

Consumption Demand

This lecture examines the empirical evidence on the response of consumption to disposable income and the interest rate. This evidence raises questions about the empirical plausibility of the simple consumption function and then shows how consumption theory has been modified given these findings.

Consumption: A Data Analysis

A. Consumption and GDP

1. In the long run, consumption and GDP grow at the same rates.
2. Over the short-run business cycle, consumption fluctuates less than GDP.
3. Ex. see figure with GDP and consumption

B. The behavior of the components of consumption

1. Services vary the least over the business cycle.
2. Non-durables vary a bit more than services but less than durables.
3. Durables are responsible for the majority of the fluctuations in consumption over the business cycle.
4. Ex. see Figure 10.2

Consumption: A Data Analysis

A. Consumption and GDP

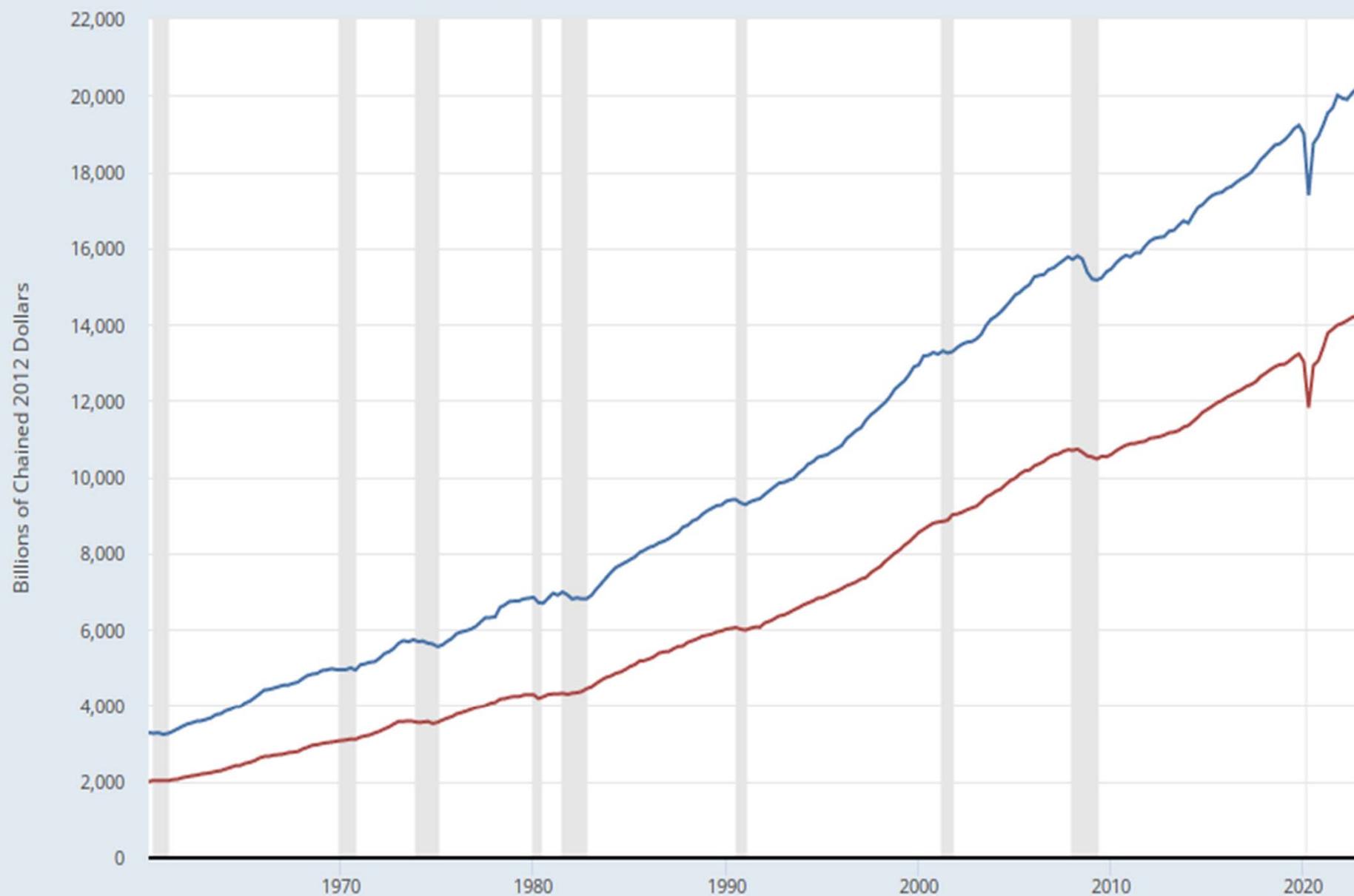
1. In the long run, consumption and GDP grow at the same rates.
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3. Ex. see Figure 10.1

