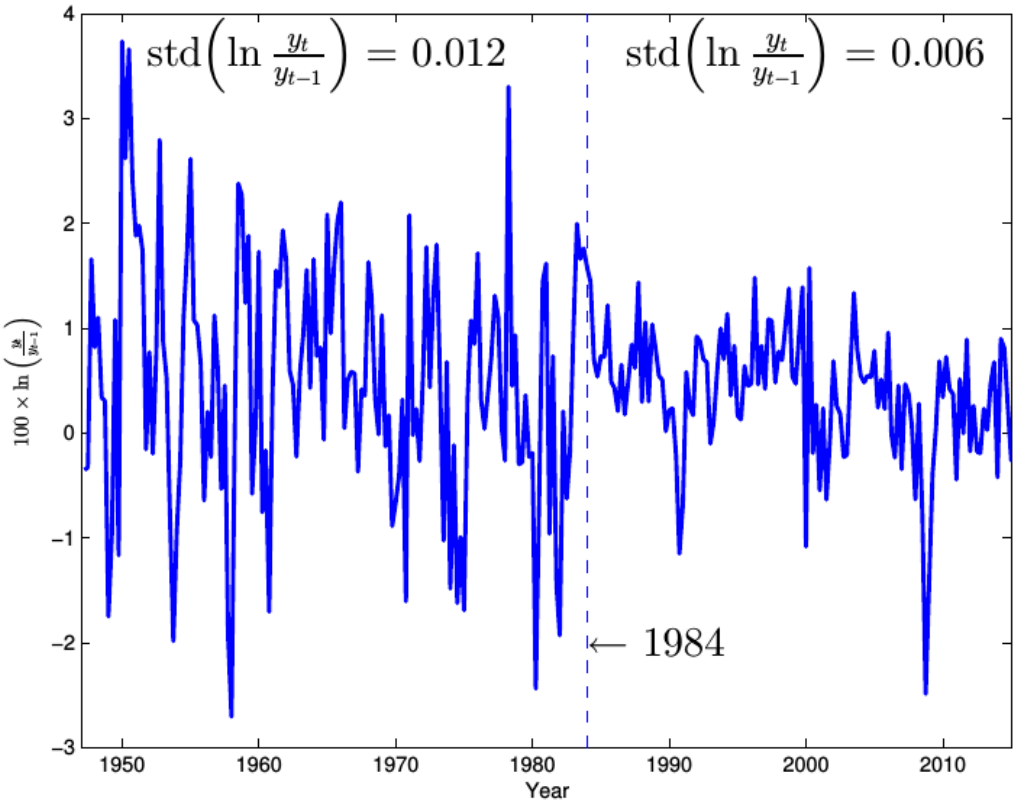
Week 7: Uncertainty and the Current Account

Motivation: The Great Moderation in the U.S.

