

Intermediate Macroeconomic Theory

Costas Azariadis

Lecture 4: Consumption and
Investment

Consumption and Investment

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1. THE ISSUES

a) Consumption & investment

C & I linked by S

-Household savings = $Y_d - C$

-Saving goes through financial system (banks, stock markets, insurance companies)

-Saving ends up financing “investments”

Investment → plant & equipment
→ residential housing

G-T → Government deficits

Wealth accumulation by households (i.e., financial investment in 401k's, mutual funds, etc.)

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Private wealth = accrued saving + interest / or dividends + capital gains

b) What determines consumption?

income & wealth

interest rates & taxes

consumer sentiment: expectations of future income

c) What determines investment?

productivity → demand for capital services

cost of capital & taxes

stock market valuations

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2. CONSUMPTION & SAVING

a) Irving Fisher's theory of permanent income

Key: current consumption depends on more than current income. It depends strongly on expectations of future income, on current wealth & other factors.

A1 Suppose: Household faces interest rate $r > 0$

has disposable current income y

has disposable future income y^f

has financial wealth = W

A2 Household lives two periods

A3 Household leaves no bequest

All household resources to be consumed either now (C) or saved now & consumed in the future (C^f)

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$$\text{PVLR} = \text{Present value of lifetime resources} = W + y + \frac{y^f}{1+r}$$

$$\text{PVLC} = \text{Present value of lifetime consumption} = C + \frac{C^f}{1+r}$$