B. The behavior of the components of consumption

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FRED

— Real Gross Domestic Product
— Real Personal Consumption Expenditures



Source: U.S. Bureau of Economic Analysis

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BILLIONS OF 1996 DOLLARS

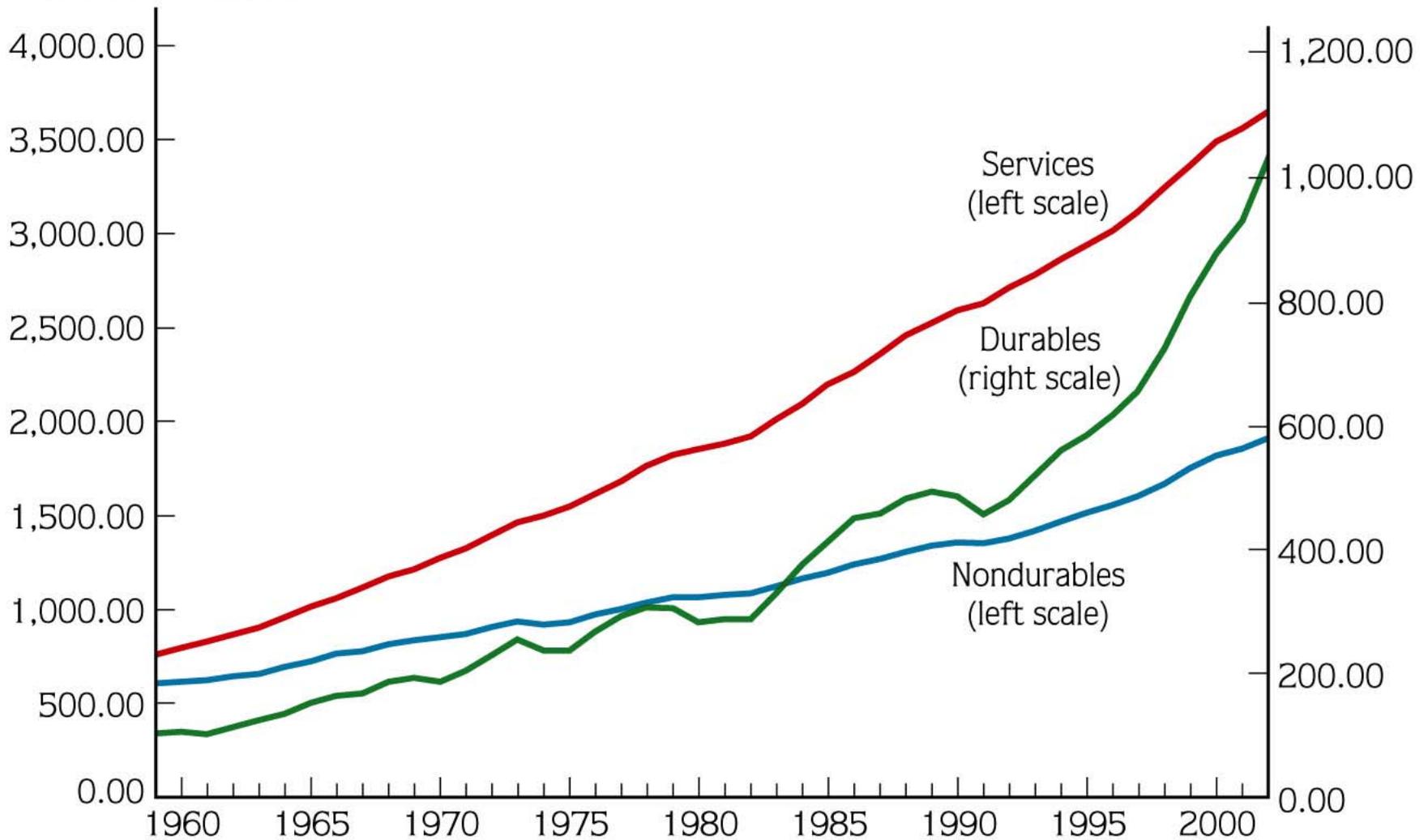


FIGURE 10.2 Fluctuations in the Components of Real Personal Consumption Expenditures

C. Consumption and disposable income

1. Consumption is less volatile than GDP in part because consumption is dependent on disposable income.
2. Disposable income tends to be less volatile than GDP for a number of reasons.
 - a. Transfer payments from the government to consumers are countercyclical.
 - b. The average proportional tax rate is procyclical because of the progressive income tax.
 - c. Corporations tend to keep dividends constant and instead vary retained earnings over the business cycle.

3. Over the long run, the relationship between consumption and disposable income is very stable (ex. see Figure 10.4).
- a. Estimates of the consumption function from 1959-2002 find that

$$C = 0.94 \times Y^d$$

where 0.94 is the estimate of the long-run marginal propensity to consume (MPC_{LR}).

- b. The estimation errors tend to be small which suggests this consumption function is a good model of consumption behavior in the economy.