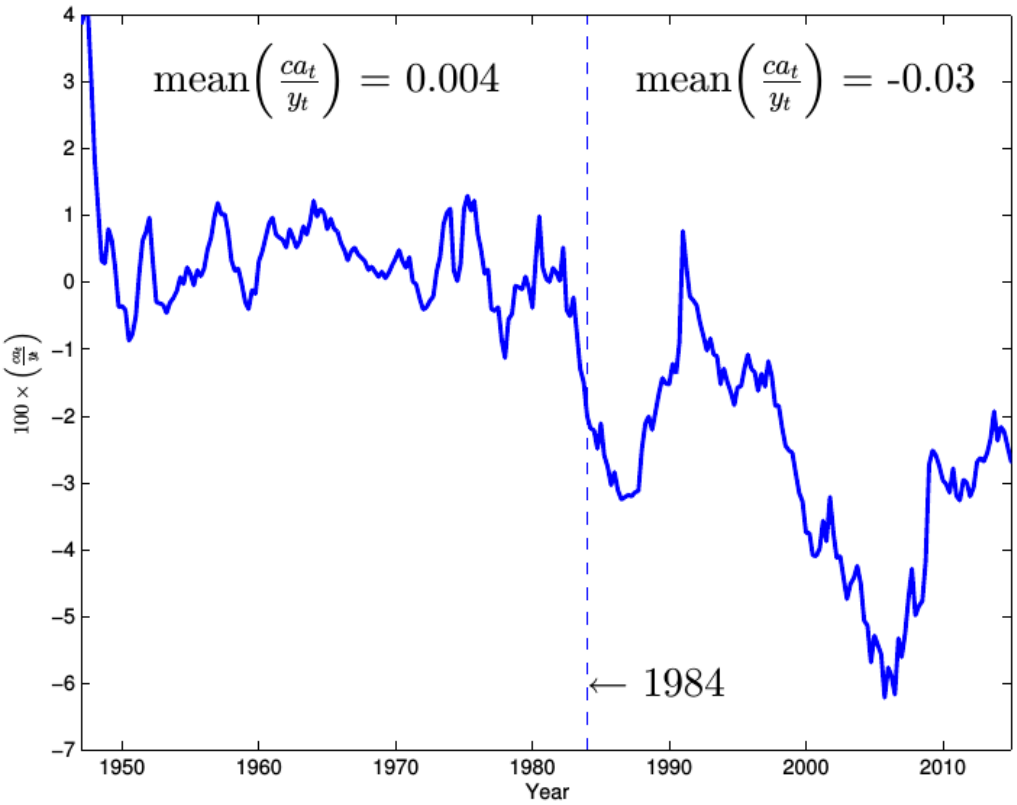
Figure: Real Per Capita U.S. GDP Growth, 1947Q2 - 2015Q4



- The growth rate of GDP became less volatile after 1984.

Motivation: The Great Moderation in the U.S.

Figure: The U.S. Net Government Asset, 1960 - 2016



- The current account was running deficits after 1984.
- Any relationship with the volatility of the GDP growth?

The Great Moderation

- The volatility of US output declined significantly starting in the early 1980s.
  1. The good-luck hypothesis states that by chance, the US economy has been blessed with smaller shocks.
  2. Regulation Q, which imposed a ceiling on the interest rate on deposits, led banks to reduce loans.
  3. The Great Moderation was in part caused by structural change, particularly in inventory management and in the financial sector.

What We Study

- Is the timing of the Great Moderation and the emergence of protracted current account deficits pure coincidence?
- Is there a casual connection between the two?

We will explore the effects of changes in output uncertainty on the trade balance and the current account.

Small Open Economy Model with Uncertainty

Uncertainty and Household's Saving

- Question: How does uncertainty affect the current account?
  - It could be through household's saving channel.
- Question: How does uncertainty affect household's saving?
  - Through **precautionary saving**.

1. High uncertainty in future
   - People save more.
   - The CA gets surplus.
2. Low uncertainty in future (Great Moderation)
   - People save less.
   - The CA gets deficits.

Setup: A Representative Household

- Time period: 1 and 2.
- Agent: A representative household in the country.
  - Make intertemporal consumption and saving decisions.
- Good: A single consumption good in this world
- Asset: A single asset, bond, in this world
  - The household holds $B_0^* = 0$ units of a bond at the beginning.
- Interest Rate: $r_1 = 0$ for the asset held at the end of period 1.

Endowment

- Endowment: The household endowed with;
  - $Q_1 = Q$ units of goods in period 1.
  - $Q_2 = \begin{cases} Q + \sigma & \text{with probability } \frac{1}{2}, \\ Q - \sigma & \text{with probability } \frac{1}{2}. \end{cases}$
- Assume $\sigma > 0$.
- So, the amount of endowment in the second period is uncertain.

Expected Utility: Assumptions

- A consumer cares about expected utility from consumption.

$$U(C_1, C_2) = \ln C_1 + E[\ln C_2].$$

- If there are a good state (G) and a bad state (B) in period 2, the expected utility is

$$U(C_1, C_2) = \ln C_1 + [\pi_G \ln C_2(G) + \pi_B \ln C_2(B)]$$

  - π_G is the probability of a good state.
  - π_B is the probability of a bad state.
- $C_2(G)$ and $C_2(B)$ are consumptions in the good state and the bad state, respectively.

