Chapter 8

Private Sector Demand: Consumption and Investment

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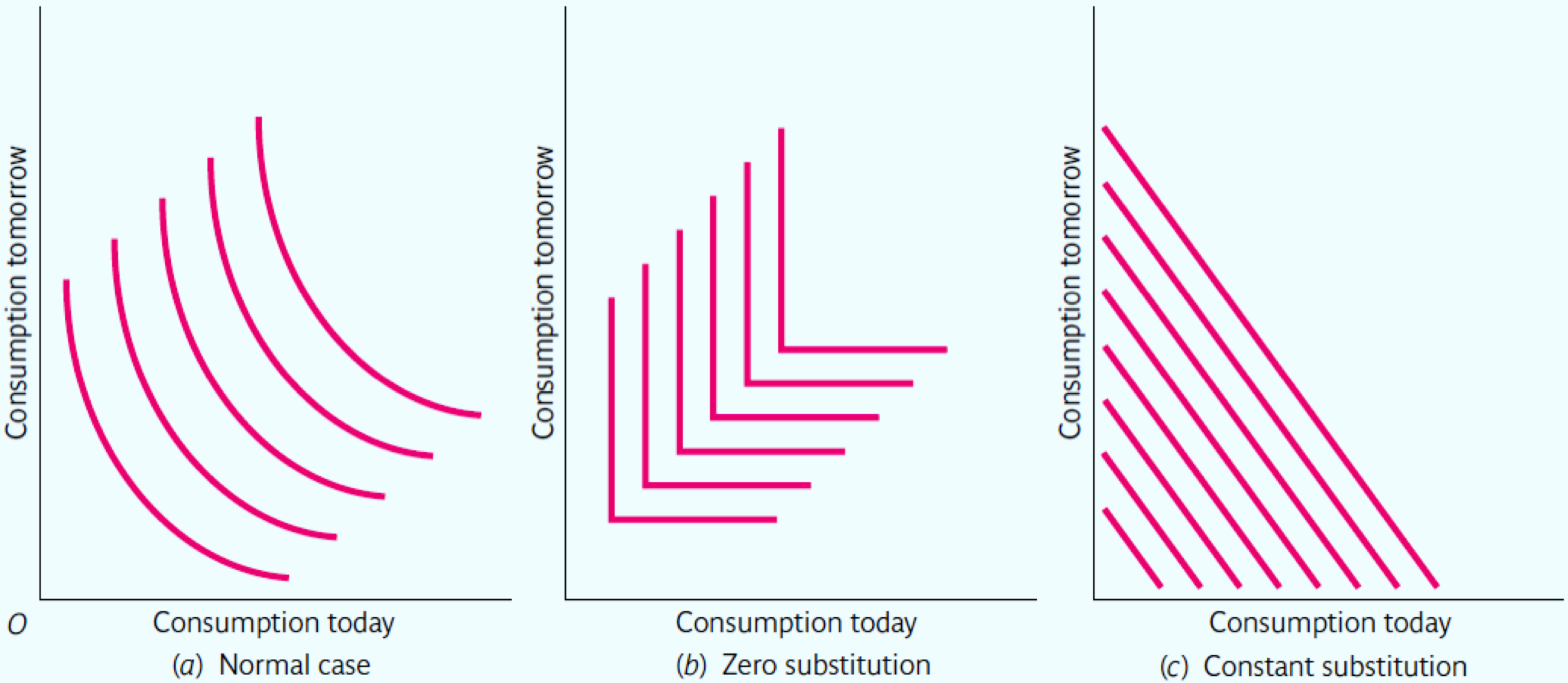
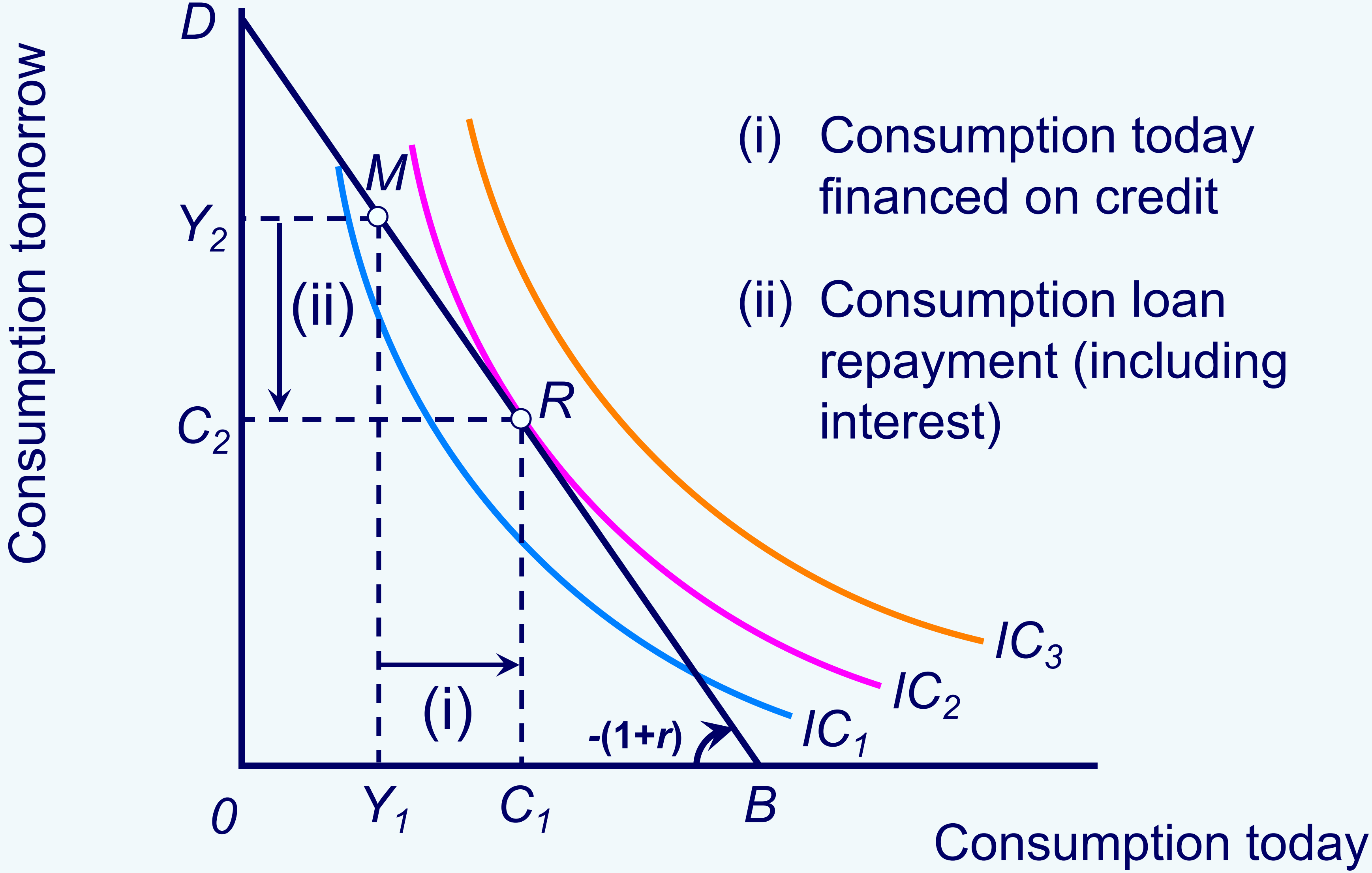
C, I : Intertemporal decisions

- Consumption (large)
  - Microeconomics: what to consume in a given period
  - Macroeconomics: how much to consume over time (when!)
  - Borrowing, lending and credit constraints
  - The macroeconomic consumption function
- Investment (volatile)
  - The rate of interest & the optimal stock of capital
  - An increasing GDP and the accelerator principle
  - Tobin's q without and with adjustment costs
  - The macroeconomic investment function

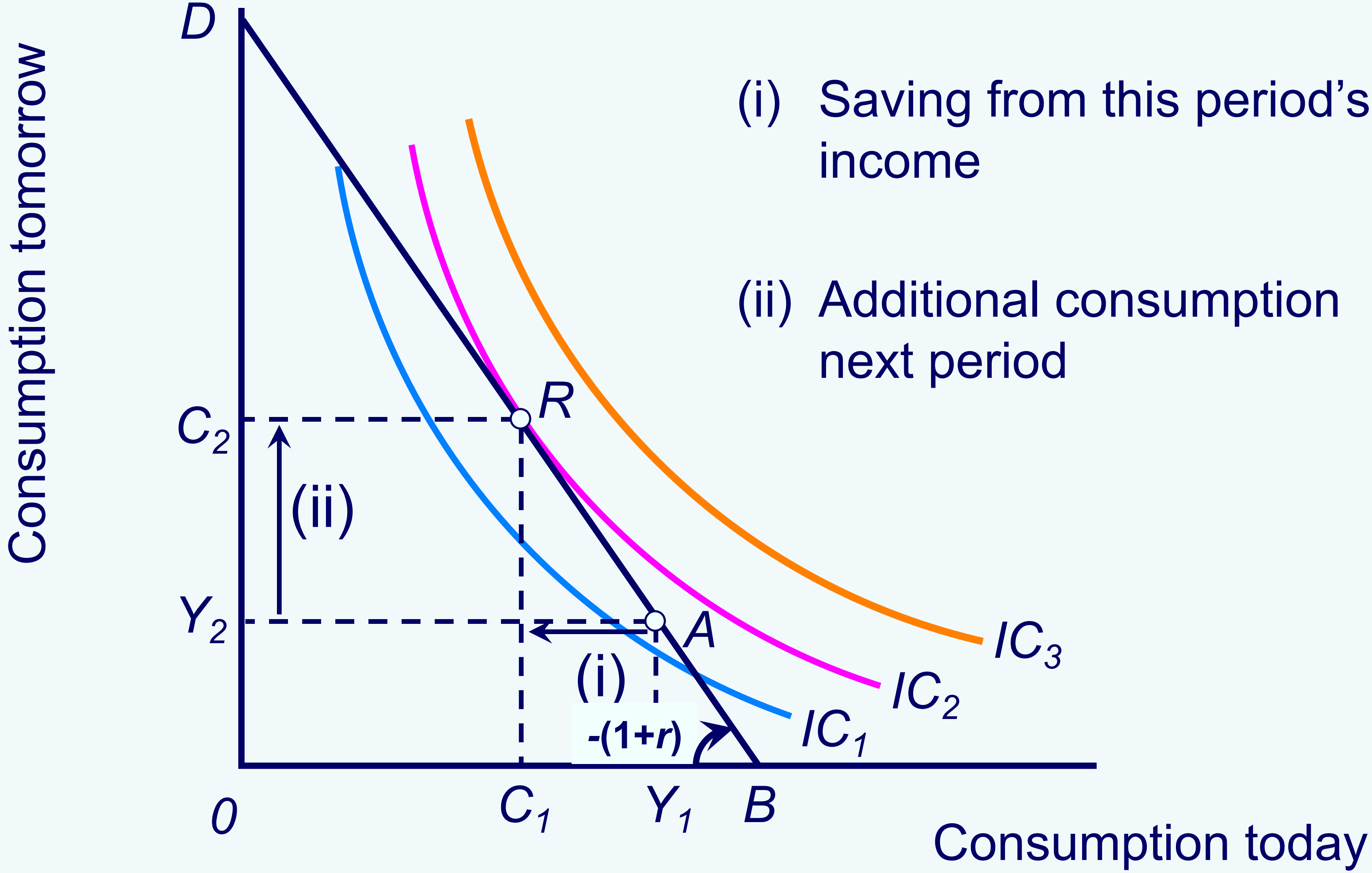
Intertemporal Consumption: Indifference Curves