$$\text{Error} = C - 0.94 \times Y^d$$

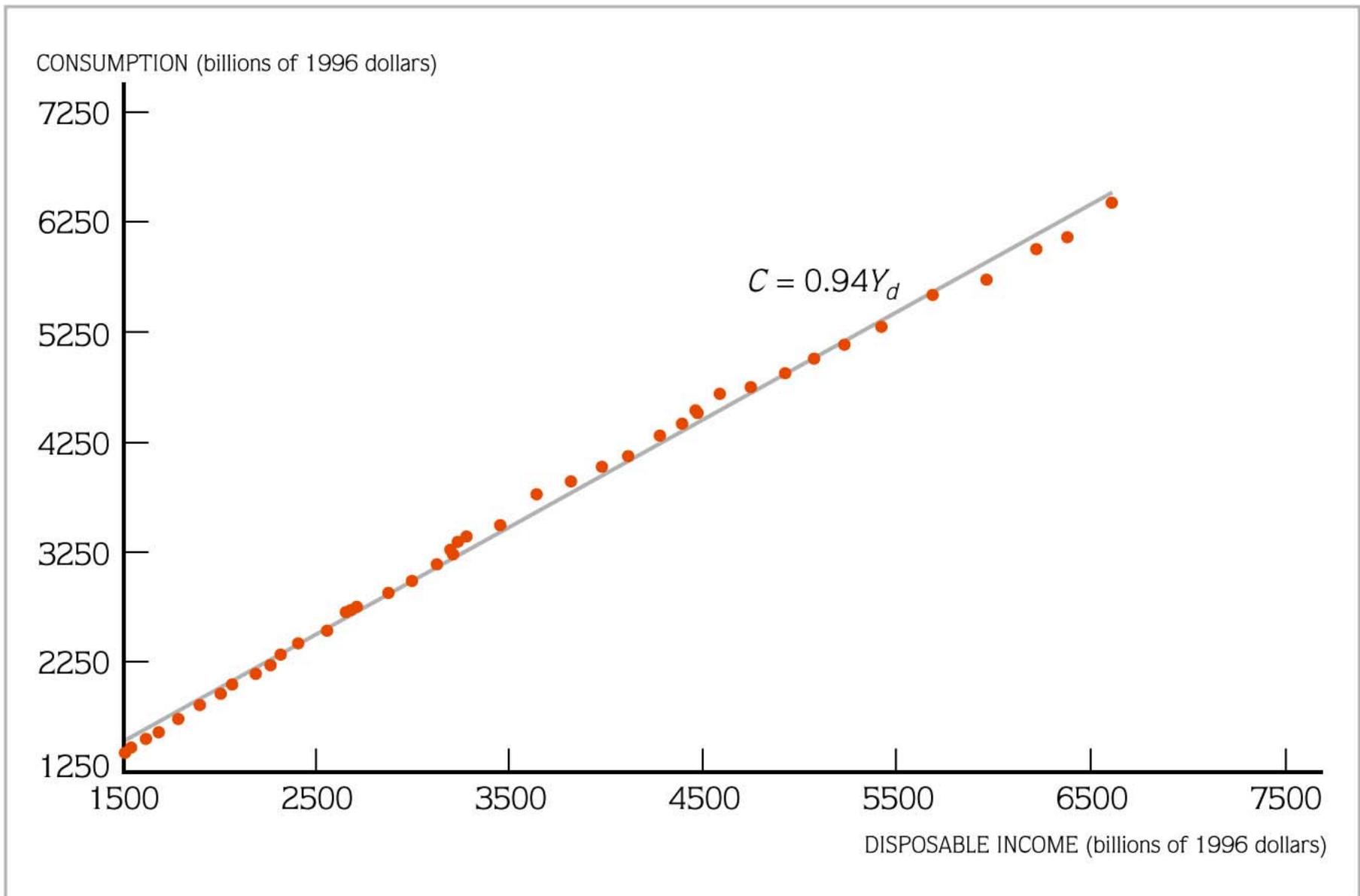


FIGURE 10.4 The Relation between Real Disposable Income and Real Consumption Expenditures

4. There are some problems with the simple relationship between consumption and disposable income that make forecasting consumption difficult.
 - a. While small, the estimation errors tend to be correlated and persist above or below zero for long periods of time. (ex. see Figure 10.5)
 - b. A plausible explanation for this behavior is that additional variables influence consumption behavior.
 1. Real wealth
 2. Interest rates
 3. Expectations of future income