- In our example, $\pi_G = \pi_B = \frac{1}{2}$, so we have

$$U(C_1, C_2) = \ln C_1 + \left[\frac{1}{2} \ln C_2(G) + \frac{1}{2} \ln C_2(B)\right] \quad (1)$$

Household's Budget Constraint

- Remember household's inter-temporal budget constraint is

$$\underbrace{C_1 + \frac{C_2}{1+r_1}}_{\text{Consumption Values}} = \underbrace{(1+r_0)\,B_0^* + Q_1 + \frac{Q_2}{1+r_1}}_{\text{Initial Assets + Total Income Values}}.$$

- Since $B_0^* = 0$ and $r_1 = 0$, we can get

$$C_1 + C_2 = Q_1 + Q_2.$$

- So, in a good state where $Q_2 = Q + \sigma$, we have the BC as

$$C_1 + C_2(G) = 2Q + \sigma. \tag{2}$$

- So, in a bad state where $Q_2 = Q - \sigma$, we have the BC as

$$C_1 + C_2(B) = 2Q - \sigma. \tag{3}$$

.

Solving the Model

- Substitute (2) and (3) for (1), then $U(C_1, C_2)$ is rewritten as

$$\ln C_1 + \left[\frac{1}{2}\ln(2Q + \sigma - C_1) + \frac{1}{2}\ln(2Q - \sigma - C_1)\right].$$

- Note that there is only one unknown variable C_1 in the above problem.

- So, the household picks up C_1 so that it maximize her utility level U.

First Order Condition

If $f(x)$ is strictly concave, x^* that satisfies $f'(x^*) = 0$ maximizes the value of $f(x)$.

Solving the Model: Continued

- Fortunately, in our case, U is strictly concave. So, we can use FOC.
- By taking the derivative w.r.t. C_1,

$$\frac{1}{C_1} - \frac{1}{2}\left[\frac{1}{2Q+\sigma-C_1} + \frac{1}{2Q-\sigma-C_1}\right] = 0. \tag{4}$$

- The FOC of U w.r.t. C_1 is

$$\frac{1}{C_1} = \frac{1}{2}\left[\frac{1}{2Q+\sigma-C_1} + \frac{1}{2Q-\sigma-C_1}\right] \tag{5}$$

A Case without Uncertainty

- Suppose $\sigma = 0$ then

$$\frac{1}{C_1} = \frac{1}{2}\left[\frac{1}{2Q - C_1} + \frac{1}{2Q - C_1}\right].$$

- And, by solving it, we obtain

$$C_1 = Q,$$
$$C_2 = Q.$$

- Therefore, the consumptions in the first and the second periods are the same.

A Case with Uncertainty

- Assume, similarly to the case w/o uncertainty, $C_1 = Q$.
- Then, from (5), we obtain

$$\frac{1}{Q} = \frac{1}{2}\left[\frac{1}{Q+\sigma} + \frac{1}{Q-\sigma}\right].$$