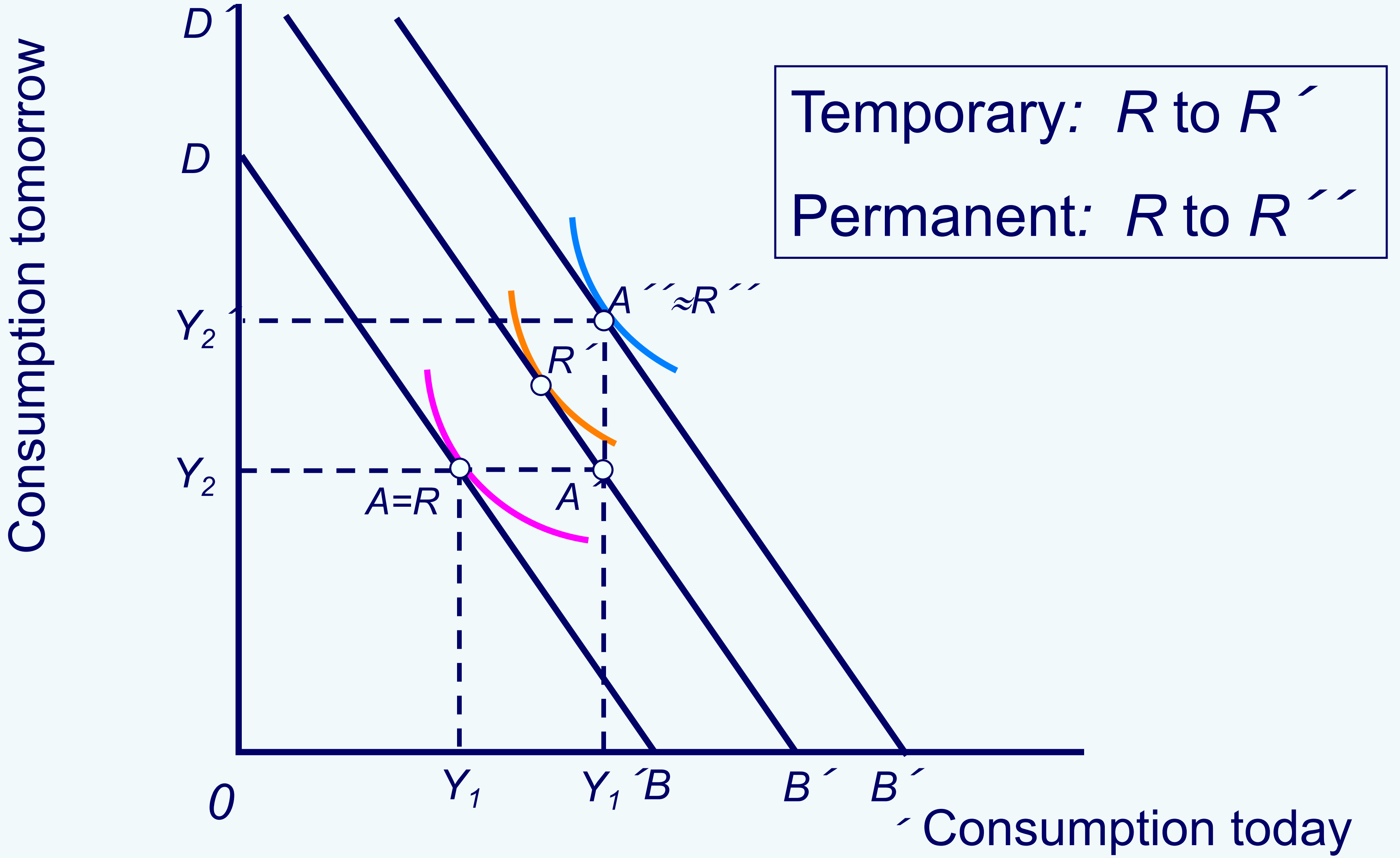
Optimal Consumption: Borrower



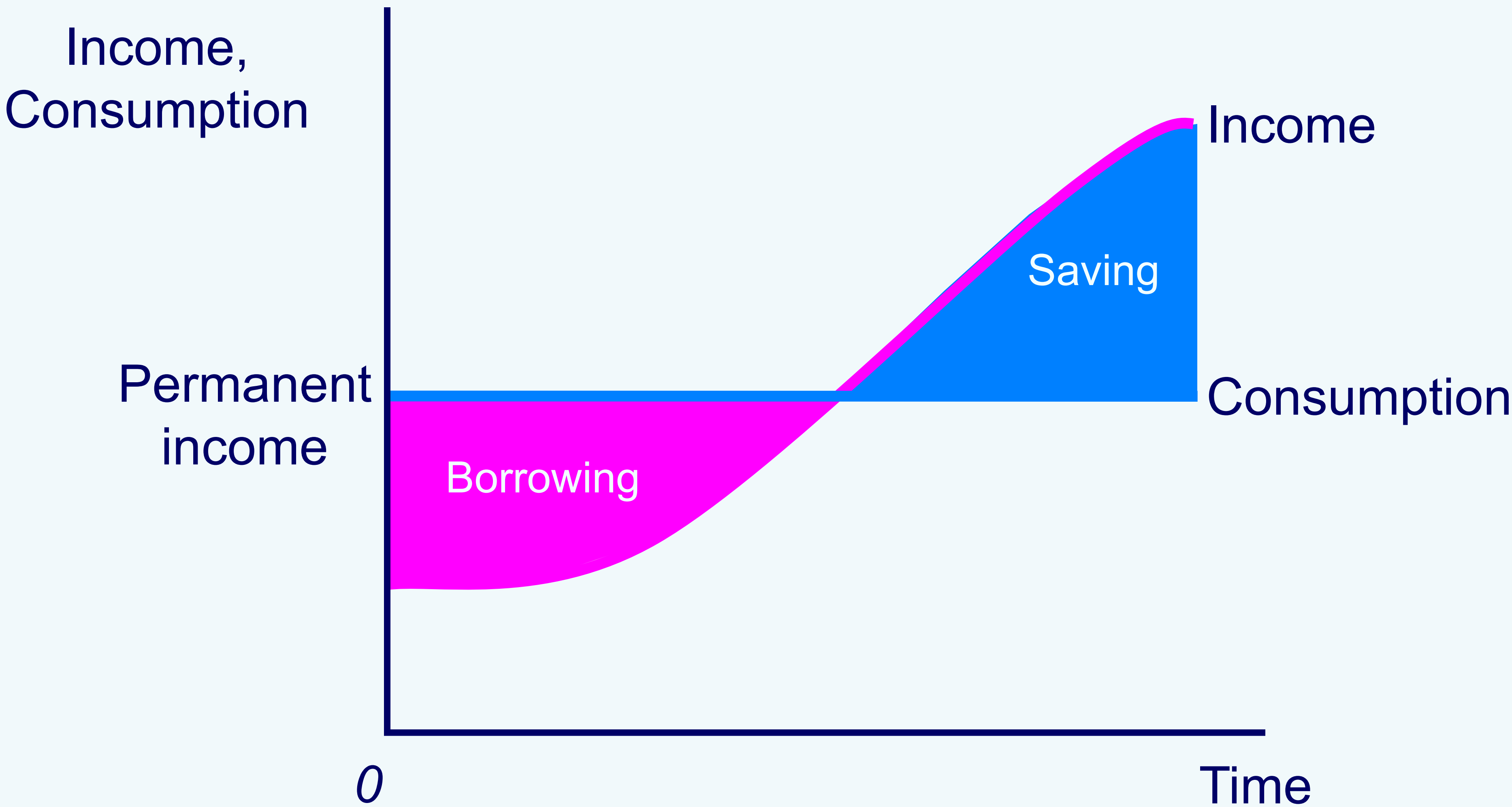
Optimal Consumption: Lender



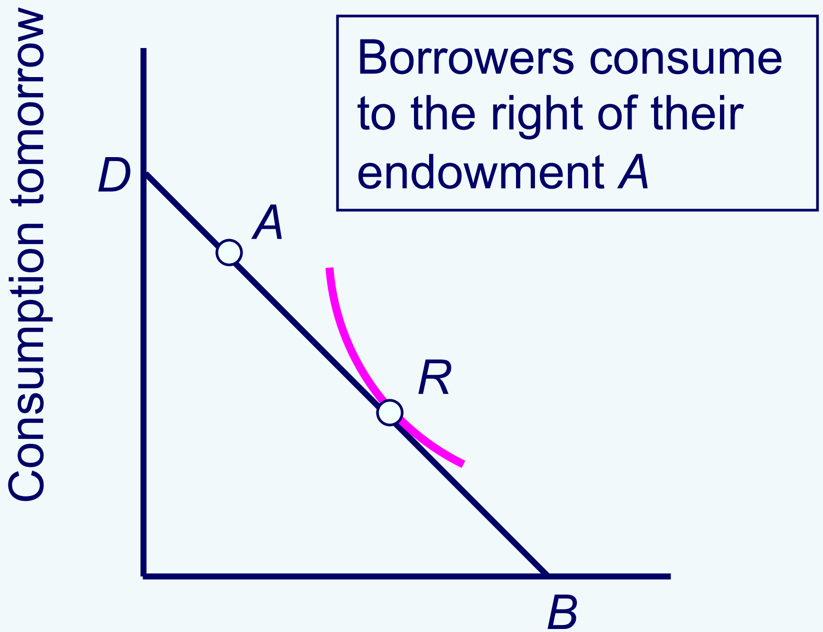
Temporary vs. Permanent Income Change



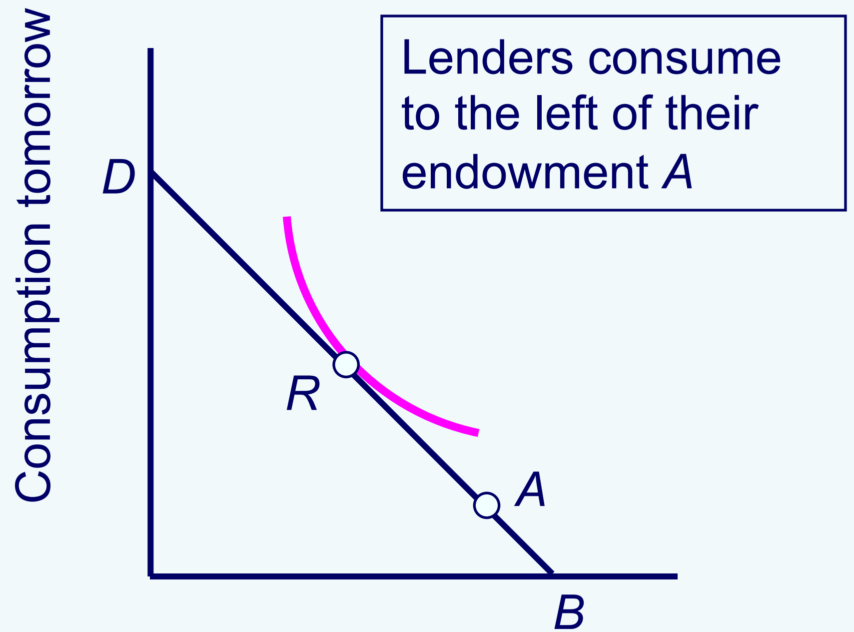
Life-Cycle Consumption / Permanent Income



Distinguish Borrowers from Lenders

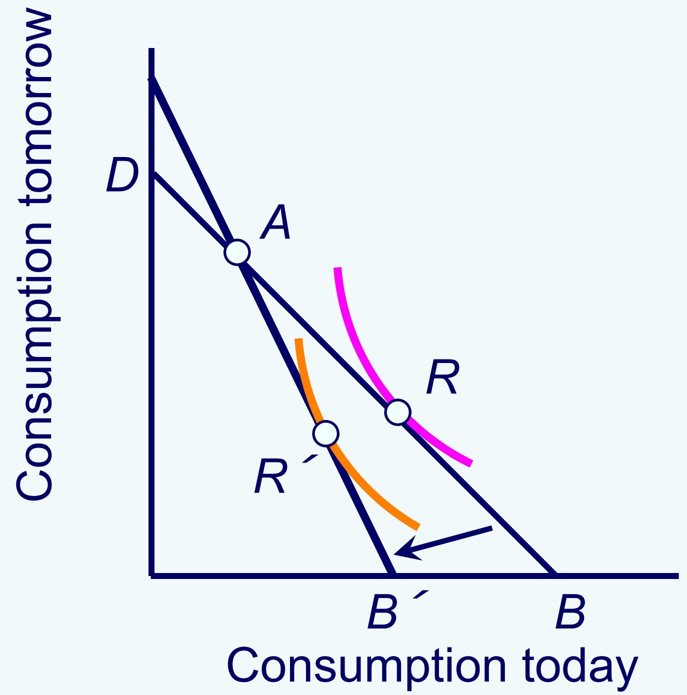


(a) Student Crusoe
(borrower)