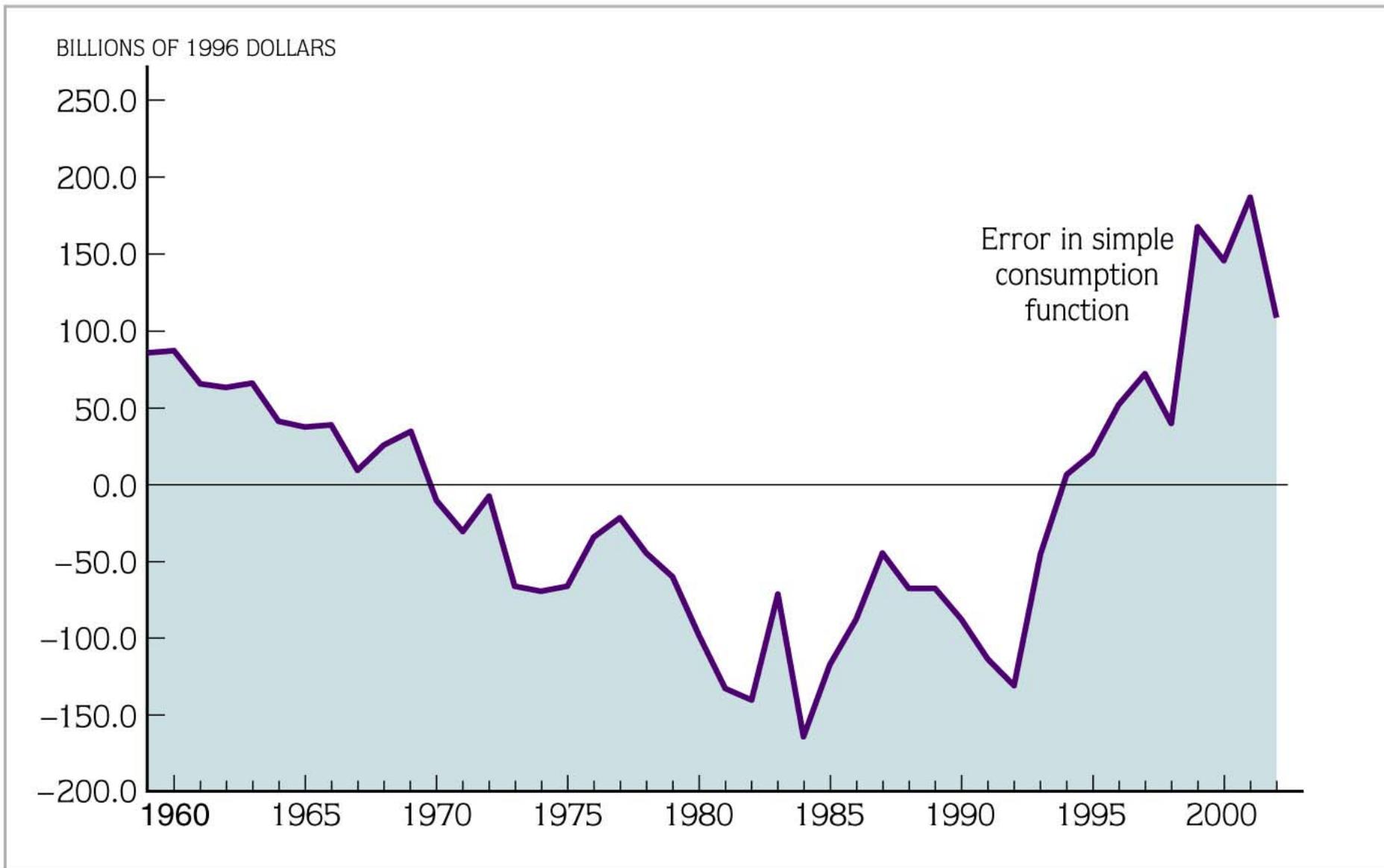


FIGURE 10.5 Error Analysis in the Simple Consumption Function

D. The short-run vs. long-run marginal propensity to consume (MPC_{SR} vs. MPC_{LR})

1. Over the short-run business cycle, consumption (C) fluctuates less than disposable income (Y^d).
2. The MPC_{LR} tells us how much C changes in the long run due to changes in Y^d.

$$C = \text{MPC}_{\text{LR}} \times Y^d$$

3. The MPC_{LR} tells us how much C changes in the short run due to changes in Y^d.

$$\Delta C = \text{MPC}_{\text{SR}} \times \Delta Y^d$$

4. Empirical estimates of the MPC_{LR} and the MPC_{SR} are 0.94 and 0.77, respectively.
5. One challenge for any consumption theory is to provide an explanation for this empirical observation.

A Forward-Looking Theory of Consumption

A. Introductory information

1. The simple consumption function assumes consumers base their current consumption (C) exclusively on their current disposable income (Y^d):

$$C = a + b \times Y^d.$$

2. The forward-looking theory assumes consumers
 - a. base C on both current and future Y^d .
 - b. prefer to keep C fairly constant from year to year. (ex. see Figure 10.7)
3. A consumer's permanent income (Y^P) is the average level of current and expected future Y^d over the remainder of his/her lifetime (n years):

