Consumption Chapter 16

Consumption is the most important part of GDP. This chapter studies the consumption behavior.

We start from a simple Keynesian consumption function:

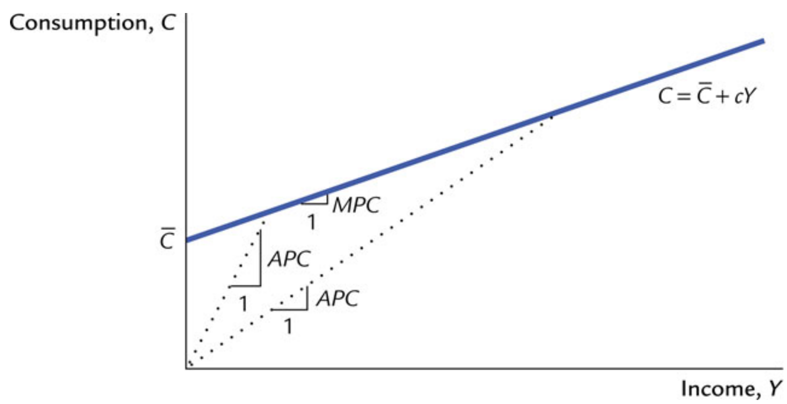
$$C = a + c\,Y$$

$$C/Y = a/Y + c$$

There are two predictions of this simple consumption function:

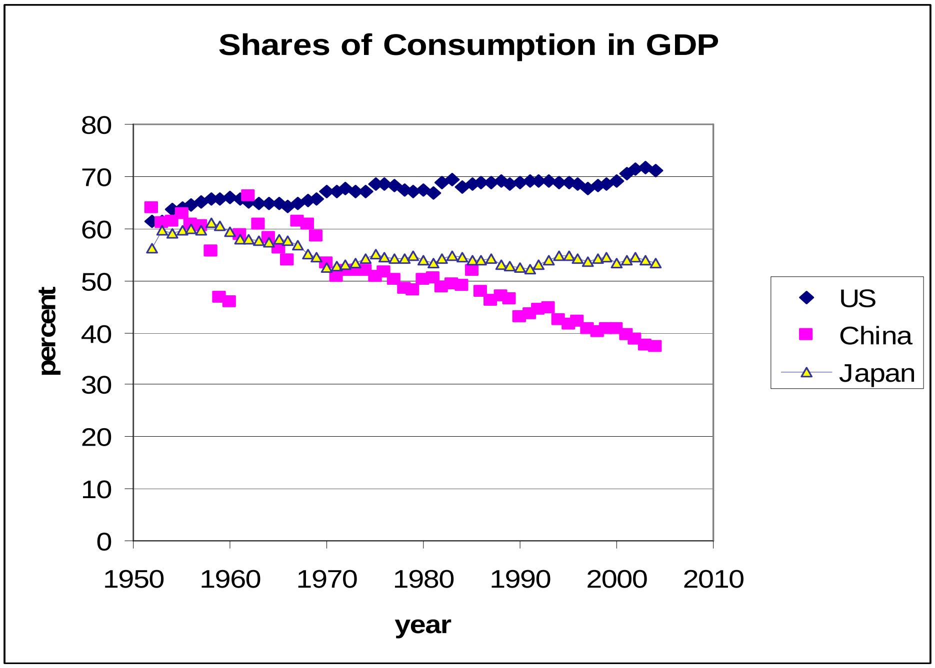
- Y increases ➔ C increases
- Y increases ➔ C/Y, average propensity to consume (APC), deceases.

Graphically, this is given by:



Across individuals, this seems fine; however, over time, this is NOT true. The consumption as a percentage of GDP remains constant as we income increases over time.

This was first discovered by Kuznet in 1945: the Kuznet consumption puzzle: the share of consumption in GDP did not drop over time.



From the above graph, the share of consumption in the US actually rose from 61.4% to 71.2% between 1952 and 2004 while the GDP has gone up by 196%, inconsistent with the Keynesian consumption function.