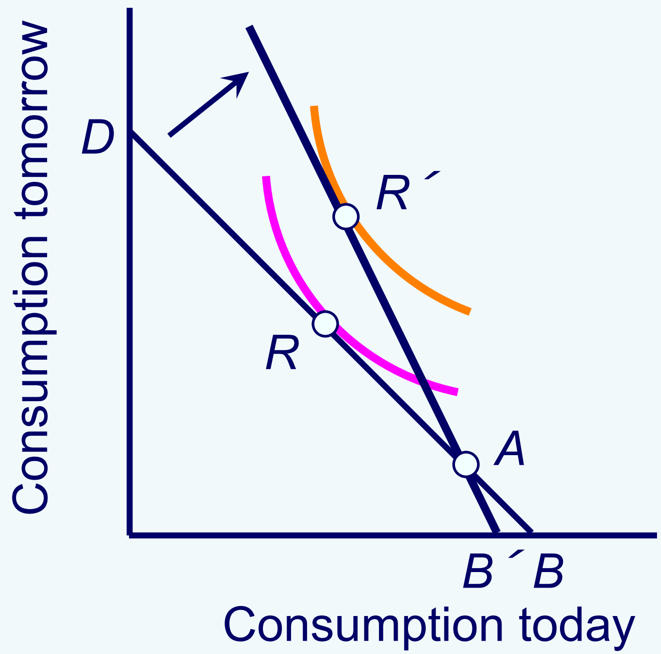
(b) Professional athlete
(lender)

Borrowers: income and substitution effects work in the same direction (to increase saving)



(a) Student Crusoe (borrower)

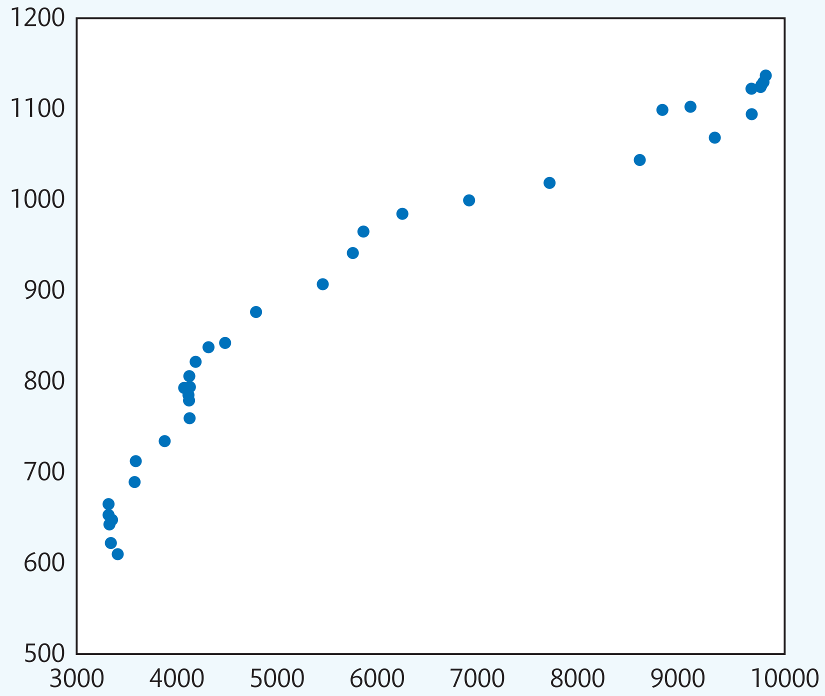
Lenders: income and substitution effects work in opposite directions (below: income effect wins)



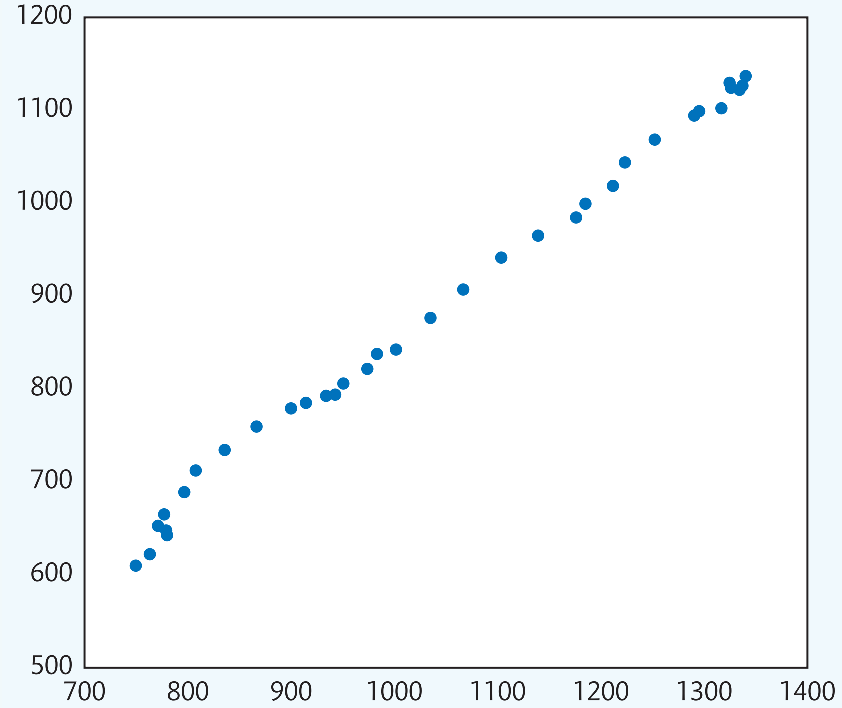
(b) Professional athlete (lender)

