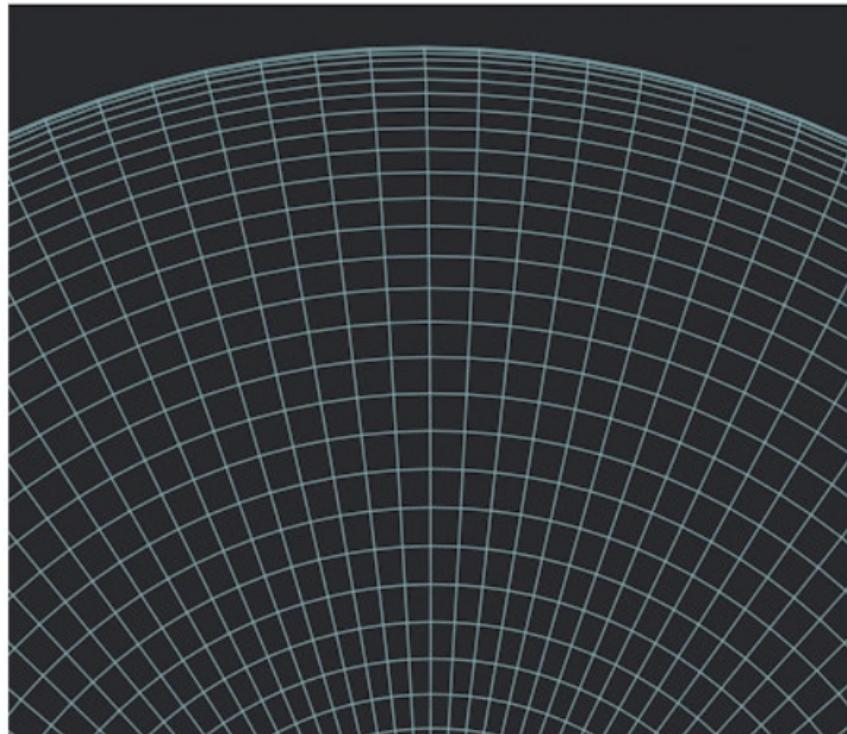

INTERNATIONAL MACROECONOMICS

A MODERN APPROACH

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Slides EC201

Chapter 6

**Uncertainty and the Current
Account**

Motivation

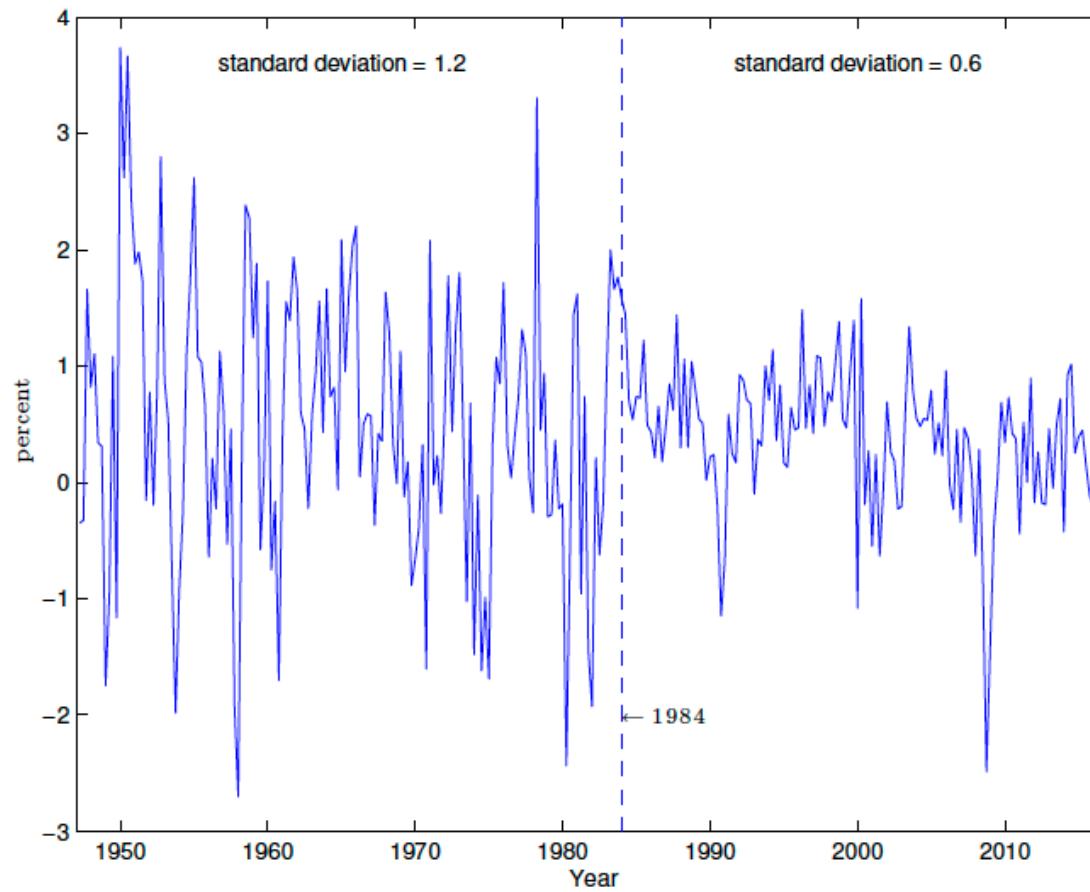
- In the postwar period, the U.S. economy was much more volatile prior to the 1980s than thereafter. The relatively tranquil period post-1984 is called the Great Moderation.
- The Great Moderation period coincided with the emergence of large U.S. current account deficits.
- This chapter expands the open economy model of Chapter 3 to introduce uncertainty.
- This modification allows us to understand the effect of changes in the aggregate level of uncertainty on consumption, saving, the trade balance, and the current account.