For Japan, the shares of consumption remain relatively constant, while GDP has gone up by 54 times, inconsistent with the predictions of the Keynesian consumption function.

For China, the consumption share did drop significant, from 63.8 to 37.2%, when income has gone up by 15 times, consistent with the predictions of the Keynesian consumption function.

Why?

<u>Irving Fisher and the Intertemporal Choice Model</u>

How to optimize over time?

Consider a model of two periods consumption: $U(C_1, C_2)$:

Budget constraint:

- Period one: $S = Y_1 - C_1$
- Period two: $C_2 = (1+r)\, S + Y_2$

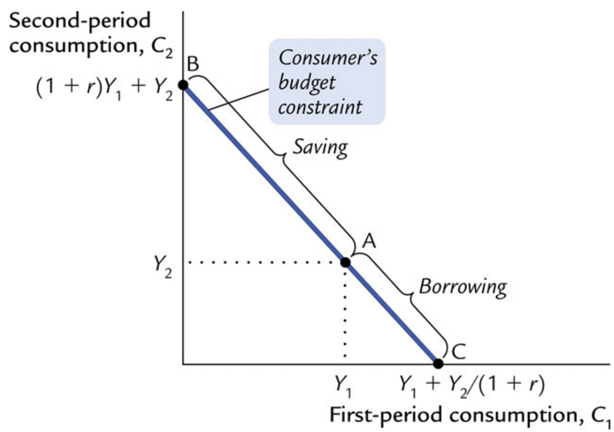
Put the two-period budget constraint together: $C_1(1+r) + C_2 = Y_1(1+r) + Y_2$

Or, equivalently, $C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2}{1+r}$

In other words, the budget constraint can be represented as:

present value of total consumption = present value of total income

This budget constraint can be illustrated as:

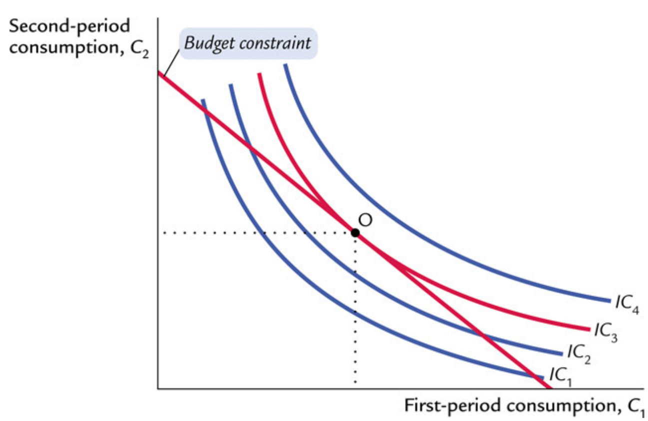


In the graph:

Point A is $\left(Y_1 + \frac{Y_2}{1+r}, 0\right)$, obtained by setting consumption at period 2 being zero.

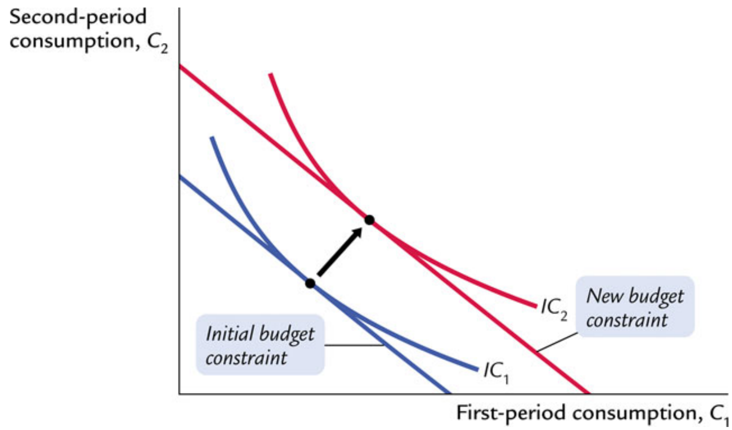
Similarly, point B is obtained by setting consumption at period 1 being zero.