The household budget constraint is

$$\text{PVLR} = \text{PVLC}$$

To see this, note

$$C + S(\text{saving}) = W + y$$

$$C^f = (1+r)S + y^f$$

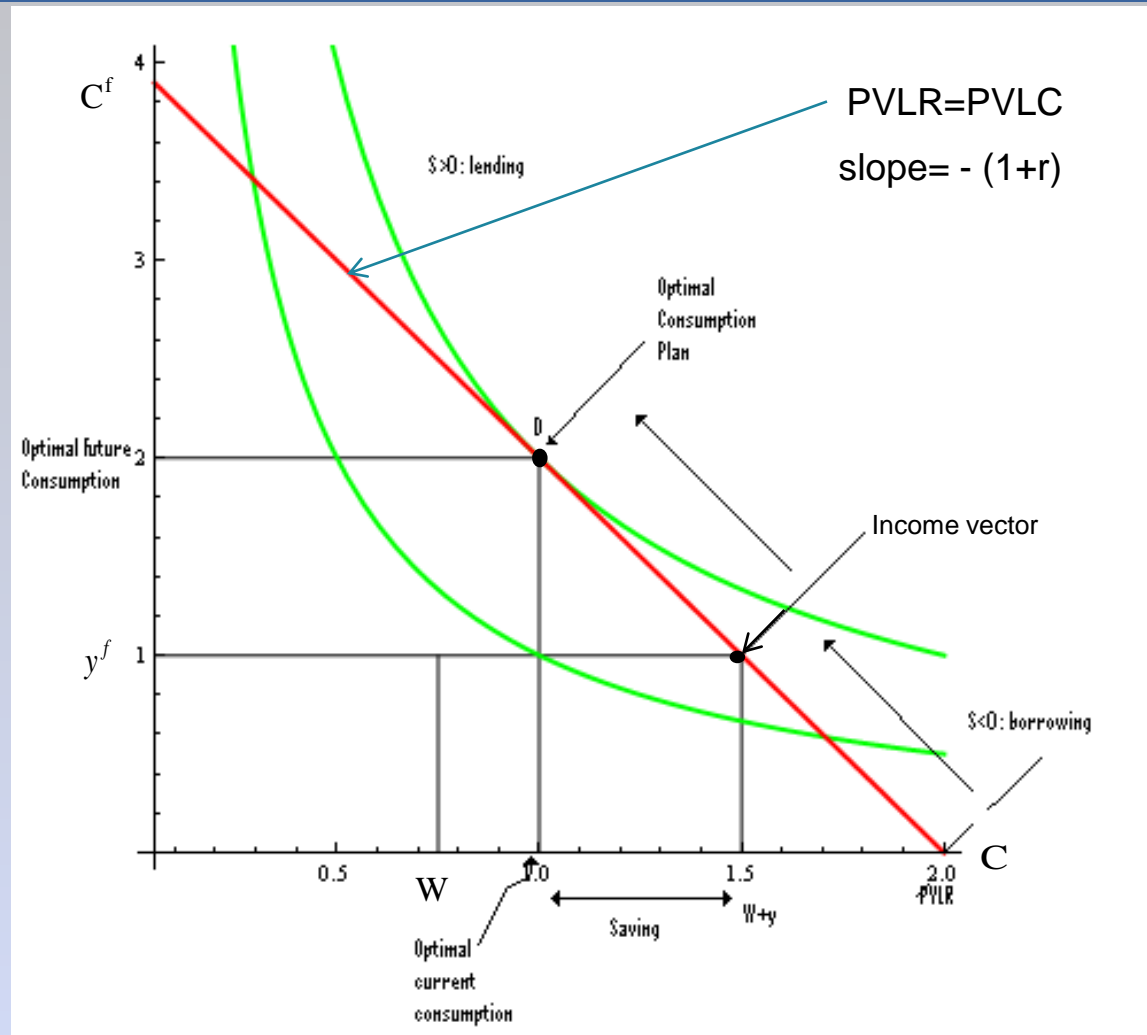
Eliminate S to obtain

$$C^f = (1+r)(W + y - C) + y^f$$

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Key idea: C depends on PVLR, not on current income.

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Current income	$0 < \frac{\Delta C}{\Delta y} < 1$	Consumption smoothing
Future income	$0 < \frac{\Delta C}{\Delta y^f} < 1$	Ditto
Current wealth	$0 < \frac{\Delta C}{\Delta W} < 1$	Ditto
Interest rate	$0 > \frac{\Delta C}{\Delta r}$	For borrowers
	$\frac{\Delta C}{\Delta r} > 0$	For lenders (because of opposing income & substitution effects)
Current taxes	$-1 < \frac{\Delta C}{\Delta T} < 0$	(because current disp. Income changed)
Future taxes	$-1 < \frac{\Delta C}{\Delta T^f} < 0$	(because future disposable income changed)

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3. TAX FINANCE VS DEFICIT FINANCE

Q1 Does a stimulus package of temporary tax cuts help current consumption?

Assume a tax cut = $\$ \Delta$ financed by selling gov't debt. New debt to be retired in the future by taxing future consumers.

Current household has an increase $\$ \Delta$ in current disp. income; also a decrease of $(1 + r) \Delta$ in future disposable income.

$$\text{Change in PVLR} = \Delta - \frac{(1+r)\Delta}{1+r} = 0$$

→ Permanent income theory says:

- 1) how a deficit is financed does not matter for consumption
- 2) only the size of the deficit matters (i.e., the fact that gov't does not reduce its own consumption in order to raise private consumption.)

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The idea is called **Ricardian Equivalence**. This brings up

Q2: If temporary tax cuts do nothing for consumption, why did Congress vote for a stimulus package in 2009-10? Where does the stimulus come from?