The Great Moderation

The volatility of U.S. output declined significantly starting in the early 1980s. This phenomenon has become known as the Great Moderation.

The next slide illustrates this point by showing that output growth has been much smoother in the post-1984 subsample than it was in the pre-1984 subsample.

Quarterly Real Per Capita GDP Growth in the United States: 1947Q2-2017Q4



The figure displays the growth rate of real GDP per capita in the United States during the postwar period. This variable became less volatile after 1984. Its standard deviation was twice as large in the pre-1984 period than thereafter, 1.2 versus 0.6 percent. This phenomenon is known as the Great Moderation.

Measuring Volatility

A commonly used measure of volatility in macroeconomic data is the standard deviation.

According to this statistic, postwar U.S. output growth became half as volatile after 1983.

The standard deviation of quarter-to-quarter real per capita output growth was 1.2 percent over the period 1947Q1 to 1983Q4 and only 0.6 percent over the period 1984Q1 to 2017Q4.

Causes of the Great Moderation

3 explanations:

- good luck
- good policy
- structural change

The Good-Luck Hypothesis

says that by chance starting in the early 1980s the U.S. economy has been blessed with smaller shocks.

The Good-Policy Hypothesis

gives credit to the government:

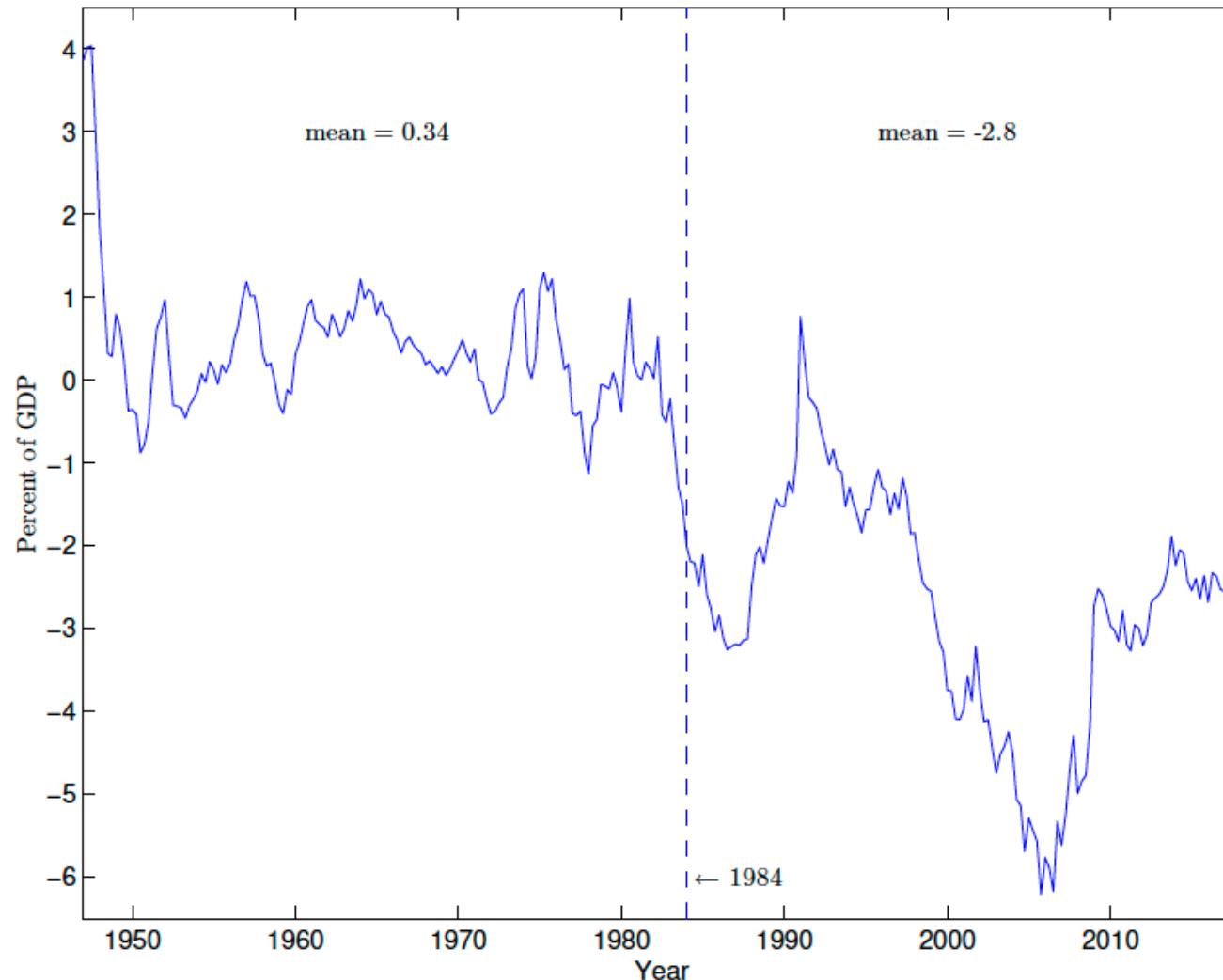
- **good monetary policy:** aggressive low inflation policy started by the Volcker Fed and continued by the Greenspan Fed.
- **good regulatory policy:** early 1980s regulation Q (or Reg Q) was abandoned. Reg Q imposed a ceiling on the interest rate that banks could pay on deposits. Regulation Q introduces a financial distortion that exacerbates inflation. When expected inflation goes up (as it did in the 1970s) the real interest rate on deposits, given by the difference between the interest rate on deposits and expected inflation, falls and can even become negative, inducing depositors to withdraw their funds from banks. As a consequence, banks are forced to reduce the volume of loans generating a credit-crunch-induced recession.