Optimization: just like the optimization problem of two consumer goods.



Applications of this intertemporal optimization model:

- Changes in income in either first period or the second period would shifts the budget constraint rightward.

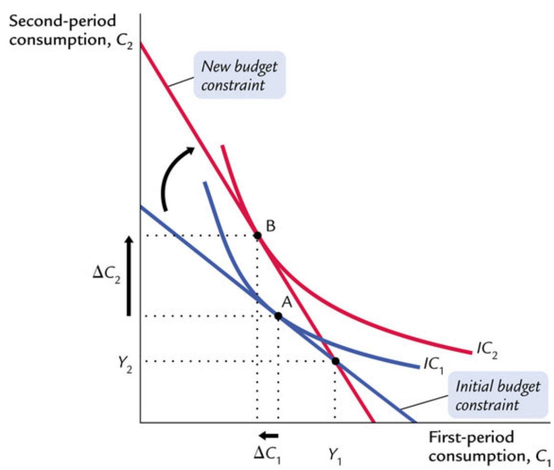


It is the present value of the income that matters:

$$\text{Present Value of Income} = Y_1 + Y_2/(1+r).$$

Example:

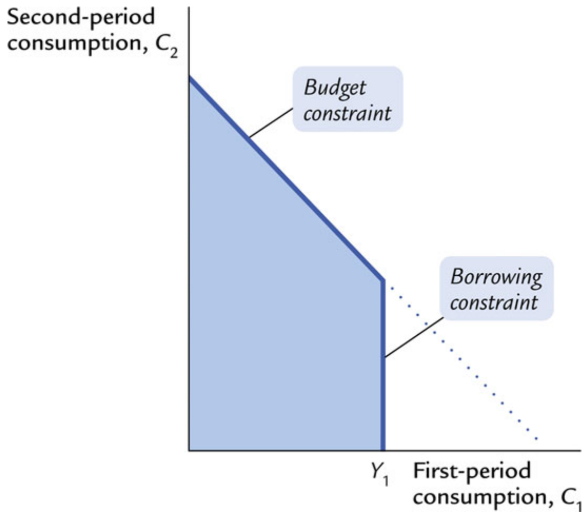
- Changes in real interest rate. Consider an increase in real interest rate.



Note the horizontal axis and the vertical axis behave differently. This is because the maximum consumption at the horizontal axis (when $C_2 = 0$) is $Y_1 + Y_2/(1+r)$. The maximum consumption at the vertical axis (when $C_1 = 0$) is $Y_1(1+r) + Y_2$.

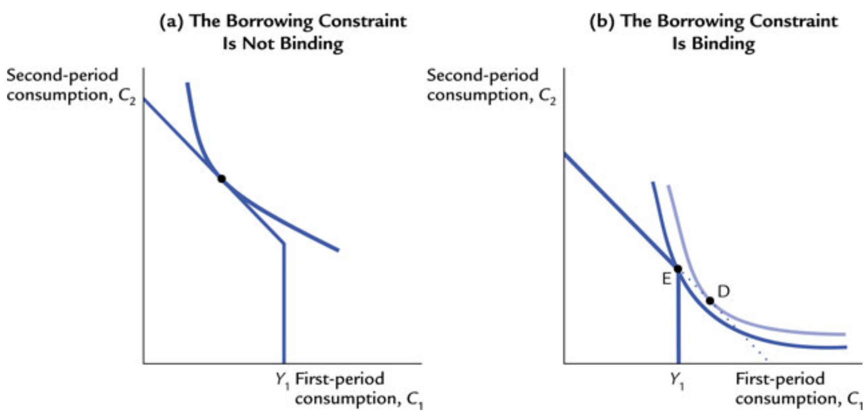
The optimal level of consumption at the new budget constraint, should be: C_2 increases while C_1 decreases.

- Constraints on borrowing: $C_1 \leq Y_1$



The borrowing constraint may be binding, or they may not be binding.

If the borrowing constraint is binding (graph (b)), then the person would choose $C_1 = Y_1$; the indifference curve intersects with the kink point at *E*.