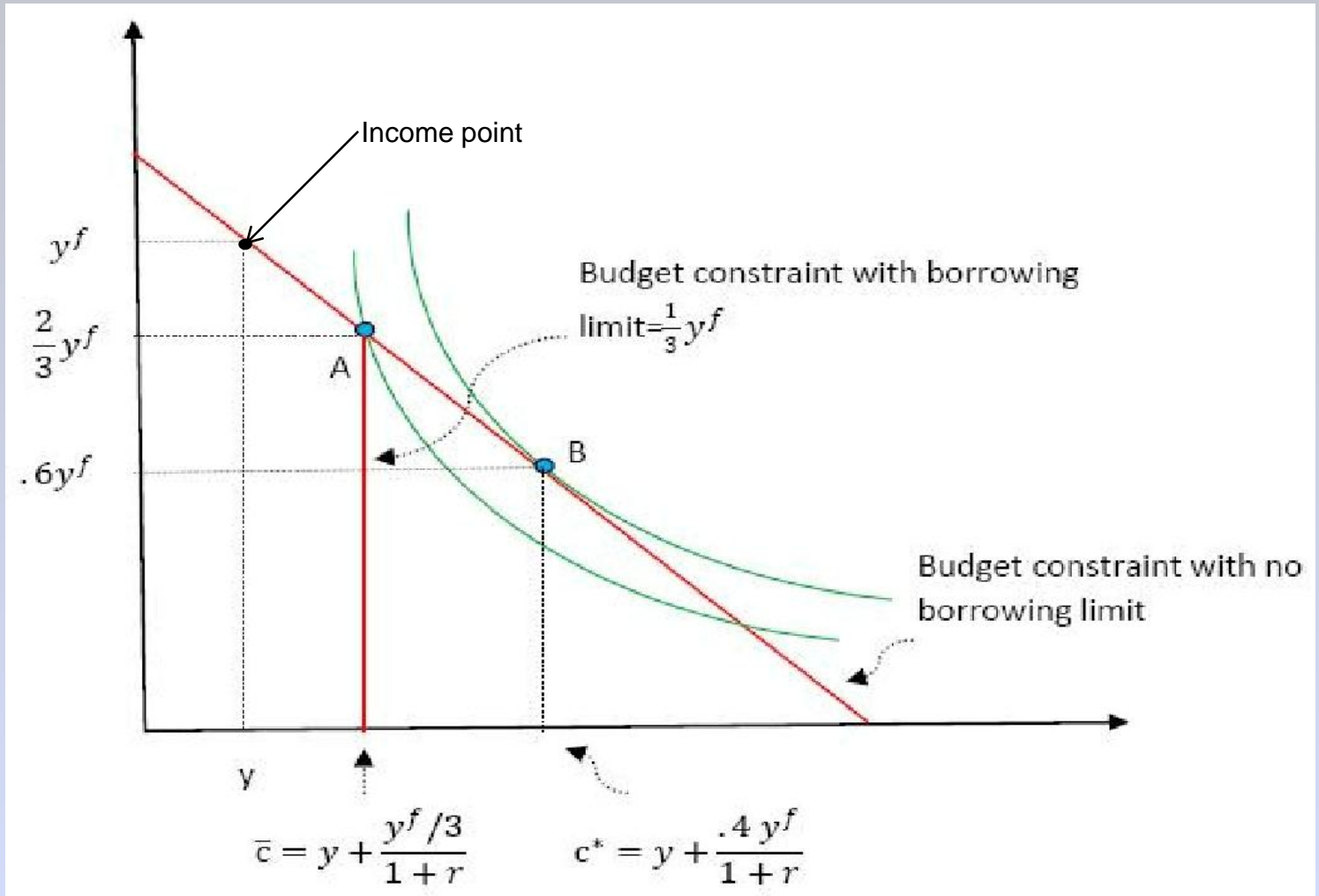
New idea: Suppose some households face **borrowing constraint** and cannot borrow much against future income. Labor income is **bad collateral**. Then cutting current taxes helps households suffering from tough borrowing constraints.

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Jack's budget situation: $W = 0, y$: small; y^f : big



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Without a borrowing constraint Jack chooses point B where

$$c^* = y + \frac{.4y^f}{1+r}$$

With a borrowing constraint, Jack is forced into point A where

$$\bar{c} = y + \frac{.33y^f}{1+r}$$

A stimulus package that cuts Jack's current taxes by $\frac{.07y^f}{1+r}$ and raises future tax by $.07y^f$ permits Jack to achieve point B.

