OVS452 + 5EN253
VSE NF, Spring 2010
Lecture Notes #3
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4 Consumption

4.1 Motivation

MICRO question: How do HH's decide how much of income will they consume now and how much will they save for future?

MACRO impact:

- long-run - effect on economic growth: savings = source of capital = key determinant of growth
- short term - aggregate demand:
  - consumption = , 50% of GDP in CR, 2/3 GDP in US
  - fluctuations the affect booms and recessions

Chronological approach: How did the understanding of demand for consumption evolve over the history of modern economic thinking?

4.2 John Maynard Keynes - Consumption function

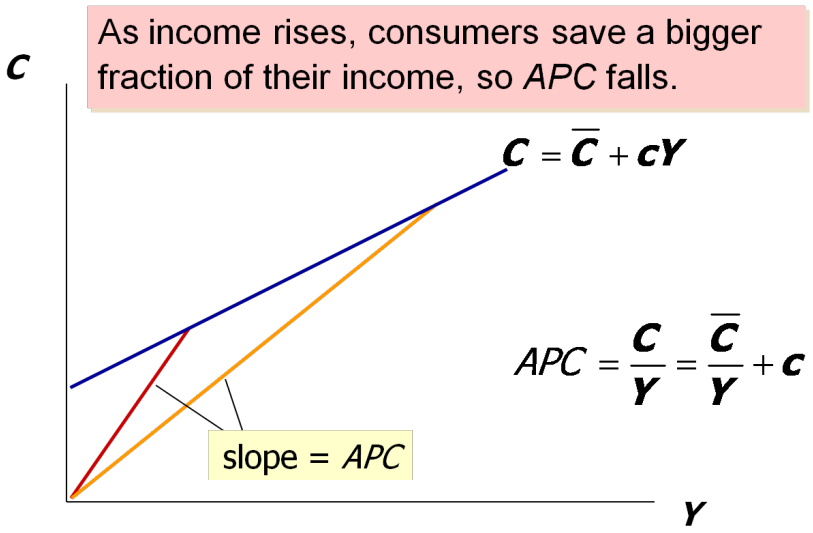
4.2.1 Conjectures about consumption function:

based on casual observation, no economic data or computers to analyse them

1. **Marginal propensity to consume** (MPC) is between 0 and 1:
   - MPC = amount consumed out of 1 additional unit of income
   - explanation: precautionary reasons
2. **Average propensity to consume** (APC) falls as income rises
   - $APC = C/Y$ - ratio of consumption to total income
   - explanation: savings are luxury good, i.e. he expected richer people to save larger fraction of their income
3. Key determinant of consumption is **current income**, interest rate does not play important role

Formally

$$C = \bar{C} + cY, \quad \bar{C} > 0;\ 0 < c < 1$$



4.2.2 Empirical verification

POSITIVE evidence:

- Individual HHs data (cross section):
  - HHs with higher income consumed more => $MPC > 0$
  - HHs with higher income saved more => $MPC < 1$
  - HHs with higher income saved larger fraction of income => $Y \nearrow$ => $APC \searrow$
- Aggregate data on consumption and income (time series):
  - years of low income = years of low cons & saving => $MPC \in (0, 1)$
  - years of low income = years with high C/Y ratio => $Y \nearrow$ => $APC \searrow$

NEGATIVE evidence: all concerning decreasing APC

- **secular stagnation** - prediction about post-war period
  - income rises => consumption relatively declines => savings rise => 1. there are not enough profitable investments to absorb the savings + 2. inadequate demand for goods and services => long depression until fiscal policy is used to expand AD
  - not confirmed by economic development after WWII

- **Kuznets dataset** - aggregate data on income & cons. since 1869
  - ratio of $C/Y = APC$ is remarkably stable despite large fluctuations in income