Consumption, Disposable Income, and Wealth in France, 1978-2014

(a) Consumption and Household Wealth

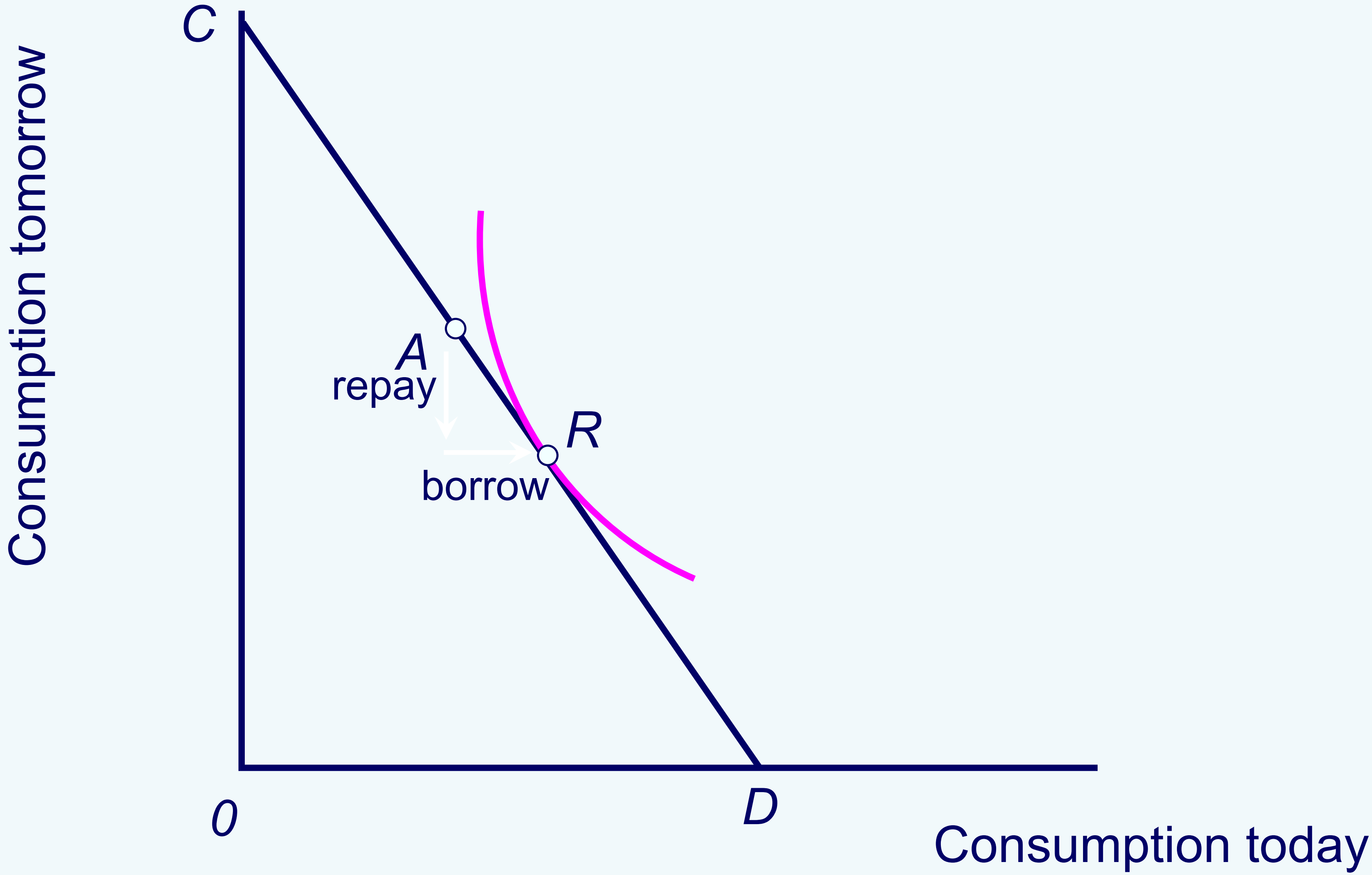


(b) Consumption and Disposable Income

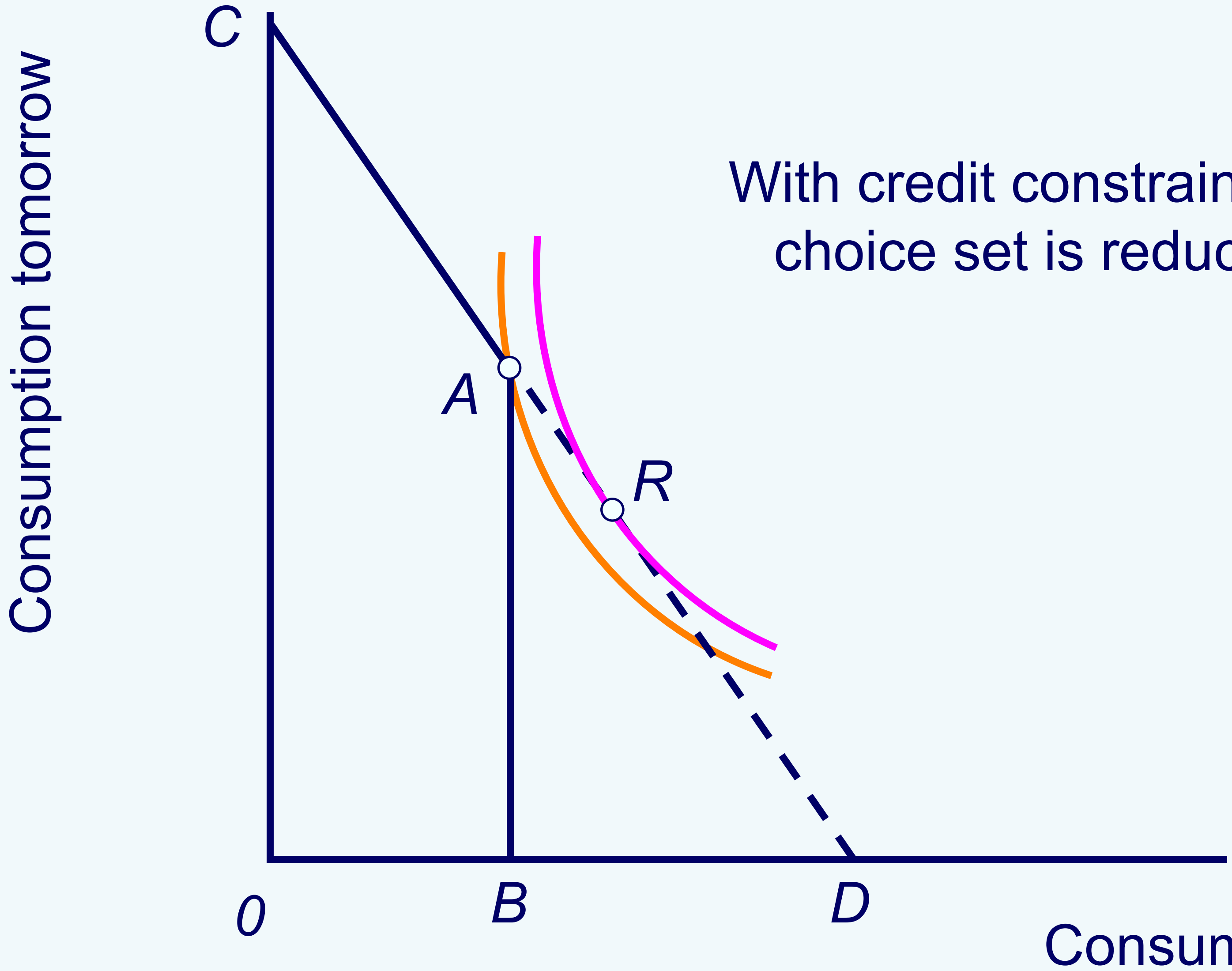


Source: OECD

Household Without Credit Constraint

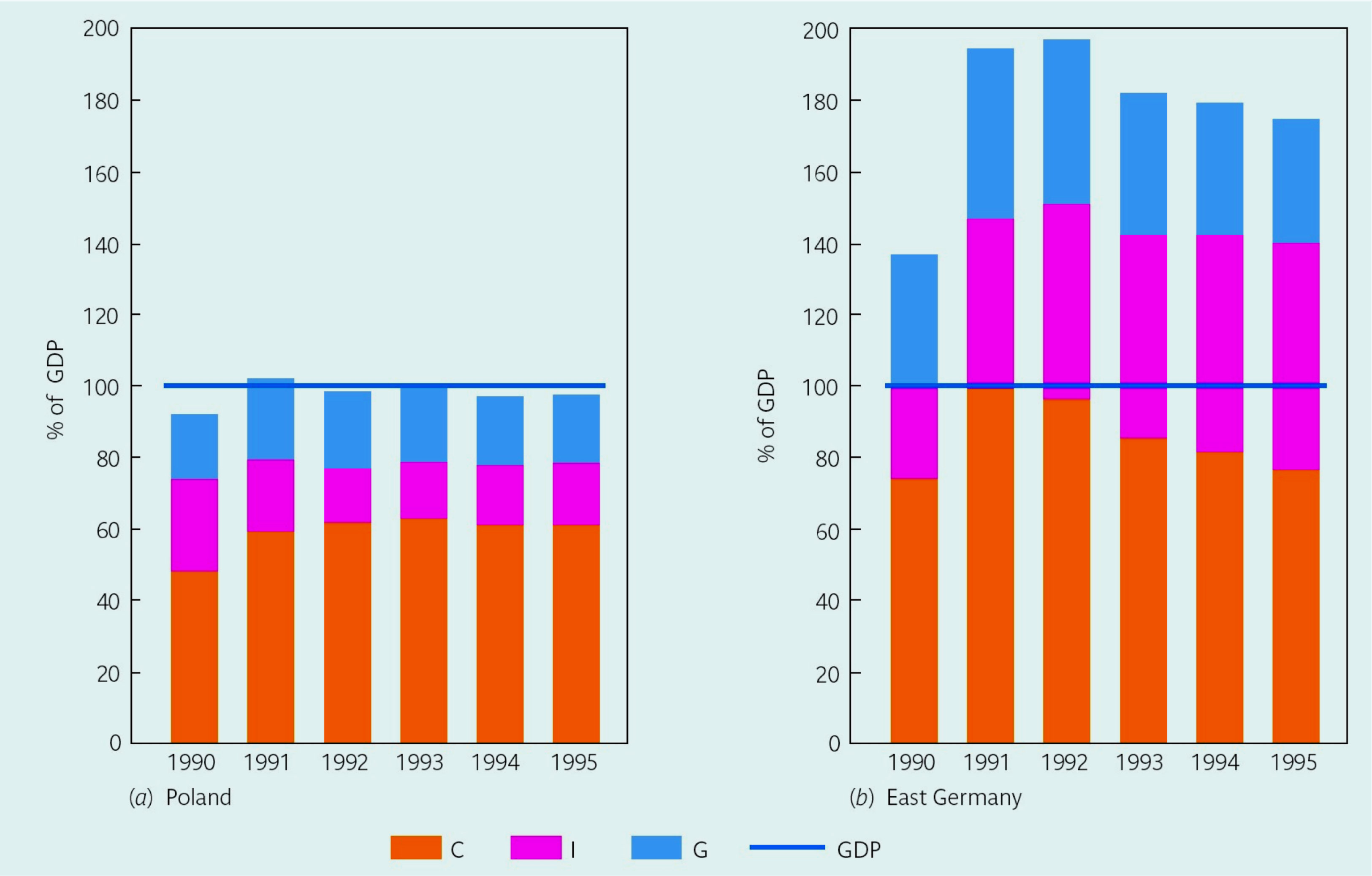


Household With Credit Constraint



With credit constraint, the choice set is reduced.