→ A stimulus package may help households facing tight debt limits.

Q3: Who faces tight debt limits?

Poor vs. Rich?

Young vs. Old?

Role of temporary income shocks: bad crops, depressed markets

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Role of unforeseen spending:
health, divorce, loss of job

Q4: How do we nudge consumption back up again?

- a) Helping banks improves investment if banks lend.
They may or may not.
- b) Cutting taxes on rich may not help. The rich also save a lot.
- c) Cutting taxes on poor/unemployed has a good chance.

Q5: How do we design & pay for a direct stimulus-to-consumption program?

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4. SAVING & INVESTMENT

a) The user cost of capital

-equals expected cost (or hypothetical rent) for using 1 unit of capital for 1 period of time

-similar to wage rate for labor

→ covers opportunity cost of money + depreciation (wear & tear) minus capital gains

$$u = (r + \delta)p_k - \Delta p_k$$

r = opp. cost of capital (ROR on alternative investment)

δ = deprec. rate

p_k = price of 1 unit of capital

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b) An example (Renting Yr house): Suppose

$$p_k = \$500,000$$

$$r = \text{average yield on equity 1950-2000} \\ \approx .07 \text{ per year}$$

$$\delta = \text{depreciation rate on houses} \approx .02 \text{ p.y.}$$

$$\frac{\Delta p_k}{p_k} = \text{average capital gains rate}$$

$$\approx .04 \text{ per year}$$

The user cost is

$$u = p_k \left(r + \delta - \frac{\Delta p_k}{p_k} \right) \\ = 500,000 (.07 + .02 - .04) \\ = 500,000 \times .05 \approx \$25,000 \text{ per year}$$

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c) The demand for capital: Desired v. Actual Capital Stock
Basic Rule: Firms invest in capital up to the point where
after tax MPK=after tax user cost