- Thus

$$\frac{1}{Q} = \frac{1}{2}\left[\frac{2Q}{Q^2-\sigma^2}\right].$$

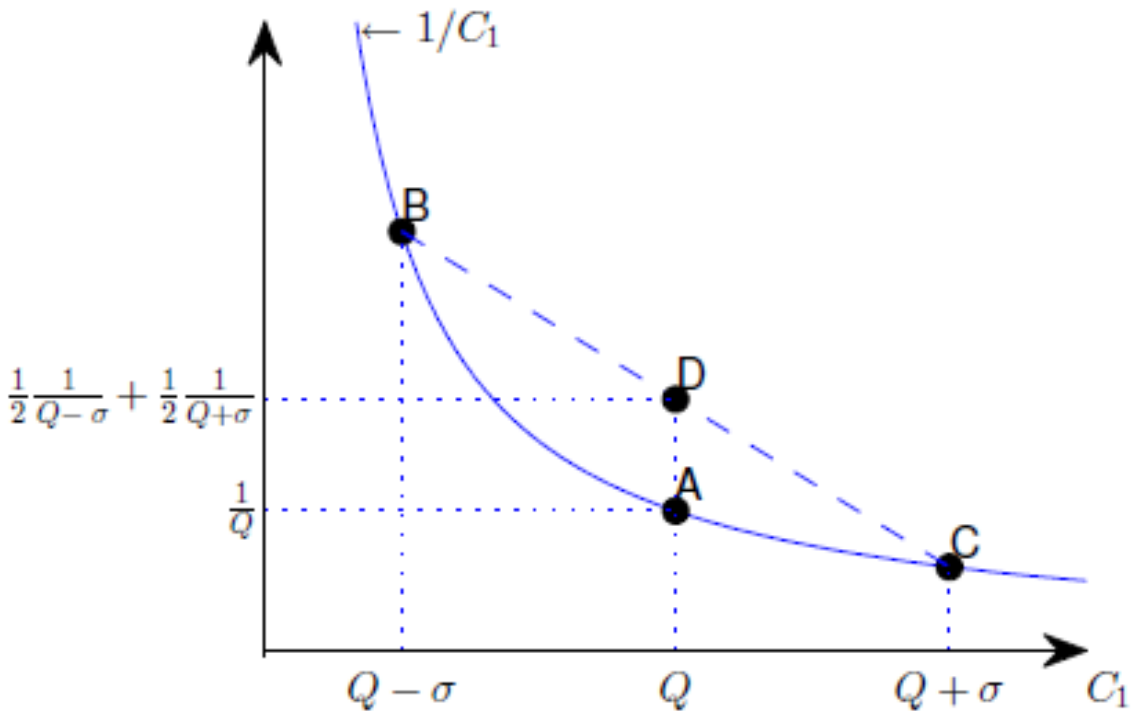
- Finally, we obtain

$$1 = \frac{Q^2}{Q^2-\sigma^2},$$

which is impossible, given that $\sigma > 0$.

A Graphical Illustration

Figure: Uncertainty and Precautionary Savings



Remember the FOC (5):

$$\frac{1}{C_1} = \frac{1}{2}\left[\frac{1}{2Q+\sigma-C_1} + \frac{1}{2Q-\sigma-C_1}\right].$$

W/O Uncertainty

- Suppose we are at point A: $C_1 = Q$.
- By the BC, consumption in period 2 is either $Q - \sigma$ or $Q + \sigma$.
- Thus the expected marginal utility in period 2 is $\frac{1}{2}\left[\frac{1}{Q+\sigma} + \frac{1}{Q-\sigma}\right]$.
- Note that point D is above point A.
- Thus, when $C_1 = Q$, the marginal utility of period-one consumption is below the expected marginal utility of period-two consumption.
- In the FOC (5),

$$\frac{1}{C_1} < \frac{1}{2}\left[\frac{1}{Q+\sigma} + \frac{1}{Q-\sigma}\right].$$

Intuition

- Once again, when $C_1 = Q$,

$$\frac{1}{C_1} < \frac{1}{2}\left[\frac{1}{Q+\sigma} + \frac{1}{Q-\sigma}\right].$$

- The household is better-off by consuming less in period 1 and more in period 2.
- Thus in the optimality, $C_1 < Q$ in the case with uncertainty.
- Note that the trade balance in period 1 equals $Q - C_1$.

Implication for TB

- Because $C_1 < Q$ in the case with uncertainty, in the economy with uncertainty, the trade balance in period 1 is

$$TB_1 = Q - C_1 > 0.$$

- Because $CA_1 = TB_1 + r_0 B_0^*$ and $B_0^* = 0$ by assumption,

$$CA_1 = TB_1 > 0.$$

- In response to an increase in uncertainty, households use the trade balance as a vehicle to save in period 1.

- This type of behaviour is called *precautionary savings*.

International Capital Market Integration

Motivation

Several historical events seem to have removed barriers for capital mobility.

- The Bretton-Woods System of fixed exchange rates broke down in 1972.
- Technologies have advanced in information processing.
- Deregulation of financial markets happened:
  - The Thatcher administration in 1979 in the U.K.
  - The Reagan administration in the 1980s in the U.S.
- The monetary union in Europe started in 1999.

Question: Has the mobility of capital increased over time?

Key Points

- We consider three alternative ways to measure the capital mobility.

1. The comovement of saving and investment.
2. The covered interest rate parity.
    - The uncovered interest rate parity.
3. The real interest rate differential.