GDP, Domestic Demand and the Current Account: Poland and East Germany



Source: DIW Wochenbericht, World Bank, CSD, DGII

The Macro-Consumption Function

Consumption function (is Keynesian +!)

$$C = C(\underbrace{\Omega}_{dynamic\,aspect\,(wealth)}, \underbrace{Y^d}_{static\,aspect})$$

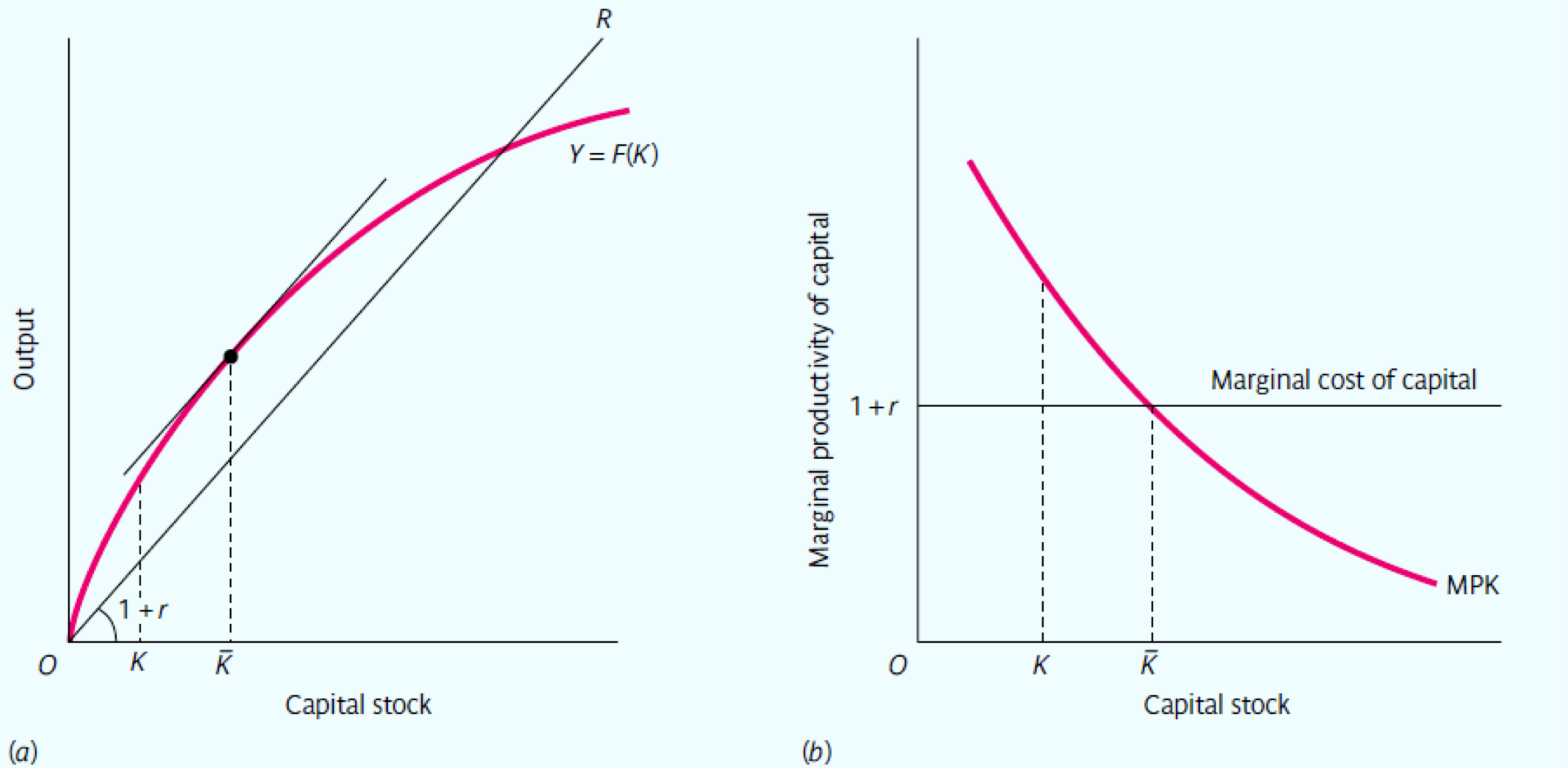
Wealth

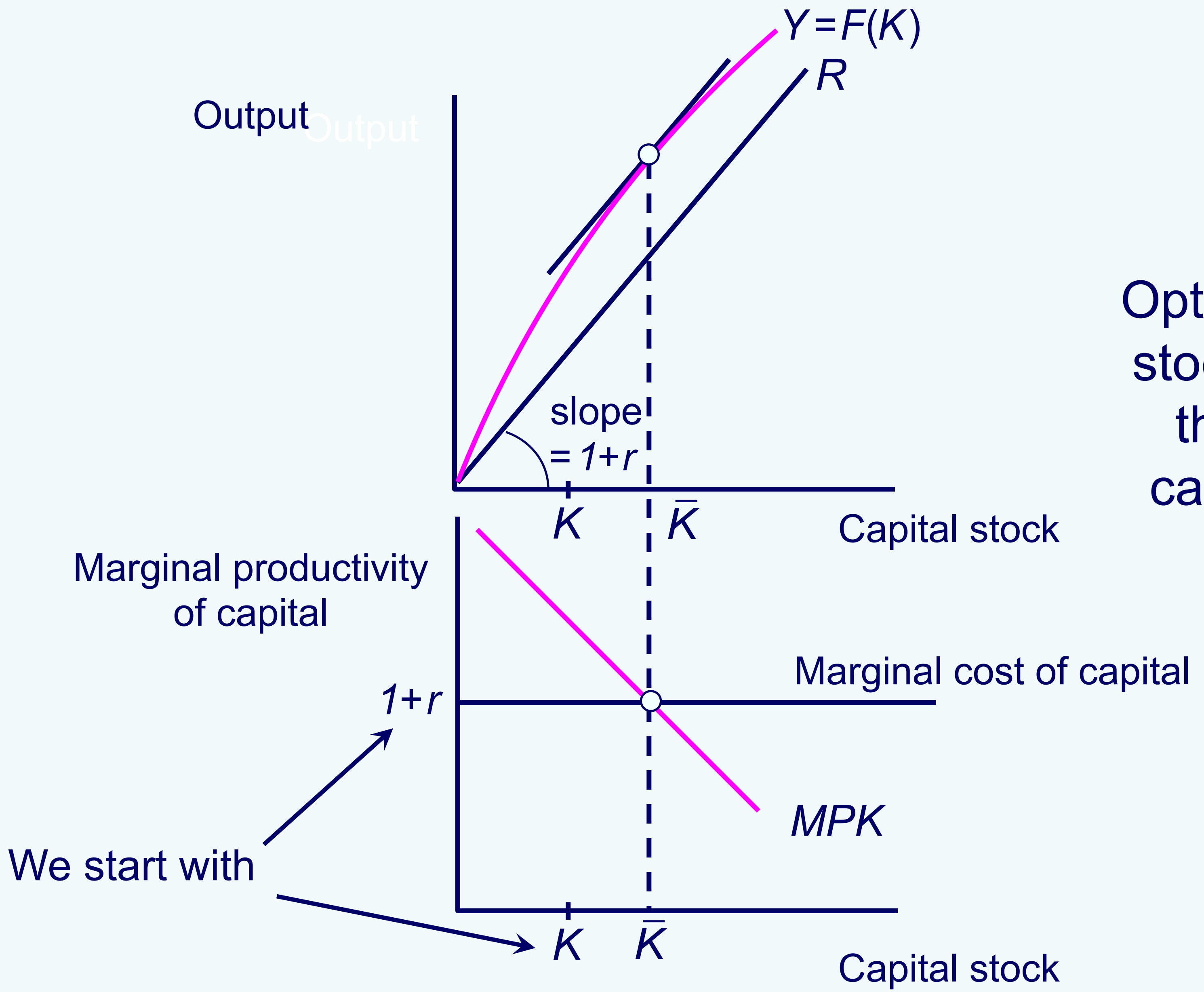
$$\Omega_t = Y_t^d + Y_{t+1}^d / (1 + r) + \ldots$$