Let τ =percent tax on capital income or profits

ITC=percent value of investment tax credit

=gov't subsidy to buyers of new capital goods

τ_g =percent capital gains tax

The after-tax user cost of new capital after tax is

$$u(AT) = p_k [(r + \delta)(1 - ITC) - (1 - \tau_g) \frac{\Delta p_k}{p_k}]$$

The after tax MPK is

$$(1 - \tau)MPK$$

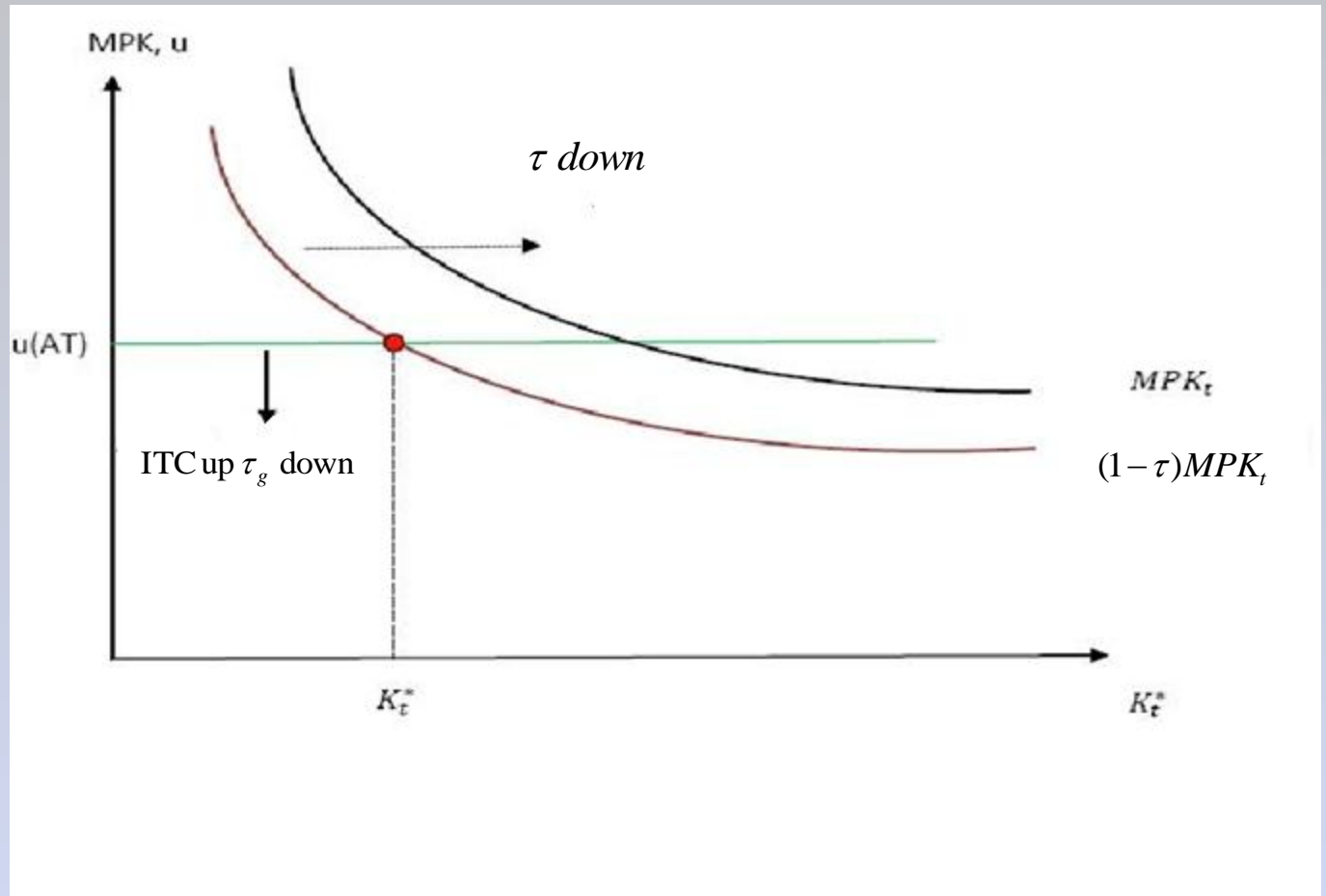
Desired capital stock is found from equating

$$(1 - \tau)MPK = p_k [(r + \delta)(1 - ITC) - (1 - \tau_g) \frac{\Delta p_k}{p_k}]$$

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- productivity of capital (& TFP)
- taxes

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Actual capital stock

$$K_t = (1 - \delta)K_{t-1} + \lambda(K_t^* - K_{t-1})$$

δ = depreciation rate

$$0 < \lambda < 1$$

λ = adjustment rate < 1 because of adjustment costs: costs of expanding capacity (building new plant) rapidly

Note: Firms reduce capital stock by shutting down plants (retail outlets), increase capital by opening new plants / outlets

- Entry & exit involves creation & destruction of jobs.
- Jobs created in high MPK new plants; destroyed in low MPK older plants/ stores.

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5. CONSUMPTION, INVESTMENT & THE STOCK MARKET

a) The data

-Consumption & investment followed the stock market upward from 1987 to 1999 but did not decline after 1999 when the stock mkt did. Investment dipped in 2008.

-Figures 4.10 & 4.11

-explain S&P 500 & Dow Jones indices

b) Consumption & the stock market

role of wealth in C

stock market is one form of wealth

home equity is another → rose until 2006, declined afterwards

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c) Investment and the stock market