- We also discuss the famous forward premium puzzle.

The Comovement of Saving and Investment

The Comovement of Saving and Investment

- This idea is from Feldstein and Horioka (1980)
- Note that

$$CA = S(r; \dots) - I(r; \dots).$$

1. In a closed economy,

$$S = I.$$

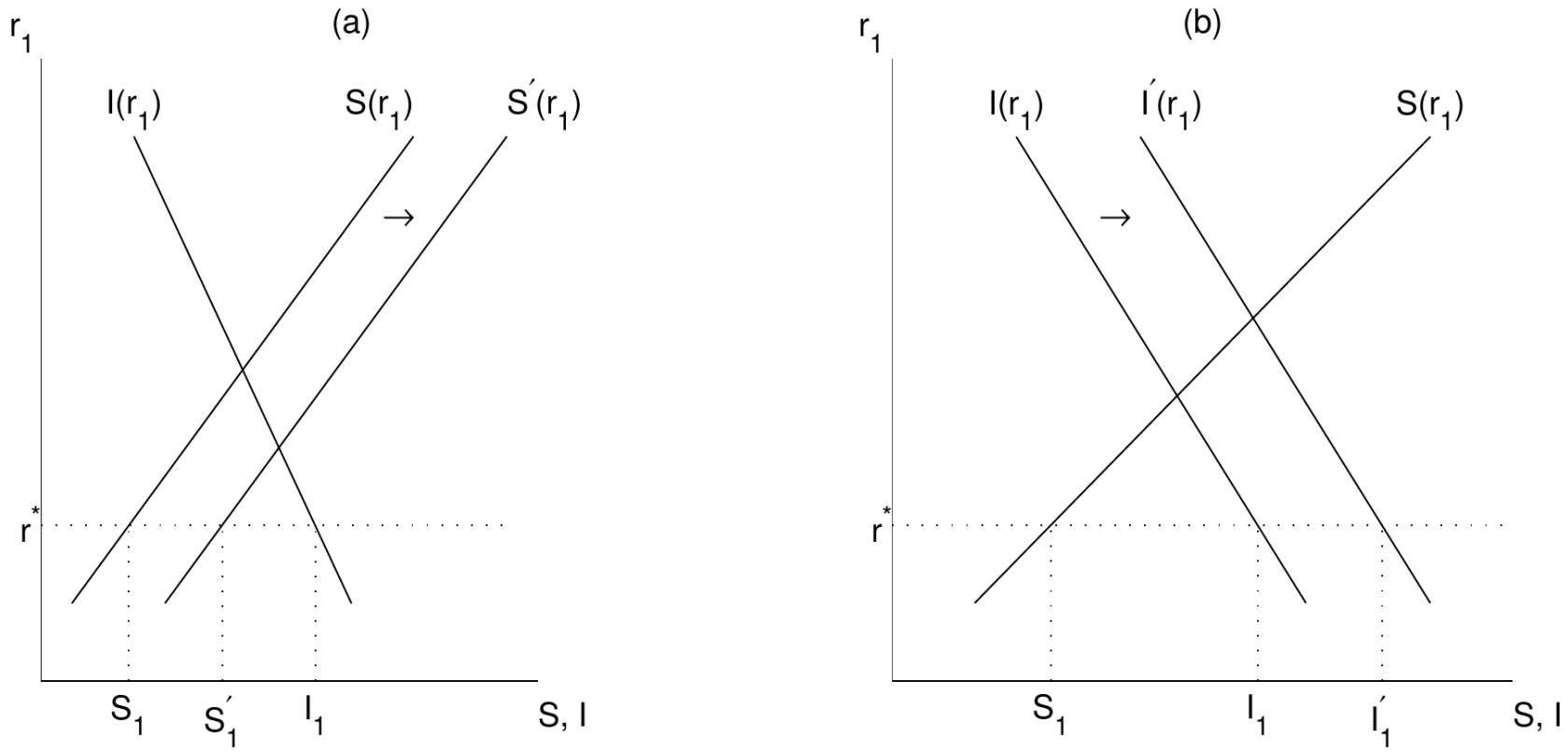
   Therefore, we see the comovement of S and I.