$$Y^P = [Y^d + Y^d_{+1} + \dots + Y^d_{+n-1}]/n.$$

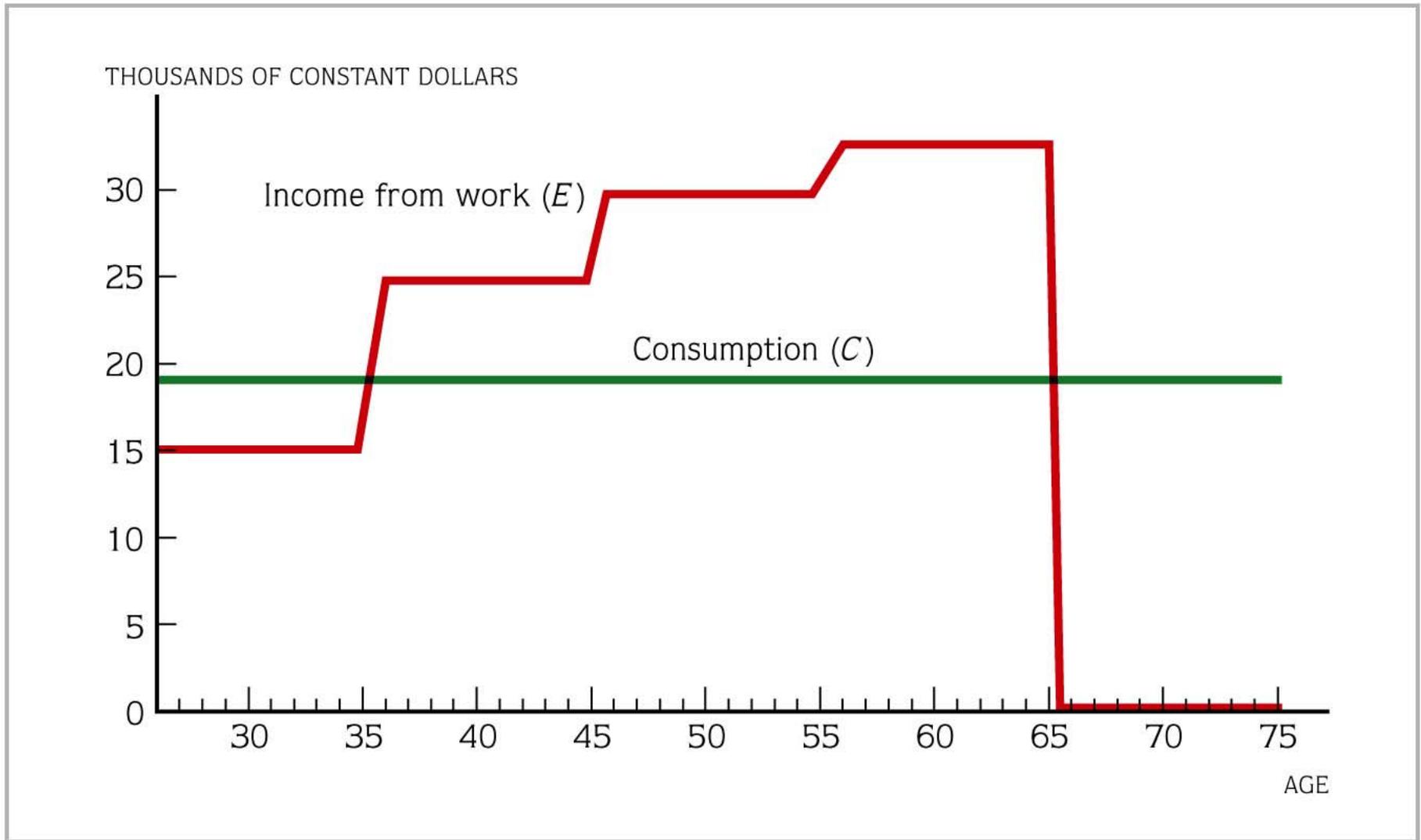


FIGURE 10.7 Illustration of Steady Consumption Compared with Income Growth and Decline

4. The forward-looking theory assumes consumers base their C on Y^P .

$$C = a + b \times Y^P,$$

B. The forward-looking theory and the intertemporal budget constraint

1. Components of the budget constraint

A = Assets at the beginning of this period

A_{+1} = Assets at the beginning of next period

R = Interest rate on assets this period

E = Income earned from work this period

T = Taxes paid this period

C = Consumption this period

2. Intertemporal budget constraint equation

$$A_{+1} = A + R \times A + E - T - C$$

3. Other key relationships

a. Disposable income (Y^d)

$$Y^d = R \times A + E - T$$

b. Private savings (S_p)

$$S_p = R \times A + E - T - C$$

4. Any feasible consumption plan requires $A > 0$. (Exception: borrowing for higher education where expected future incomes are much higher.)