Wealth effects

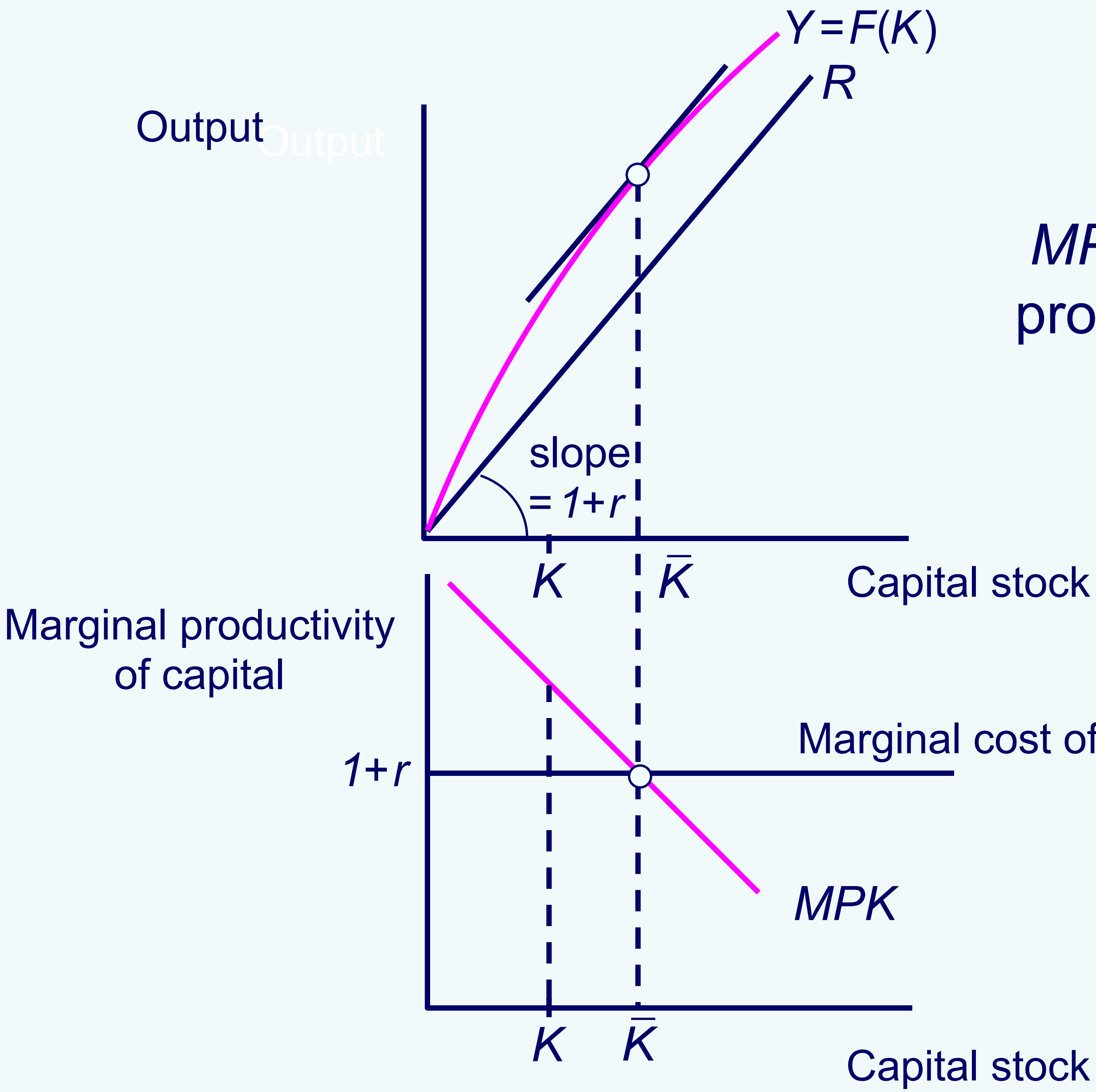
Change in (i) expected future income; (ii) interest rate
...changes consumption (in all periods) – Why?

Investment: The Optimal Capital Stock



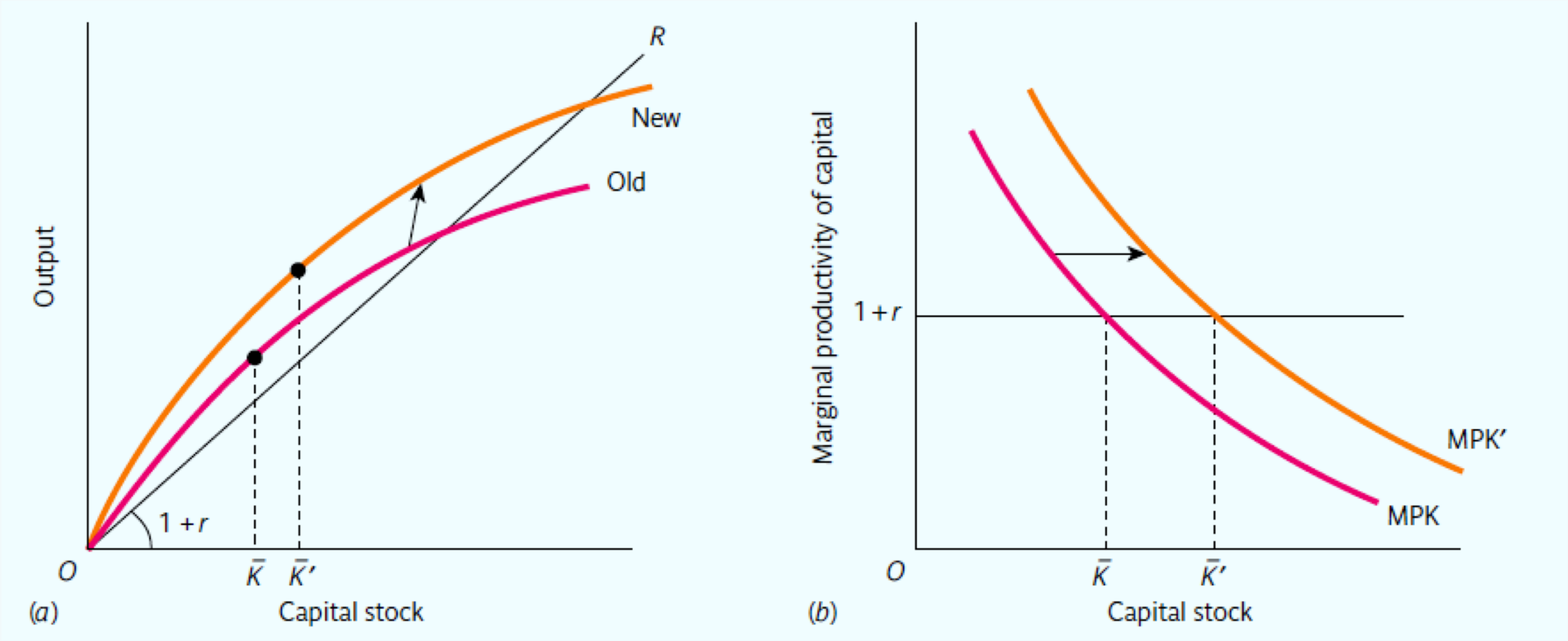


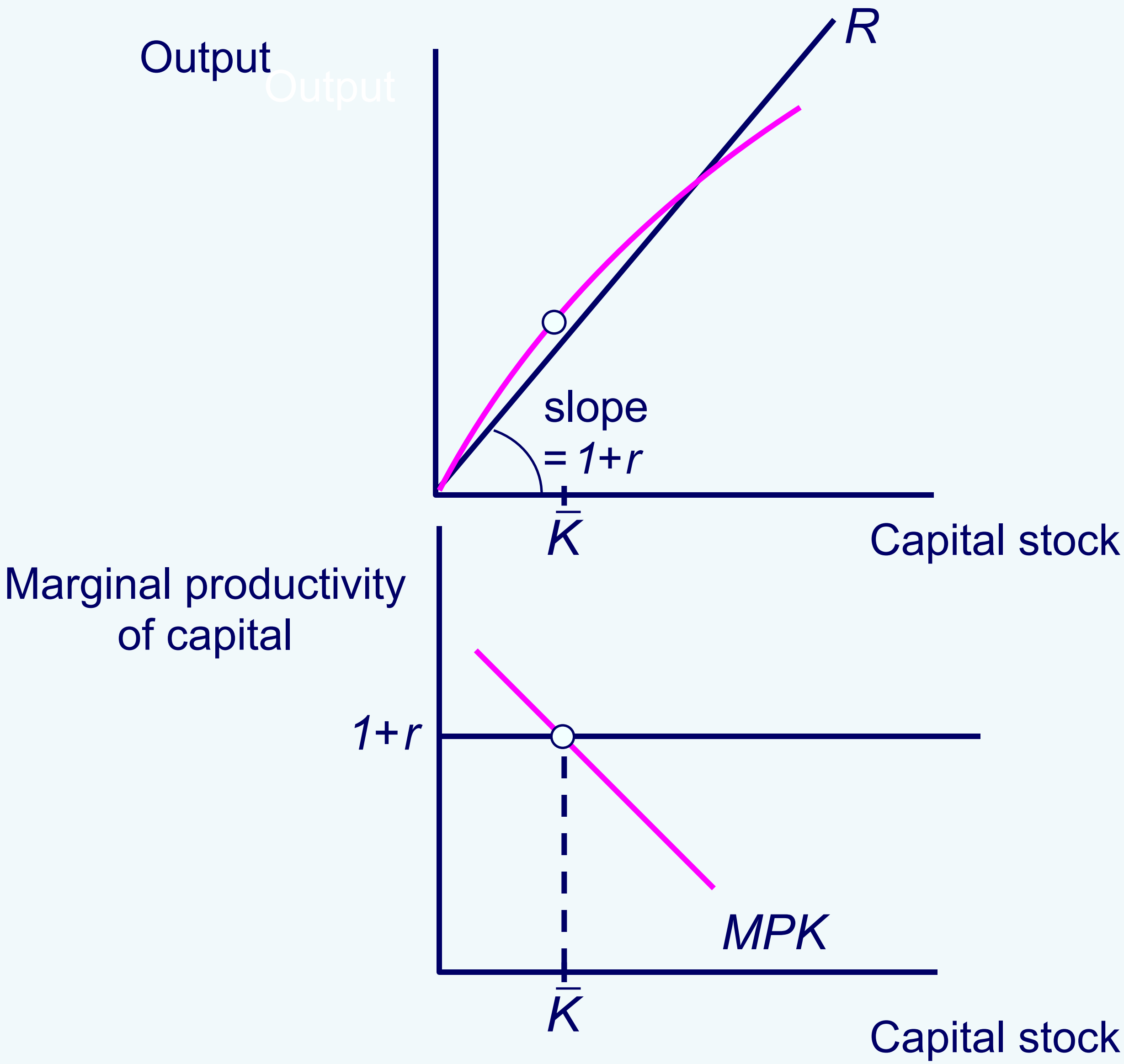
Optimal capital stock is larger than initial capital stock