2. In an open economy, S and I don't have to move together.

- Therefore, by measuring the comovement of the saving and investment, we can get an idea on the degree of capital mobility.

The Comovement of Saving and Investment

Figure: Response of *S* and *I* to independent shifts in (a) the savings schedule and (b) the investment schedule



Feldstein and Horioka (1980)

- 16 Industrialized Countries.
- The average saving (S) and investment (I) rates during 1960-1974.
- Regress I_i/GDP on S_i/GDP as

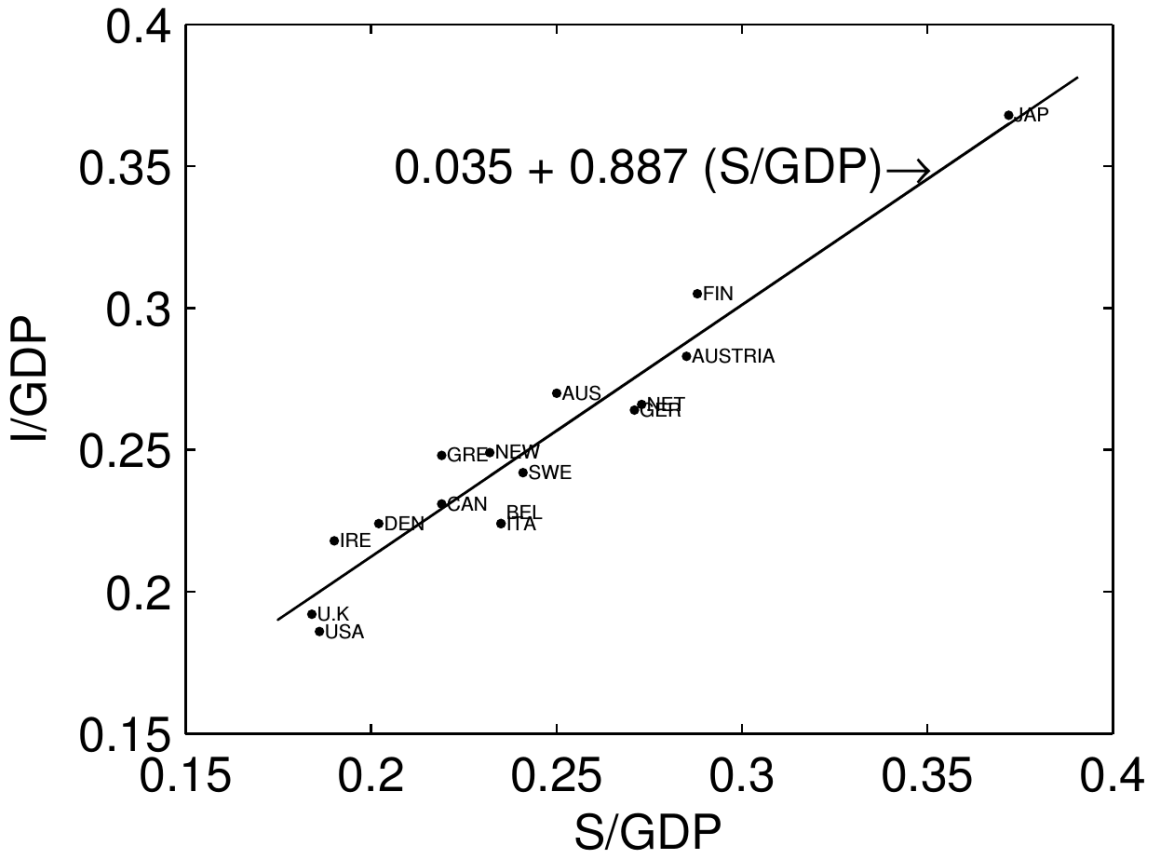
$$\frac{I_i}{GDP_i} = \alpha + \beta \left(\frac{S_i}{GDP_i} \right) + \nu_i$$

  where i indicates a country.

- We expect that β is positive and significant if the country is closed.
- On the other hand, β is insignificant under free capital mobility.