5. Any feasible consumption plan cannot exceed the sum of current assets plus current and expected future income.

C. The MPC: temporary vs. permanent changes in income.

1. Suppose there is an unanticipated permanent rise in disposable income. (Y^d is higher now and in every period in the future.)
 - a. Y^P will rise by the change in disposable income.
 - b. In this case, the marginal propensity to consume (in the simple consumption function) will be close to one.
2. Suppose there is an unanticipated temporary rise in disposable income. (Y^d rises only in this period.)
 - a. Since the change is temporary, most of the additional income is saved in interest-bearing assets because consumers prefer to have a constant consumption path.
 - b. This temporary change increases Y^P by a little more than the annual interest earned on the additional income.

- c. In this case, the marginal propensity to consume (in the simple consumption function) will be slightly higher than the interest rate.
 - d. Therefore, the marginal propensity to consume for a temporary change in Y^d is much less than when the change in Y^d is permanent.
3. If the change in disposable income is anticipated, (it does not matter if it is permanent or temporary) the Y^P would have already been adjusted so C will not change.

How Well Does the Forward-Looking Theory Work?

- A. The short-run and long-run MPC: A rough check of the theory.
 1. If the forward-looking model is a plausible, it should be able to explain why MPC_{SR} is less than MPC_{LR} .
 2. If consumers view recessions and expansions as being temporary, the changes in consumption will be more modest. This will cause MPC_{SR} to be less than MPC_{LR} , which is what is observed in the data.

- B. Policy experiments
 1. This analysis involves comparing situations where the government explicitly enacted a temporary tax adjustment, such as the 1975 and 2008 tax rebate, with those situations where they enacted permanent tax changes.
 2. Statistical evidence suggests the MPC from a temporary tax cut is about half the MPC from a permanent tax cut.

3. While this experiment finds a permanent tax cut has a greater impact on consumption, the estimated MPC from a temporary tax cut is much larger than the forward-looking model would suggest.

C. There are a couple of potential reasons why the forward-looking model underpredicts the response of consumption to a temporary change in income.

1. Empirical tests might incorrectly estimate expectations of future income.
2. People are uncertain about their lifetime income which leads to impatience. Thus, they consume based on their current income and expected future income over the next few years.
3. Consumers may not be able to borrow as easily as the forward-looking theory suggests so they cannot keep their consumption smooth during economic downturns. In this case, the consumers are said to be liquidity constrained.

Consumption and the Interest Rate

- A. The decision to consume today or postpone consumption until a later period is influenced by a couple of factors.
 - 1. The rate of time preference
 - a. People prefer present consumption to future consumption.
 - b. Some reasons why consumers prefer current consumption include impatience and uncertainty.
 - c. If people have a high rate of time preference, they will prefer to consume more now and less in the future.
 - 2. The real interest rate ($R - \pi^e$)
 - a. $R - \pi^e$ is the nominal interest rate (R) minus the expected inflation rate (π^e)
 - i. R is the reward for postponing consumption (C).
 - ii. π^e is how much consumers expect prices to change.

- b. $R - \pi^e$ is the reward consumers expect to receive after taking into account expected changes in prices.
- A rise in $(R - \pi^e)$, increases the opportunity cost of current C so consumers will consume less now and more in the future.
$$[(R - \pi^e)\uparrow \rightarrow \text{opportunity cost of current } C\uparrow \rightarrow C\downarrow]$$
 - This is called the substitution effect.
- c. $R - \pi^e$ is also the real rate of return consumers receive on assets they hold.
- A rise in $R - \pi^e$, increases consumers' return on their assets, i.e. their income (Y) rises, so their C increases.
$$[(R - \pi^e)\uparrow \rightarrow Y\uparrow \rightarrow C\uparrow]$$
 - This is called the income effect.

d. Empirical evidence is inconclusive on whether the substitution effect dominates the income effect, i.e. C is negatively related to $R - \pi^e$, or these effects cancel each other out, i.e. C is not related to $R - \pi^e$.