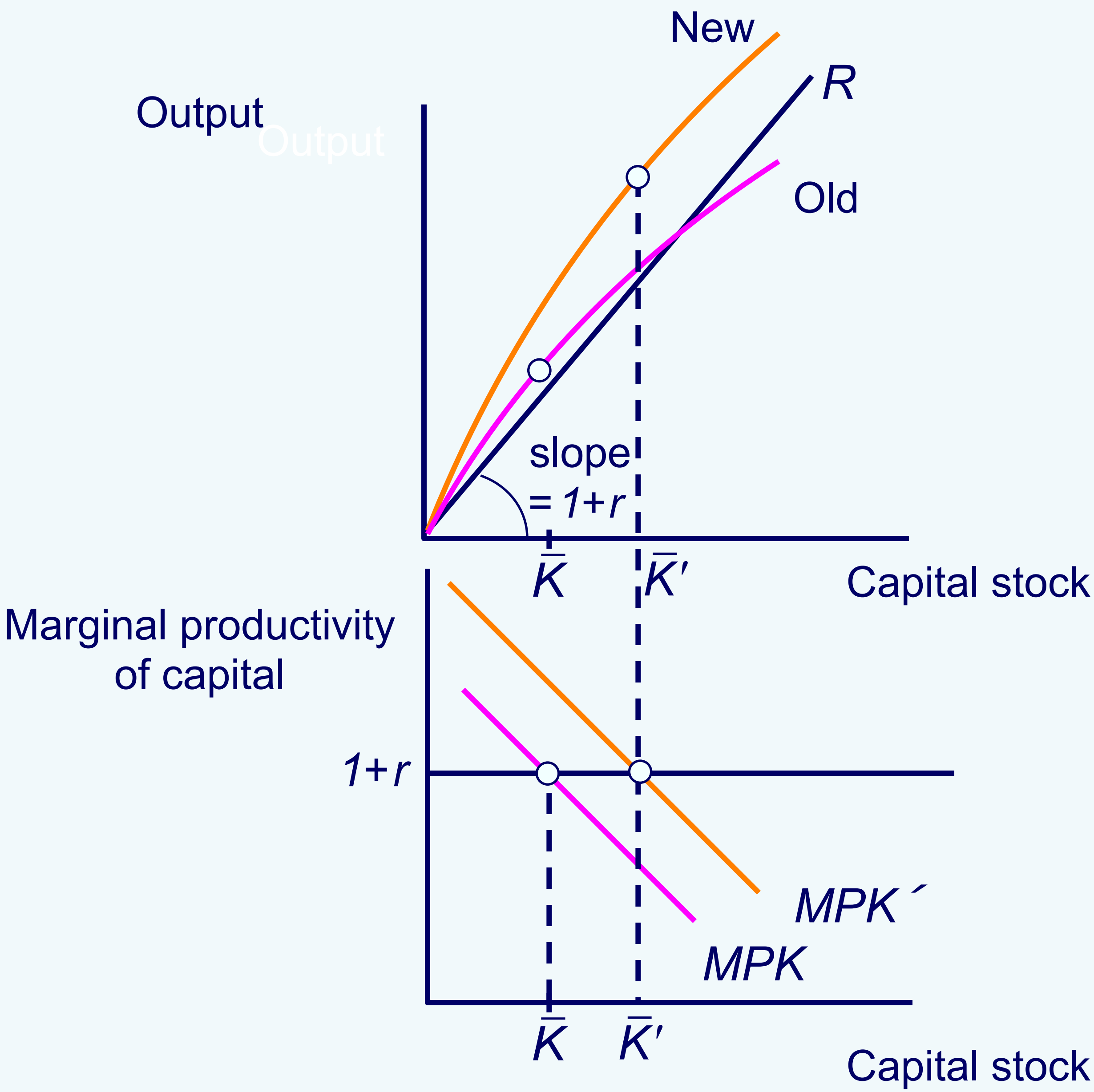
MPK>1+*r*, so it is profitable to invest up to $\bar{K}$

Technological Progress





We will start with an optimal capital stock...



Technological progress makes more output possible with the same capital stock. The desired capital stock increases.

To sum up (so far)...

- Investment
  difference between optimal and actual capital stock
  - r
  - technical progress (via MPK)
- Several periods: $0 < \delta < 1$
  - $MPK + (1 - \delta) = 1 + r \quad \Leftrightarrow \quad MPK = r + \delta$
  - Investment function, so far: $I = I(r)$

Accelerator Principle

- Firms also adjust investment according to (expected) output
- $K_t = vY_t$
- $I_t = K_{t+1} - K_t = v(Y_{t+1} - Y_t) = v\,\Delta Y_t$

(neglecting depreciation)

Investment function, so far: $I = I(\underbrace{r}_{(-)}, \underbrace{\Delta Y}_{(+)})$

Tobin‘s q

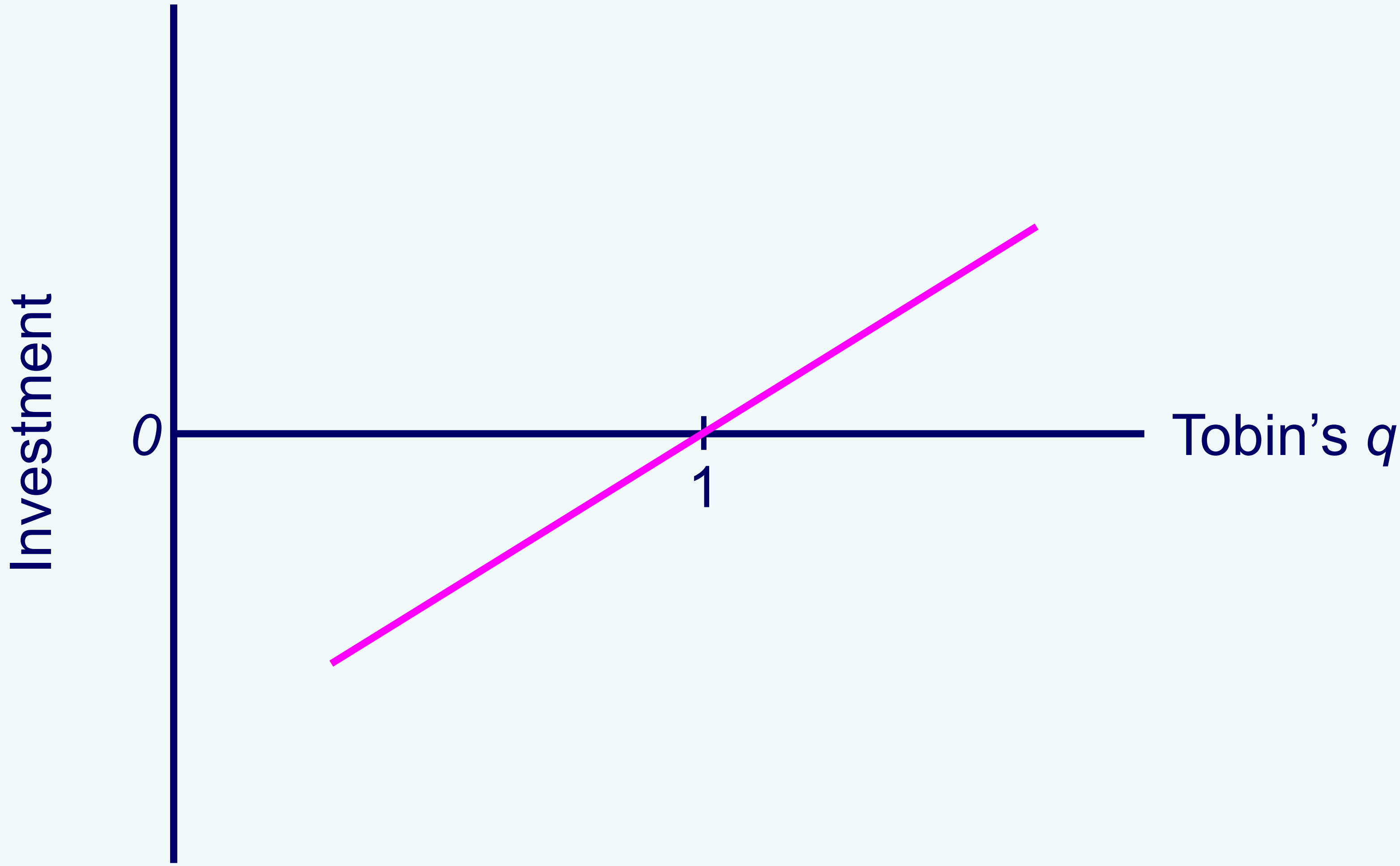
- market value of installed capital = price of share
- replacement value of installed capital