One of the key points in the intertemporal optimization model is that it is the present value of income that only matters.

<u>Time Discount Rate</u>

How to compare utilities over time?

- We use time discount rate to link the utility across time.

  $U(C_1, C_2) = U(C_1) + \beta U(C_2)$.

  The utility of tomorrow is β of today's utility. Typically it is assumed that β = 0.96.

- Applications:

- Differences between kids and grownups.
  Kids would value current assumption much higher than future consumption. (β is small for kids than for grownups)

- Difference between smokers and non-smokers.
  Almost all smokers know the health consequences of smoking. They still smoke, because they value current utility (from smoking) higher than future utility (β is small for smokers than for non-smokers)

Behavior difference for people with a higher β

- More saving less consumption right now
- More investment in human capital – more schooling etc.

<u>Modigliani and the Life-Cycle Hypothesis</u>

Consider a consumer who expects to live another T years, has wealth of W, and expects to earn income Y until she retires R years from now. Suppose the interest rate is zero for simplicity. The consumption level of this consumer is given by:

$$C = (W + RY) / T$$
$$= W/T + (R/T)\ Y$$

- If W is constant, then let W/T = a, R/T = b, we have the Keynesian consumption function:

  $$C = \text{a} + bY$$

- If W is not constant, then the consumption depends on both income and wealth.

  $$C = \alpha W + \beta Y$$

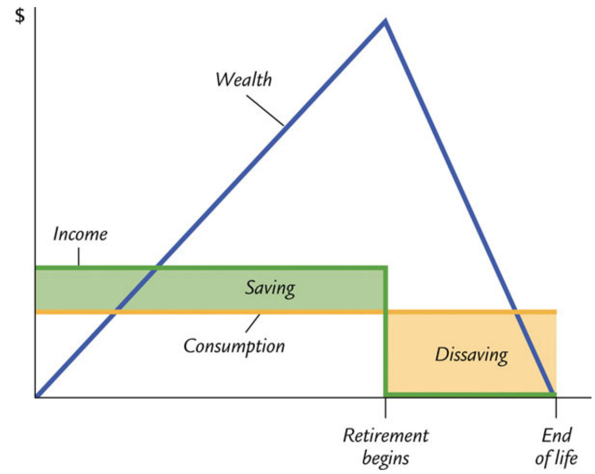
  Therefore,

  $$C/Y = \alpha W/Y + \beta$$

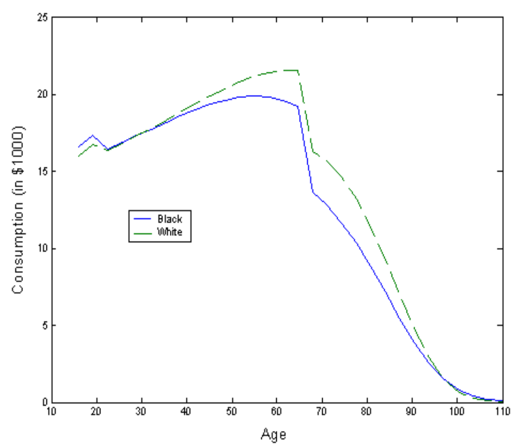
  Because wealth does not vary proportionally with income from person to person, high income people would have a lower average propensity to consume.

  However, over the years, as the economy grow, W and Y roughly grow proportionally, i.e., over time, W/Y = constant ➔ C/Y constant over time, as in the case of Japan, and US.

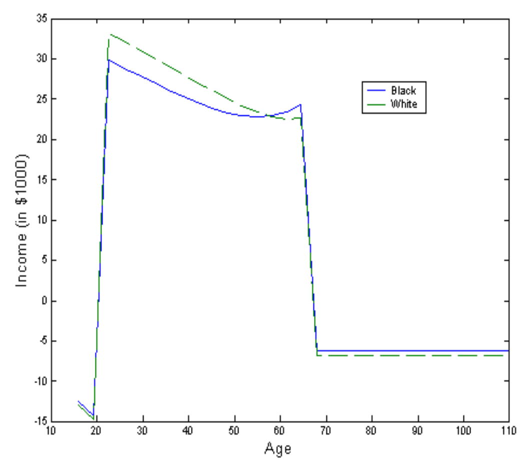
Life cycle consumption and saving behavior:



