Objectives:

- Understand factors affecting consumption
- Understand the role of consumption in the Great Recession and its aftermath

I. Keynesian consumption function

Keynes (1936): consumers spend a constant proportion of additional disposable income; save the rest.

He thought of it as a "fundamental psychological law"

Keynesian consumption function:

- consumption depends on disposable income *Y-T*
- the relationship is linear

$$C = \bar{C} + MPC \cdot (Y - T)$$

- $\bar{C}$ is the amount of consumption that would be undertaken if disposable income was zero
- MPC is the **marginal propensity to consume:** the amount by which *C* changes for a one-dollar increase in (*Y-T*):

$$MPC = \frac{\Delta C}{\Delta (Y - T)}$$

The MPC is between zero and one:

$$0 < MPC < 1$$

The MPC equals the **slope** of the consumption function.

Related concept: the **average propensity to consume:** the ratio of consumption to disposable income

$$APC = \frac{C}{Y - T}$$

Keynesian consumption function is a hypothesis. It implies:

- As disposable income increases, consumption rises – meaning **MPC>0**
- As disposable income increases, savings increase – meaning **MPC<1**
- Other factors, for example interest rates, are relatively unimportant
- As disposable income increases, average propensity to consume falls

$$APC = \frac{C}{Y-T} = \frac{\bar{C} + MPC \cdot (Y-T)}{Y-T} = \frac{\bar{C}}{Y-T} + MPC$$

Since $\bar{C}$ is a constant, as (Y-T) increases, APC falls.

It was extensively tested and, initially, the results were positive

- Cross section – look at different households at the same moment of time:
  Households with higher income:
  - consumed more → MPC>0
  - saved more → MPC<1

- Over time – for short time series:
  In years when income – unusually low (Great Depression)
  - consumption and savings were low →MPC between zero and one
  - APC was high

II. Kuznets and long-run data – the consumption puzzle

Kuznets constructed data on consumption over a long period (1869-1940). Found APC – constant.

The consumption puzzle:

- For short time series, and cross section, APC is decreasing
- For long time series APC is constant

Two explanations of the consumption puzzle: the life – cycle hypothesis and the permanent income hypothesis.

III. The life – cycle hypothesis

Main insight:
- **consumers prefer constant consumption over their lifetime**
- to determine consumption they take into account wealth and current and future income.

Assume consumer expects to live for T=50 years, work for R=30 years and receive income Y while working. She has current wealth of W. Assume interest rate =0 for simplicity.

Total (expected) lifetime wealth is $W+RY$

Constant value of consumption per year is:

$$C = \frac{W + RY}{T} = \frac{W}{T} + \frac{RY}{T} = \frac{W}{50} + \frac{30}{50}Y$$

$$C = 0.02W + 0.6Y$$

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

α is the marginal propensity to consume out of wealth;
β is the marginal propensity to consume out of income

So: consumption depends on wealth and on current income.

Explaining the consumption puzzle:

Average propensity to consume APC=$C/Y= \alpha(W/Y)+\beta$

- Over long periods wealth is proportional to income, so W/Y is constant and so is APC
- Over short periods wealth changes little when income changes and so when Y is high, W/Y is low and APC is low

Pattern of savings over a lifetime:

As disposable income increases
- over a lifetime income is first high, then falls to zero in retirement
- so people save during working life, dissave in retirement

IV. Permanent income hypothesis

Current income consists of two components:

- **Permanent income** Y^P – the part of income people expect to persist into the future
  Example: extra income you will get due to university degree, promotion
- **Temporary income** Y^T - the part of income not expected to persist
  Example: one-time bonus

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

Permanent income hypothesis: to smooth consumption, consumers base consumption on permanent income. Approximately:

$$C=\alpha Y^P$$

Consumption is proportional to permanent income.

Explaining the consumption puzzle:

Average propensity to consume $APC=C/Y=\alpha Y^P/Y$

So: if transitory income is high (Y high relative to Y^P) then APC is low

- Over long periods – income changes because of changes in permanent income (economic growth) so APC is constant.
- Over short periods – some income changes are due to changes in temporary income. Higher temporary income – APC is low.