The Structural Change Hypothesis

maintains that the Great Moderation was in part caused by structural change, particularly in inventory management and in the financial sector. These technological developments, the argument goes, allowed firms to display smoother flows of production, distribution, sales, employment, and inventories, thereby reducing the amplitude of the business cycle.

We will not dwell on which of the proposed explanations of the Great Moderation has more merit. Our interest is in possible connections between the Great Moderation and the significant current account deterioration observed in the United States over the post-1984 period.

The Great Moderation and the Emergence of Current Account Imbalances



Current-account-to-GDP ratio in the United States from 1947Q1 to 2017Q4.

Current Account Pattern

During the period 1947Q1-1983Q4 the United States experienced on average positive current account balances of 0.34 percent of GDP. Starting in the early 1980s, large current account deficits averaging 2.8 percent of GDP opened up.

The emergence of persistent current account deficits in the United States coincided with the beginning of the Great Moderation in 1984.

U.S. Summary Statistics

Statistic	1947Q1-1983Q4	1984Q1-2017Q4
Std. Dev. Output Growth	1.2%	0.6%
Average CA/GDP	0.34%	-2.8%

An Open Economy With Uncertainty

Motivation Question: Is there a causal relation linking the Great Moderation with the emergence of current account deficits?

To address this question, we will modify the endowment economy of Chapter 3 by assuming that the endowment in period 2, Q_2 , is uncertain.

Intuition: Facing an uncertain income in period 2, households are likely to engage in precautionary saving in period 1. This would allow them to hedge against a bad income realization in period 2. Thus, consumption should fall in period 1. Since the period-1 endowment is unchanged, the trade balance must improve.

Implication: If this intuition is right, the decline in income uncertainty observed during the Great Moderation should lead to an elevation in current account deficits.

Starting Point: An Economy without Uncertainty

Assumptions

- Endowments $Q_1 = Q_2 = Q$ and Q is known with certainty.
- The utility function is $\ln C_1 + \ln C_2$
- Zero initial assets, $B_0 = 0$, and zero interest rate, $r^* = 0$.

Then, the intertemporal budget constraint is $C_1 + C_2 = 2Q$. Using this expression to get rid of C_2 in the utility function, the optimization problem of the household is

$$\max_{\{C_1\}} \ln C_1 + \ln(2Q - C_1)$$

First order condition: $\frac{1}{C_1} = \frac{1}{2Q-C_1}$

Solution: $C_1 = Q$. Thus, we have $TB_1 = Q - C_1 = 0$, $CA_1 = r_0 B_0 + TB_1 = 0$.

Intuition: Output is perfectly smooth so consumption is also perfectly smooth. No need to use the current account to smooth consumption over time.