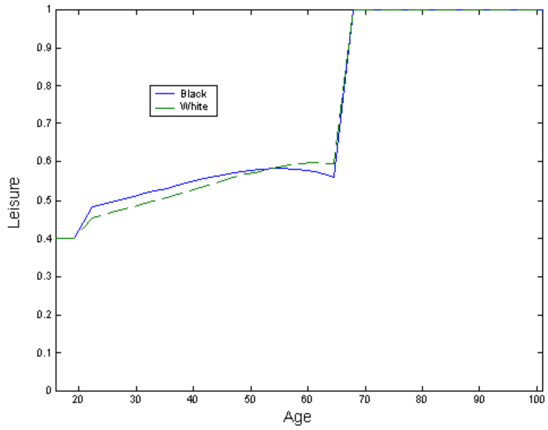
Example: Because blacks have a lower life expectancy, they would invest less in education than whites. Here are the consequences:



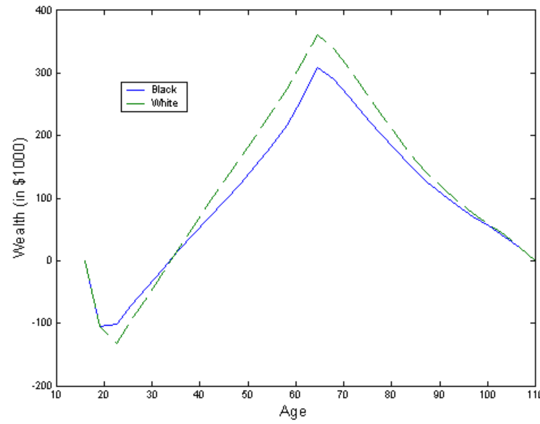
Lifetime Consumption Trajectories



Lifetime Net Income Trajectories



Lifetime Leisure Trajectories



Lifetime wealth trajectories

<u>Milton Friedman and the Permanent-Income Hypothesis</u>

Friedman suggested that current income as the sum of two components, permanent income Y^P, and transitory income Y^T.

$$Y = Y^P + Y^T.$$

Permanent income Y^P is the part of income that people expect to persist into the future, while transitory income Y^T is the random deviation from the average.

Friedman suggests that the consumption function should be:

$$C = \alpha Y^P$$

Implications: Divide both sides of the consumption function by Y to obtain average propensity to consume:

$$APC = C/Y = \alpha Y^P/Y$$

When current income temporarily increases, the APC falls.

Consider the studies of household data. Friedman reasoned that these data reflect a combination of permanent and transitory income.

Consider the household data. If all variation in current income came from e the permanent income component, the average propensity to consumer would be the same in all households. Across households, most variation across incomes comes from the Y^T instead of Y^P. Across decades, most variation across incomes comes from the Y^P.

<u>Robert Hall and the Random-Walk Hypothesis</u>

- According to the intertemporal optimization, people's consumption depends on their present value of the expected income.

➔ So changes of consumption should reflect the surprise in changes of their income.
➔ Changes in consumption should not be predictable.
➔ Changes in consumption should be random walk.

However, predictable changes in income would also lead to predictable changes in consumption, violation of the hypothesis.

<u>David Laibson and the Pull of the Instant Gratification</u>

Question 1: would you prefer (A) a candy today or (B) two candies tomorrow?
Question 2: would you prefer (A) a candy in 100 days or (B) two candies in 101 days?

Many people would answer A in question 1, and would answer B in question 2.

In a sense, people are more patient in the long run than they are in the short run.

So people consume more but promise themselves that they would consume less in the future.

<u>The Saving Policies (other than real economic incentives)</u>

(i) To make saving the path of least resistance.

(ii) To give people the opportunity to control their desires for instant gratification. For example, let people to commit their future incomes in the saving.