V. Interest rates and consumption

1. Nominal and real interest rates

The distinction between nominal and real interest rates is crucial.

***i* - Nominal interest rate** - the cost of borrowing/reward to lending measured in money
***r* - Real interest rate** - the cost of borrowing/reward to lending, measured in goods

The nominal interest rate - the rate paid by a bank.
- Save \$100;
- Nominal interest rate i= 5%
- a year later receive \$105 =\$100·(1+i)

The real interest rate – how many extra units you will have after one year if save 100 units today.

Real interest rate depends on the nominal interest rate and inflation.
- save the amount of money that would buy 100 units of a good.
- a year later you get money with interest.
- the amount of the good you can buy depends on how prices change

If π = the actual inflation rate (π=%ΔP), then the realized (or ex post) real interest rate (r) can be calculated as follows (using the exact formula):

$$1 + r = \frac{1 + i}{1 + \pi}$$

Example: Suppose you lend $100 for a year at a nominal interest rate of 10% (i =0.10). Over the year prices rise 6% (π = 0.06). At the end of the year you receive repayment of principal and interest in the amount of $110. However, the $110 you receive at the end of the year has a purchasing power equivalent to $103.77 (= $110/1.06) at the beginning of the year. Thus, the real interest rate, or real reward for lending, is 3.77% (r =0.0377).

The approximate formula (in the book):

$$r \approx i - \pi$$

Notes:
The approximation error - small in Canada;
The formula is ex post: after the inflation rate is known

2. Consumption depends on the real interest rate

Real interest rate is the benefit of postponing consumption/cost of accelerating consumption.

Real interest rate determines the relative price between consumption today and consumption in the future:

- If you save 1 unit of consumption today, you can get (1+r) units tomorrow.
- Conversely, if you consume 1 unit today, you have to give up (1+r) units tomorrow

So **the price of one unit today, calculated in terms of consumption tomorrow, is (1+*r*)**

Conversely, the price of one unit tomorrow, calculated in terms of consumption today, is 1/(1+r)
Question for students: explain the previous statement

3. The effect of a change in the real interest rate on consumption.

A change in the real interest rate has two effects on consumption:
- A **substitution effect**
- An **income effect**, also called a wealth effect

The substitution effect is the effect of changing a price
The income effect is the effect on the household ability to purchase goods and services

(a) Substitution effect of higher real interest rate

Higher real interest rate

- Raises the price of consumption today, calculated in terms of consumption tomorrow
- Lowers the price of consumption tomorrow, calculated in terms of consumption today

Now we repeat the statement from the previous page. It is very important!

The price of consumption today in terms of consumption in the future is (1+*r*)

Why? Because to get one unit of consumption today, you need to give up (1+*r*) units of consumption in the future

In other words, **a higher real interest rate**

- **Makes consumption today more expensive**
- **Makes consumption in the future cheaper**

Substitution effect of a higher interest rate

- lowers consumption today,
- raises consumption in the future.

(b) Income effect of a higher real interest rate

- If the consumer is a saver, she is wealthier since she can buy more in the future. The income effect is positive and she consumes more today
- If the consumer is a borrower, he is poorer since he has to pay back more in the future. The income effect is negative and he consumes less today

(c) What is the net effect of higher real interest rate on consumption?

There are two types of lending:
- Between private parties
- By households to the government

- The income effect more or less cancels for private contracts since for each borrower there is a lender.
- The income effect is positive for lending to the government.

So, overall:

Income effect of a higher interest rate tends to increase consumption today and in the future

Net result of a higher real interest rate:
depends on whether the substitution effect or the income effect is stronger.

VI. Summary

Consumption depends on:

- Current disposable income
- Wealth (or permanent income)
- The real interest rate

VII. The Great Recession and Consumption

The most important factor in consumption: housing wealth

Before the recession:
rising house prices → wealth increases → higher consumption

In the recession – same reasoning in reverse:
Falling house prices → wealth falls →lower consumption