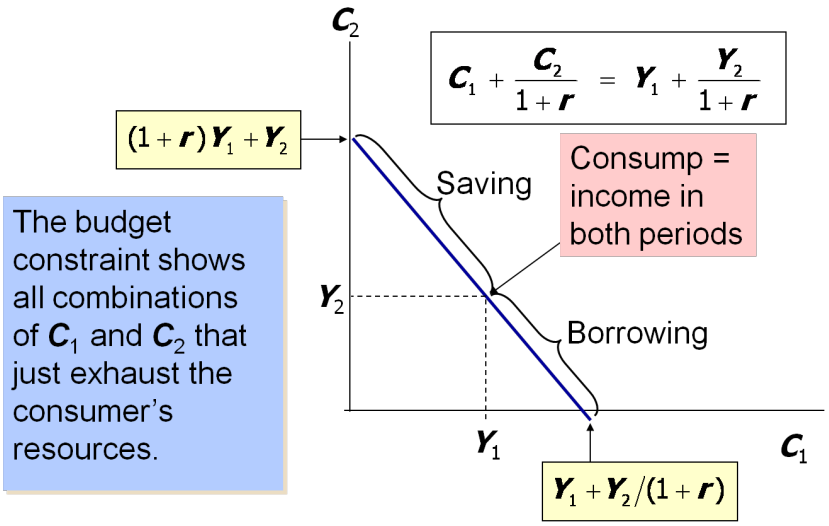
SUMMARY: Keynes's conjectures **hold** well in cross section studies of HHs' data + in short time-series, but **fail** when long time-series are concerned

4.3 Irving Fisher - Theory of intertemporal choice

- incorporate time dimension of consumption decision (intertemporal = involving different periods of time)
- tradeoff between current and future consumption
- MODEL: preferences + constraints => choices about consumption and saving

4.3.1 2 period model:

- at $t = 1$ person is young => earns income Y_1 (given) and consumes C_1 (choice)
- at $t = 2$ person is old => earns income $Y_2 < Y_1$ (given) and consumes C_2 (choice)
- opportunity to borrow/save at interest rate r



=> **Budget constraint:** limit on how much person can spend, constrained by his income

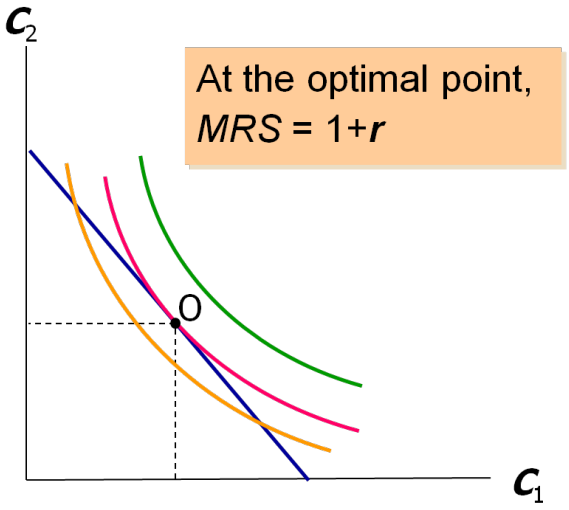
$$\begin{aligned} S + C_1 &= Y_1 \\ C_2 &= Y_2 + (1+r)S \end{aligned}$$

- S can be both positive and negative => borrowing or saving
- **intertemporal** = all resources available for today and future (discounted)

$$\underbrace{C_1 + \frac{C_2}{1+r}}_{\text{PDV of consumption}} = \underbrace{Y_1 + \frac{Y_2}{1+r}}_{\text{PDV of income}}$$

=> **Consumer preferences:** choice between 1^{st} and 2^{nd} period consumption

- **indifference curves (IC)**: combination of C_1 and C_2 that make consumer equally happy
- **tradeoff**: less today = more tomorrow, and vice versa
  - quantification: **marginal rate of substitution** = what min. addition to C_2 you would accept in order to sacrifice 1 unit of C_1?
  - ICs are **not linear**: MRS depends on the level of C_1 and C_2
- **ranking of ICs**: more consumption is better
  - consumer prefers higher IC to lower

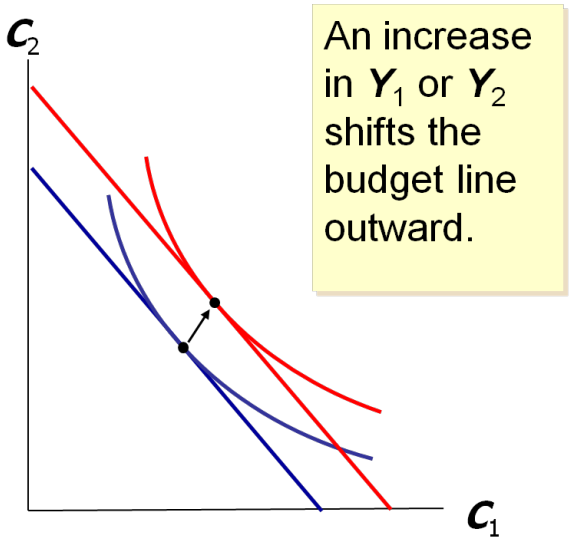


=> **Optimisation:**

- highest possible IC x staying on or under budget constraint
- in optimum, IC is tangent to BC => $MRS = 1 + r$