- Tobin’s q = market value/replacement value

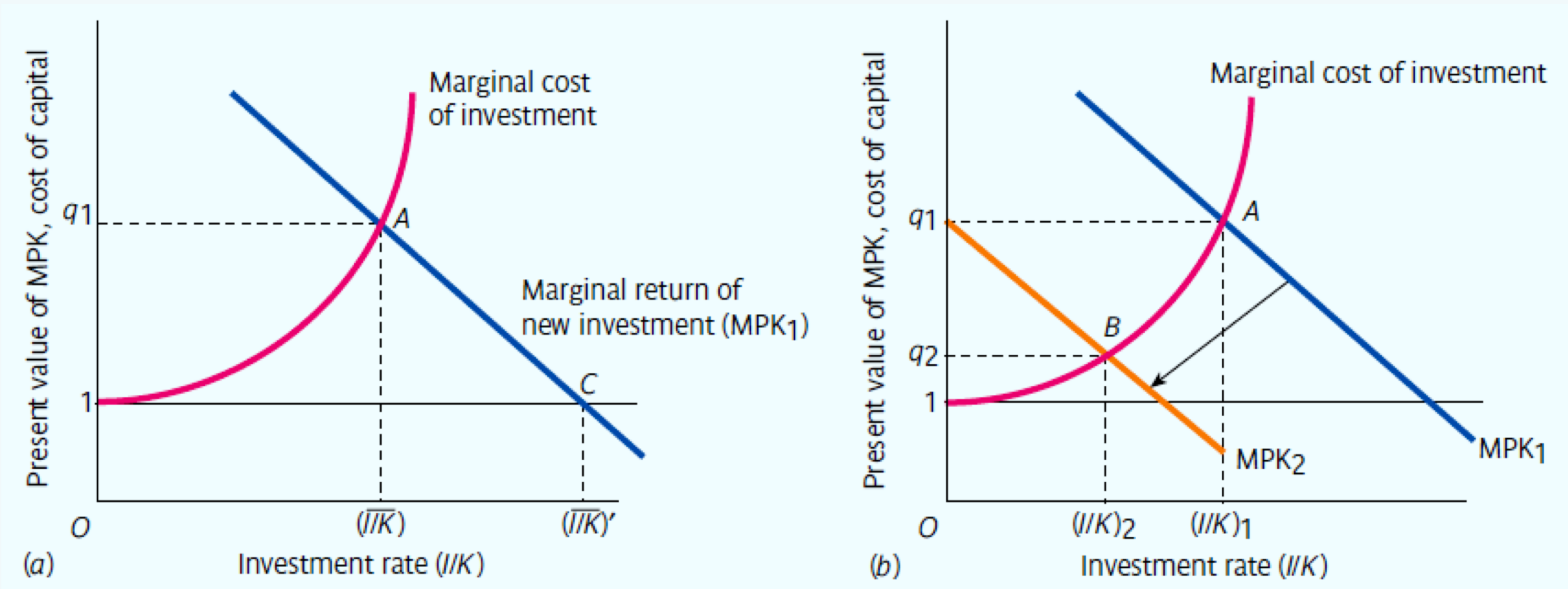
Query. Under which condition is q=1, when does q differ from 1?

- q>1 invest!

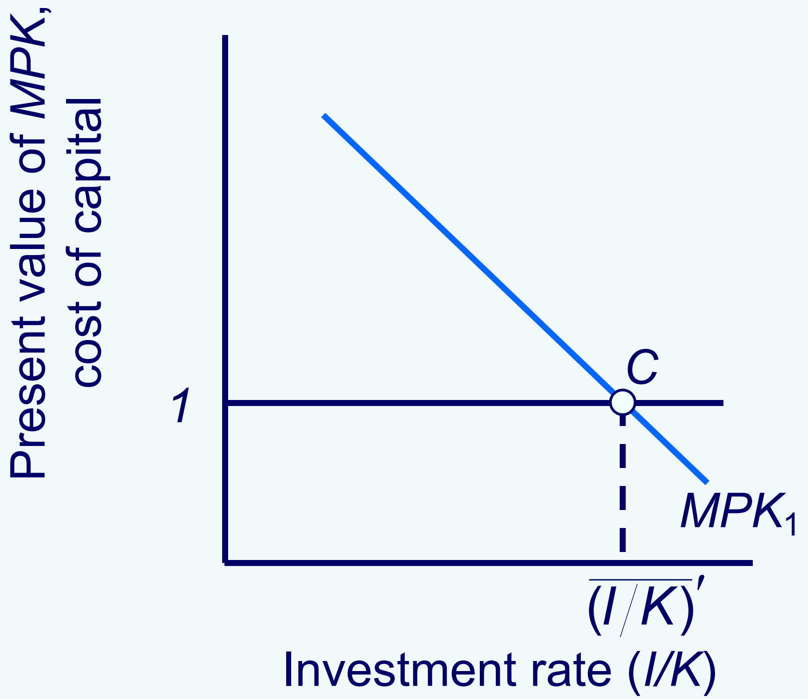
The *q*-Theory of Investment



Tobin's *q*


Present value of MPK, cost of capital
Marginal cost of investment
q1
A
Marginal return of new investment (MPK1)
C
1
O
(I/K)
(I/K)′
(a)
Investment rate (I/K)
Present value of MPK, cost of capital
Marginal cost of investment
q1
A
B
q2
1
MPK2
MPK1
O
(I/K)2
(I/K)1
(b)
Investment rate (I/K)

Tobin's *q=1* in a World of No Adjustment Costs

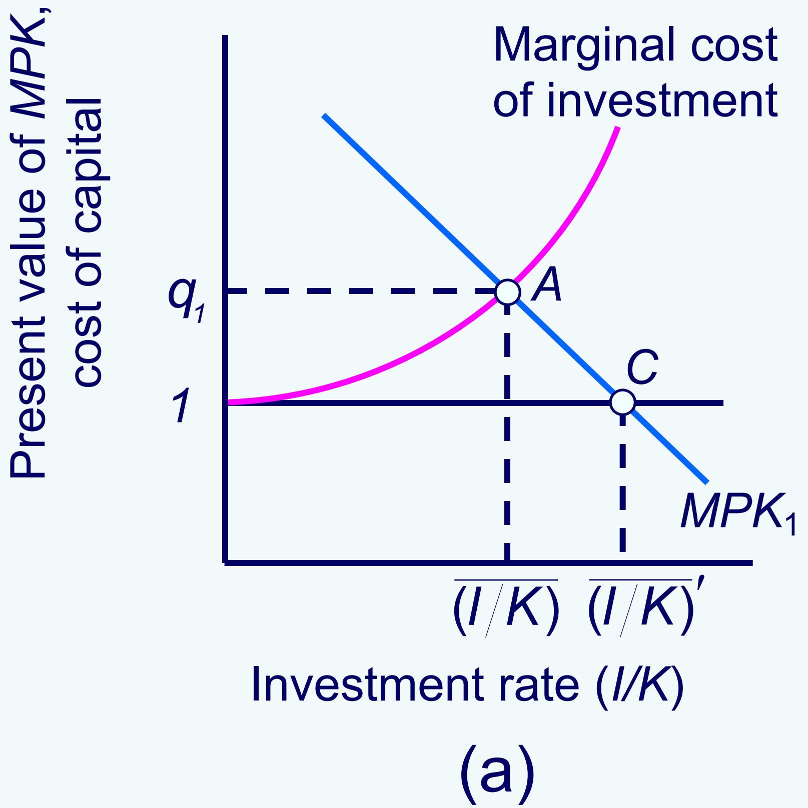


If there were no costs of adjustment, the present value of the marginal cost of capital would be independent of the investment rate.

If there were no depreciation, the investment rate, *I/K*, = $\Delta K/K$, the rate of change of the capital stock.

MPK=Marginal return of new investment

Tobin's *q* When Adjustment Costs Are Significant



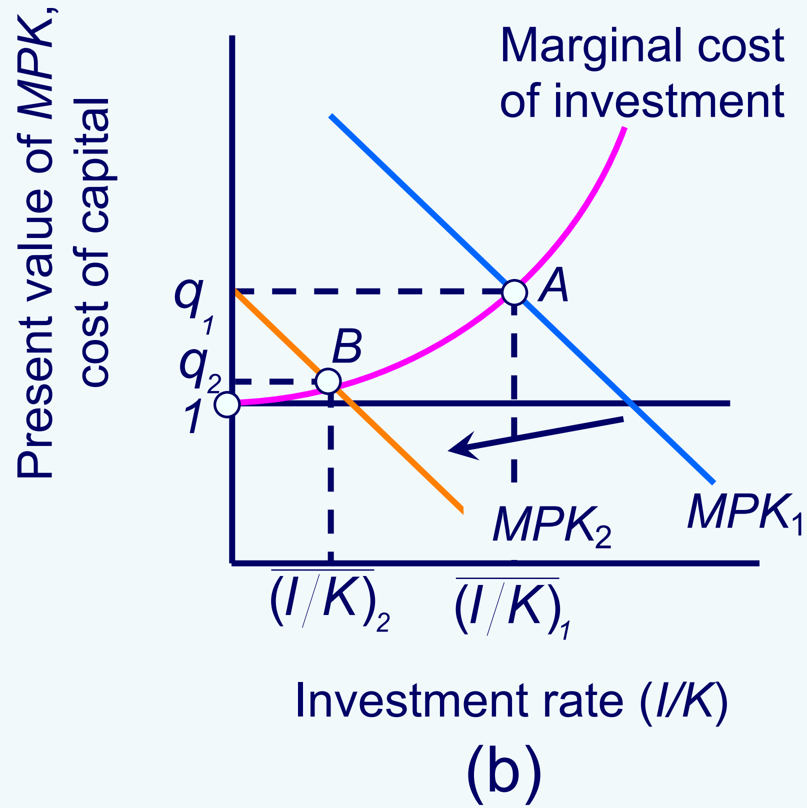
However the faster we try to install new capital, the more it adds to the cost of that capital. "Haste makes waste." Hence the upward slope of the marginal cost of investment with respect to the investment rate.

MPK=Marginal return of new investment

Tobin's *q*

With the investment rate corresponding to the rate at point *A*, in the following period there will be more capital and a lower *MPK*.

The investment rate next period will fall too (as will Tobin's *q*), ultimately heading towards a value of unity and no more investment.



MPK=Marginal return of new investment

Tobin‘s q

Queries.

♦(1) How does a change in r affect Tobin’s q?

♦(2) In which way is Tobin’s q differing from r?

♦Aggregate Investment function: $I = I(\underbrace{r}_{(-)}, \underbrace{\Delta Y}_{(+)}, \underbrace{q}_{(+)})$