Introducing Uncertainty Suppose now that the period-1 endowment continues to be Q , but that the period-2 endowment is uncertain. Specifically,

$$Q_2 = \begin{cases} Q + \sigma & \text{with probability } 1/2 \\ Q - \sigma & \text{with probability } 1/2 \end{cases}$$

This is a mean preserving increase in uncertainty:

$$E(Q_2) = \frac{1}{2}(Q + \sigma) + \frac{1}{2}(Q - \sigma) = Q$$

The parameter σ measures the degree of uncertainty:

$$\text{Variance of } Q_2 = E(Q_2 - E(Q_2))^2 = \frac{1}{2}(Q + \sigma - Q)^2 + \frac{1}{2}(Q - \sigma - Q)^2 = \sigma^2$$

$$\text{Standard deviation of } Q_2 = \sqrt{\text{var}(Q_2)} = \sigma$$

Intertemporal Budget Constraints

$$C_2 = \begin{cases} 2Q + \sigma - C_1 & \text{with probability } 1/2 \text{ (good state)} \\ 2Q - \sigma - C_1 & \text{with probability } 1/2 \text{ (bad state)} \end{cases}$$

Expected Utility

Assume that households care about the expected value of utility.

$$\ln C_1 + E \ln C_2 \quad (1)$$

The Household's Maximization Problem Using the two state contingent intertemporal budget constraints shown in slide 17 to eliminate C_2 from the lifetime utility function (1), the household problem is to choose C_1 to maximize

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

The first-order optimality condition associated with this problem is

$$u'(C_1) = E(u'(C_2)) \quad (2)$$

This condition **MUST** be satisfied!

$$\frac{1}{C_1} = \frac{1}{2} \left[\frac{1}{2Q + \sigma - C_1} + \frac{1}{2Q - \sigma - C_1} \right] \quad (3)$$

LHS: marginal utility of consumption in period 1.

RHS: expected marginal utility of consumption in period 2.

Precautionary Saving

Is the optimal consumption level under certainty, $C_1 = Q$, also optimal under uncertainty?

Let's check this by setting $C_1 = Q$ in optimality condition (2) and check if it will be satisfied:

$$\begin{aligned}\frac{1}{Q} &\stackrel{?}{=} \frac{1}{2} \left[\frac{1}{2Q + \sigma - Q} + \frac{1}{2Q - \sigma - Q} \right] \\ &= \frac{Q}{Q^2 - \sigma^2} = \frac{1}{Q} \left(\frac{Q^2}{Q^2 - \sigma^2} \right) > \frac{1}{Q}\end{aligned}$$

So $C_1 = Q$ isn't the solution, as it makes the LHS of (2) less than the RHS. Since the LHS is decreasing in C_1 and the RHS increasing in C_1 , we have that the optimal C_1 satisfies

$$C_1 < Q$$

We conclude that a mean-preserving increase in uncertainty induces a fall in consumption and an increase in saving. This increase in saving is called **precautionary saving**.

The higher is the curvature of the utility function the stronger is precautionary savings motive. Draw a steeper MUC in Figure 6.3. and it is clear that marginal utility of consumption in period 1 (if we again try to check if Q is the solution) will be even further from the marginal utility of the expected consumption in period 2 and that you would need to reduce C_1 even more.

hows the presence of **precautionary savings**: uncertainty depresses current consumption (increases savings)

Pre-class question for the next week asks of you to repeat the exercise with risk neutrality.

Risk neutrality means that you have a linear utility function.

With linear utility marginal utility is constant and does not depend on the level of uncertainty, in which case households will not use precautionary savings to ensure against uncertainty.

Uncertainty, the Trade Balance, and the Current Account

An increase in uncertainty causes an improvement in the trade balance and the current account:

$$TB_1 = Q - C_1 > 0$$

$$CA_1 = r_0 B_0 + TB_1 > 0$$

(since B_0 is assumed to be 0.) Recalling that under certainty $TB_1 = CA_1 = 0$, we have that a mean-preserving increase in uncertainty leads to an improvement in the trade balance and the current account. Similarly, a fall in uncertainty causes a deterioration in the trade balance and the current account.

Viewed through the lens of this model, the reduction in output volatility that came with the Great Moderation should have contributed to the observed concurrent deterioration of the U.S. current account.

Summing Up

- Great Moderation (1984-): lower output growth volatility. Three main explanations: good luck, good policy, and structural change.
- The Great Moderation coincided with the beginning of sizable U.S. current account deficits.
- A model of an open economy with uncertain future endowments predicts that an increase in uncertainty causes an increase in precautionary saving and improvements in the trade balance and the current account.
- We will not study complete asset markets, but if you are interested you can read section 6.5. of the book - it explains that with complete asset markets, the positive relationship between the level of uncertainty and the current account disappears.