=> **Effect of change in income on consumption:**

- increase in Y_1 or Y_2 shifts BC outward
- if C_1 and C_2 are normal goods => both increase (even if only Y_1 changes)
- **consumption smoothing** = regardless when consumer experiences increase in income, he spreads it over consumption in both periods
- **Implication:** consumption is based on resources the consumer expects over his lifetime

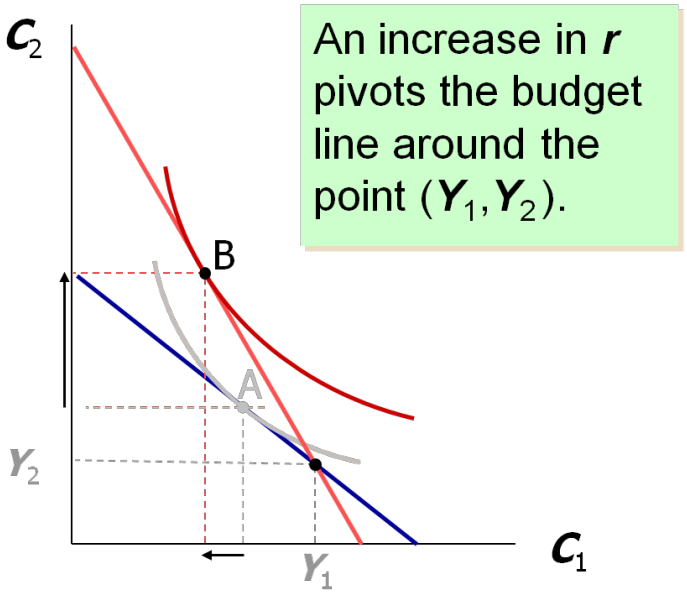


=> **Effect of change in interest rate on consumption:**

- change in r rotates consumer BC around the endowment point (Y_1, Y_2)
- 2 basic effects:
  - **income effect:** results from shift to higher/lower indifference curve => more or less of both C_1 and C_2
  - **substitution effect:** results from the change of the relative price of consumption in two periods

    - e.g. if $r \nearrow$ then consumption in period 2 is less expensive than consumption in period 1 => one may decide to shift part of his consumption to period 2

- final effect = combination of income and substitution effect (depends on the shape of preferences)



4.4 Franco Modigliani - Life-cycle hypothesis

4.4.1 Hypothesis:

- income varies systematically over people's lives
- savings allow people to move income from high-income period to low-income period

Example:

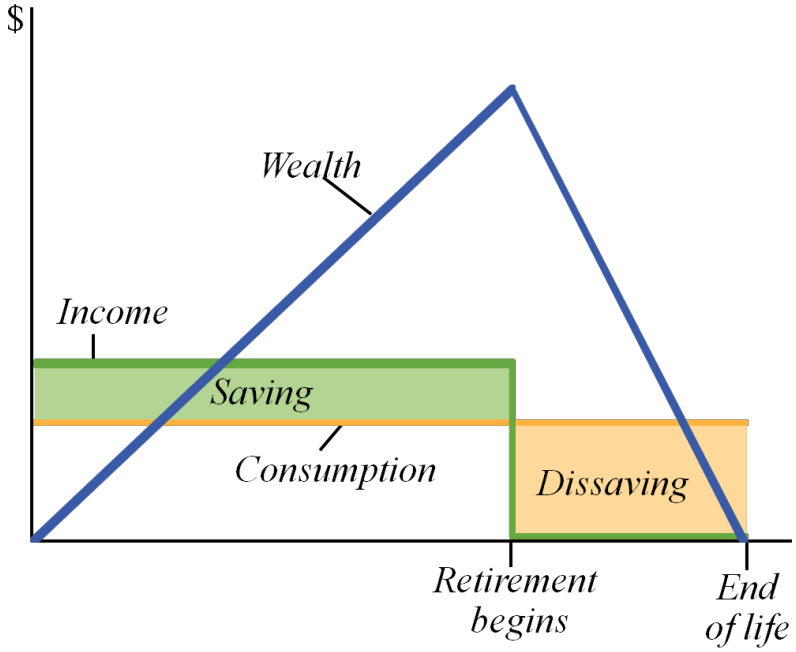
- person expects his income to fall after retirement => saves during productive age to maintain consumption
- e.g. person with current wealth W expects to live T more years: R working and earning Y, $T - R$ in retirement with no earnings
- goal = smooth consumption over life time (same every year)