Tobin's q :

$$= \frac{V}{p_k K}$$

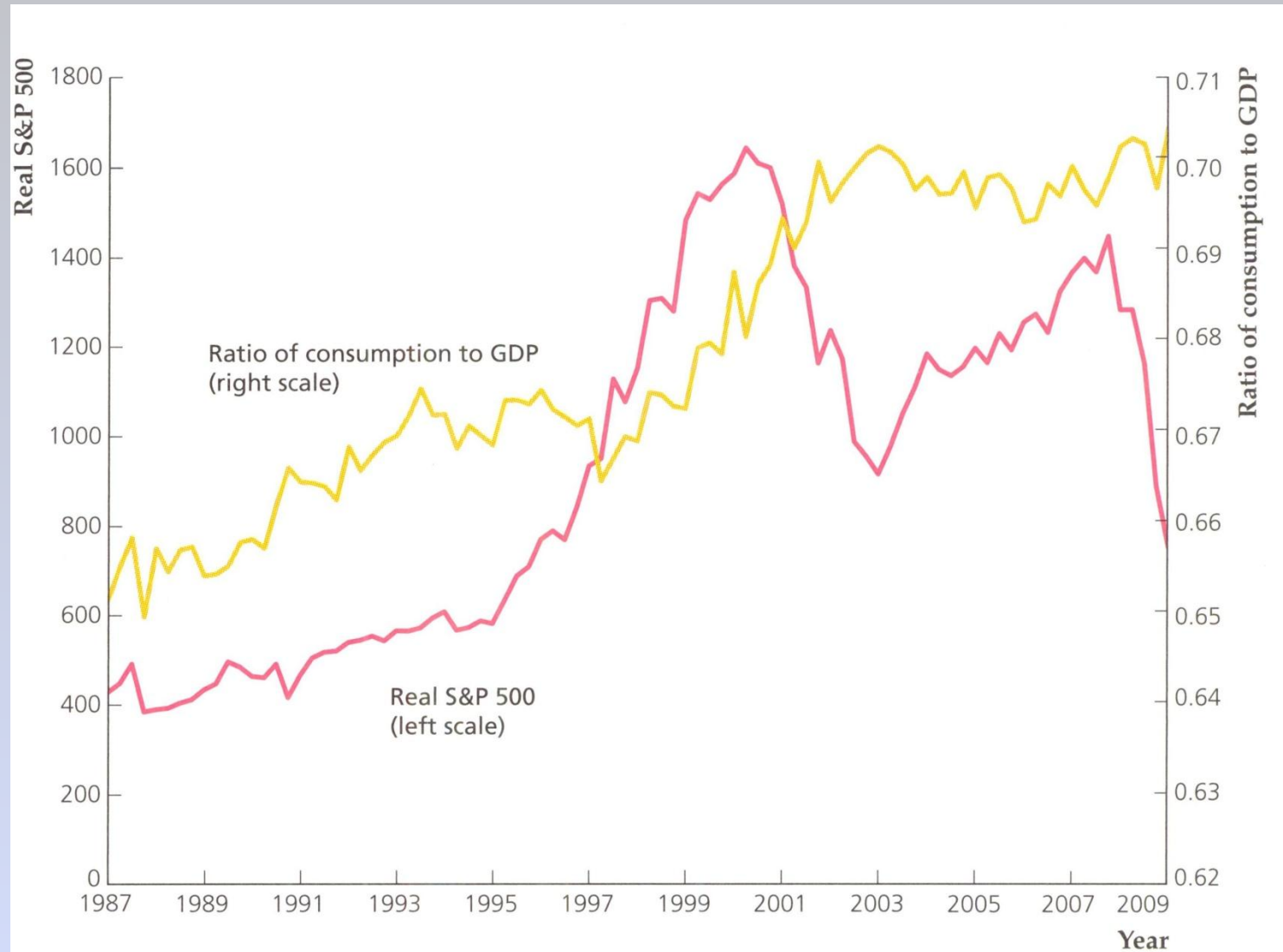
$$= \frac{\text{value of firm}}{\text{replacement cost of capital}}$$