Feldstein and Horioka (1980)

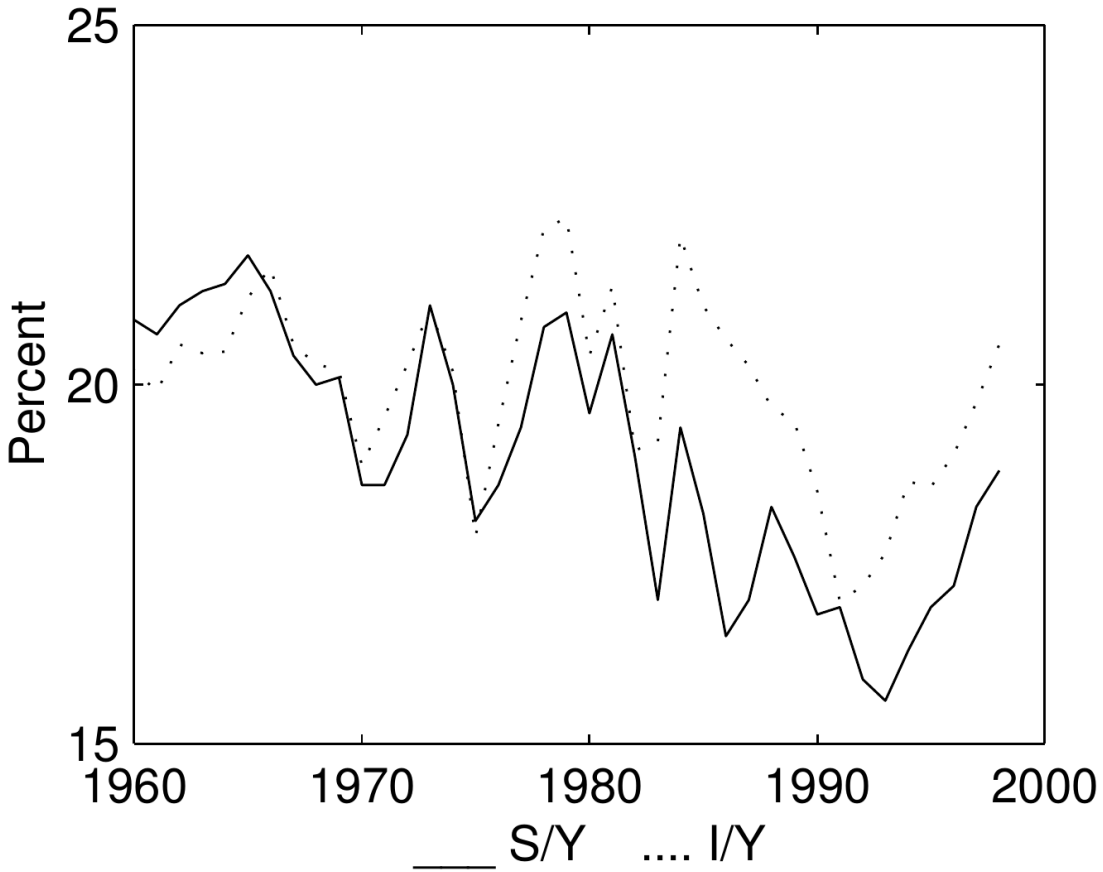
Figure: Saving and Investment Rates for 16 Industrialized Countries, 1960-1974 Averages



Source: M. Feldstein and C. Horioka, "Domestic Saving and International Capital Flows," *Economic Journal* 90, June 1980, 314-29.

Feldstein and Horioka (1980)

Figure: U.S. National Saving, Investment, and the Current Account as a Fraction of GNP, 1960-1998



Source: Department of Commerce, Bureau of Economic Analysis, www.bea.gov.

Summary

For the 16 industrialized countries,

- The β is 0.887 during the period 1960 - 1974.
- For the later period 1974 - 1990, the β is 0.495.

For the U.S.,

- The β is 1.05 during the period 1955 - 1979.
- For the later period 1980 - 1987, the β is 0.03.
- This implies that the mobility of capital has increased over time.

Summary and Conclusion

- Today, we studied:
  1. the Great Moderation.
  2. a small open economy model with uncertainty.
  3. precautionary savings.
  4. International Capital Market Integration.