B. What is the impact on the IS curve's slope when the interest rate is included in the consumption function.

1. Without loss of generality, we assume $\pi^e = 0$ so that C depends negatively on R .
2. If R falls, C rises more than it otherwise would, which leads in a larger increase in Y :

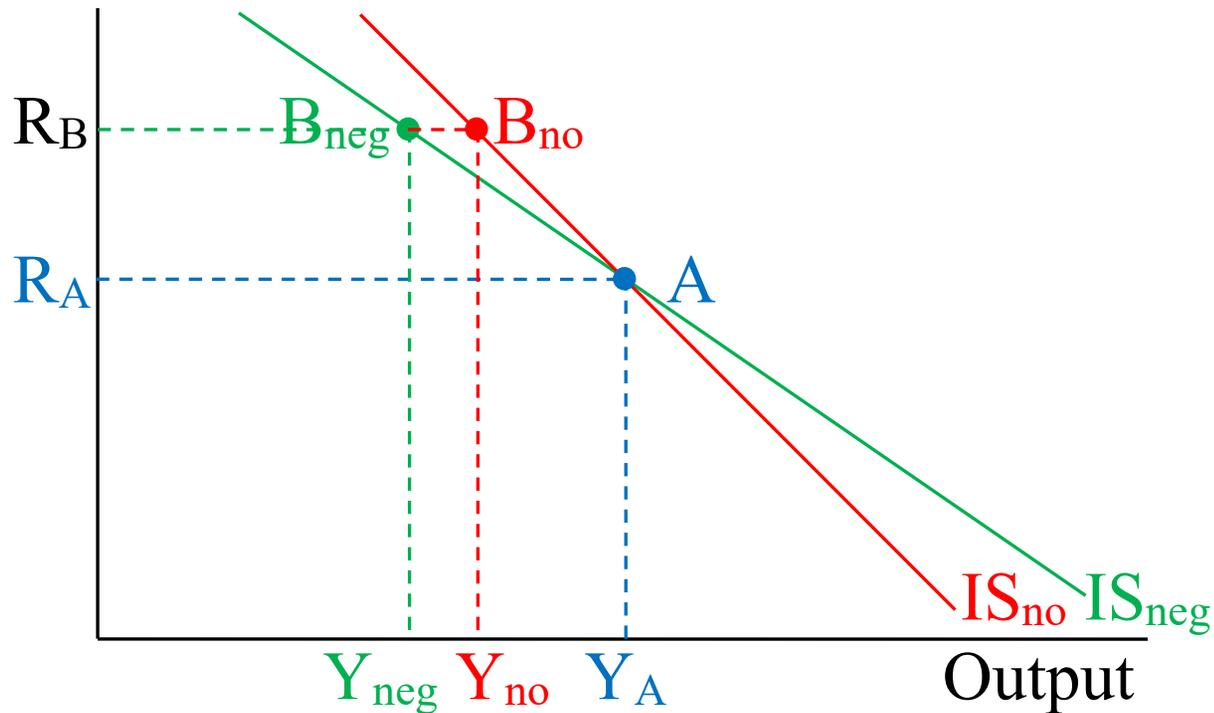
$$C = a + b \times (1 - t) \times Y - z \times R,$$

where $z > 0$.

3. Thus, the IS curve will be flatter when C depends negatively on R because Y is more sensitive to changes in R .

4. IS curve graph when R has no impact (**no**) and a negative impact (**neg**) on C: The effect of an increase in R.

Interest rate



- a. R has no impact (**no**) on C:

$$[R \uparrow \rightarrow I \downarrow \ \& \ (X - IM) \downarrow \rightarrow Y \downarrow (B_{no})]$$

- b. R has a negative impact (**neg**) on consumption:

$$[R \uparrow \rightarrow C \downarrow \ \& \ I \downarrow \ \& \ (X - IM) \downarrow \rightarrow Y \downarrow (B_{neg})]$$

Consumption and Tax Rate Changes

- A. A temporary tax cut leads to a small increase in permanent income, which causes a little increase in C and a tiny rightward shift in the IS curve.
- B. A permanent tax cut leads to a comparable rise in permanent income, which causes a similar increase in C and a sizable rightward shift in the IS curve.
- C. Two examples of a temporary tax cut are the 1975 and 2008 tax rebates.