$$= \frac{\text{value of equity}}{\text{replacement cost}}$$

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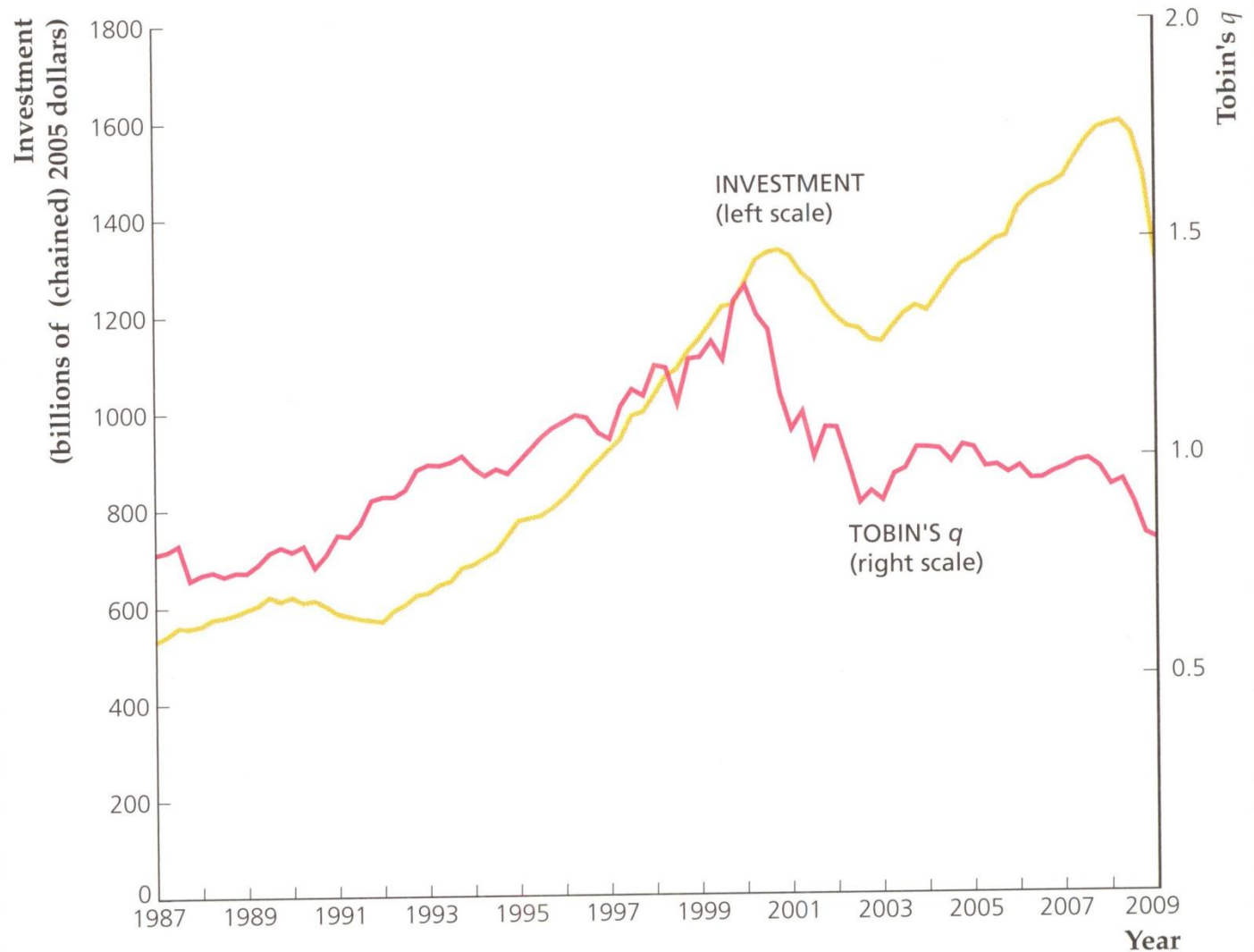
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Q-Theory of Investment

→ I up when $q > 1$ (buy capital)

I down when $q < 1$ (sell capital)

→ Ignores other determinants of value V
(e.g., patents, dist'n network)
capital is not the only determinant of V .

→ q a good but imperfect predictor of I .