$$C = \frac{W + RY}{T} = \frac{1}{T}W + \frac{R}{T}Y$$

- $T = 50, R = 30 \quad => \quad C = 0.02W + 0.6Y$

Formally:

$$C = \alpha W + \beta Y; \quad \alpha - \text{MPC out of wealth}, \ \beta - \text{MPC out of income}$$



4.4.2 Implications:

- explanation of APC paradox: $APC = \frac{C}{Y} = \alpha \frac{W}{Y} + \beta$
  - short run: W does not vary proportionally with Y - falling APC
  - long run: W and Y grow at the same rate - constant ratio $\frac{W}{Y} = APC$
- savings vary across person's lifetime (testable prediction): young who are working save, while old who are retired dissave
- PROBLEM: in data, elderly do not dissave as much as model predicts
  - insurance: longer live than expected, possibility of illness
  - altruism: bequests to their children

4.5 Milton Friedman - Permanent income hypothesis

4.5.1 Hypothesis:

- people experience random and temporary changes in income
- their savings are derived from their expected income

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

  - Y^P - permanent income (part of Y person expects to persist in the future) e.g. return to one's education
  - Y^T - transitory income (part of Y person does not expect to persist in future e.g. good weather => big harvest => high income

- consumption depends primarily on permanent income
- saving / borrowing are used to smooth consumption in response to transitory changes

Formally: $C = \alpha Y^P$

4.5.2 Implications:

- explanation of APC paradox by fluctuation of Y around Y^P: $APC = \frac{C}{Y} = \alpha \frac{Y^P}{Y}$
  - HHs survey: observed = high income HHs => lower APC
    - if variation (increase) in income is based on Y^P - HHs add proportionally to their consumption => constant APC (α)
    - if variation (increase) in income is based on Y^T - HHs do not change their consumption => decreasing APC
  - time series:
    - short term: fluctuations determined by Y^T => falling APC
    - long term: changes determined by changes in Y^P => constant APC

4.6 Robert Hall - Random walk hypothesis

4.6.1 Hypothesis:

If permanent-income hypothesis is corrects and people form rational expectations => consumption follows a **random walk** (fluctuations are unpredictable)

- **Random walk** = trajectory that consists of taking successive random steps

- Ex.: assume random variables $Z_1, Z_2, \ldots$ each taking on values {0,1} with equal probability 1/2. Define sequence of their sums, e.g. $S_n = \sum_{j=1}^{n} Z_j$. Sequence S_n is called random walk on Z.

Explanation:

- permanent income hypothesis: consumers try to smooth their consumption w.r.t. transitory fluctuations
- rationality of consumers: they use all available information to calculate and revise expected income => only unpredictable shocks are reflected by shifts/jumps in consumption

4.6.2 Implications:

- only unexpected policy changes influence consumption
- they take effect by changing the expectations

PROBLEM:

- not supported by data - predictable changes in income => predictable changes in consumption

4.7 David Laibson - Pull of instant gratification

- behavioral economics: What if people are not rational optimizers?

Q1: Would you prefer	A)1 candy today	B) 2 candies tomorrow?
Q2: Would you prefer	A)1 candy in 100 days	B) 2 candies in 101 days?

- **time inconsistency:** Q1 - answer A, Q2 - answer B
- people generally prefer smaller, sooner payoffs to larger but later payoffs, when the smaller payoffs would be imminent - **instant gratification** (Q1)
- when the same payoffs are distant in time, people tend to prefer the larger outcome, even though the time lag from the smaller to the larger would be the same as before (Q2)
- also called **hyperbolic discounting**

4.8 Synthesis

Consumption = F(Current income, Wealth, Expected future income, Interest rate)