

UWTSD MBA HKBM7009
(UWMBA-30013-2023-1-SS)

Global Business Challenges) (3-1)

Microeconomics Foundations I: Understanding Interest Rates

Che Cheong POON
21 January 2024; Sunday 12:00pm to 3:00pm

Lecture Agenda :

- The origins of the rate of interest
- The Pure Consumption Loan Model of Households
- The Investment Opportunity
- Theory of Interest Rate Determination
- Nominal versus Real Interest Rates

The origins of the rate of interest

International prime and Central bank benchmark lending interest rates (% p.a.)

	Jan 2023	Jan 2024
Hong Kong	5.35	5.88
China	3.65	3.55
US	7.5	8.5
Japan	4.48	1.48
Eurozone	2.00	4.5
UK	3.50	5.25

Sources:

https://www.fedprimerate.com/non-us_foreign_primerates.htm

http://www.fedprimerate.com/wall_street_journal_prime_rate_history.htm#current

https://www.censtatd.gov.hk/en/web_table.html?id=122

Major interest rates in Hong Kong (% per annum)

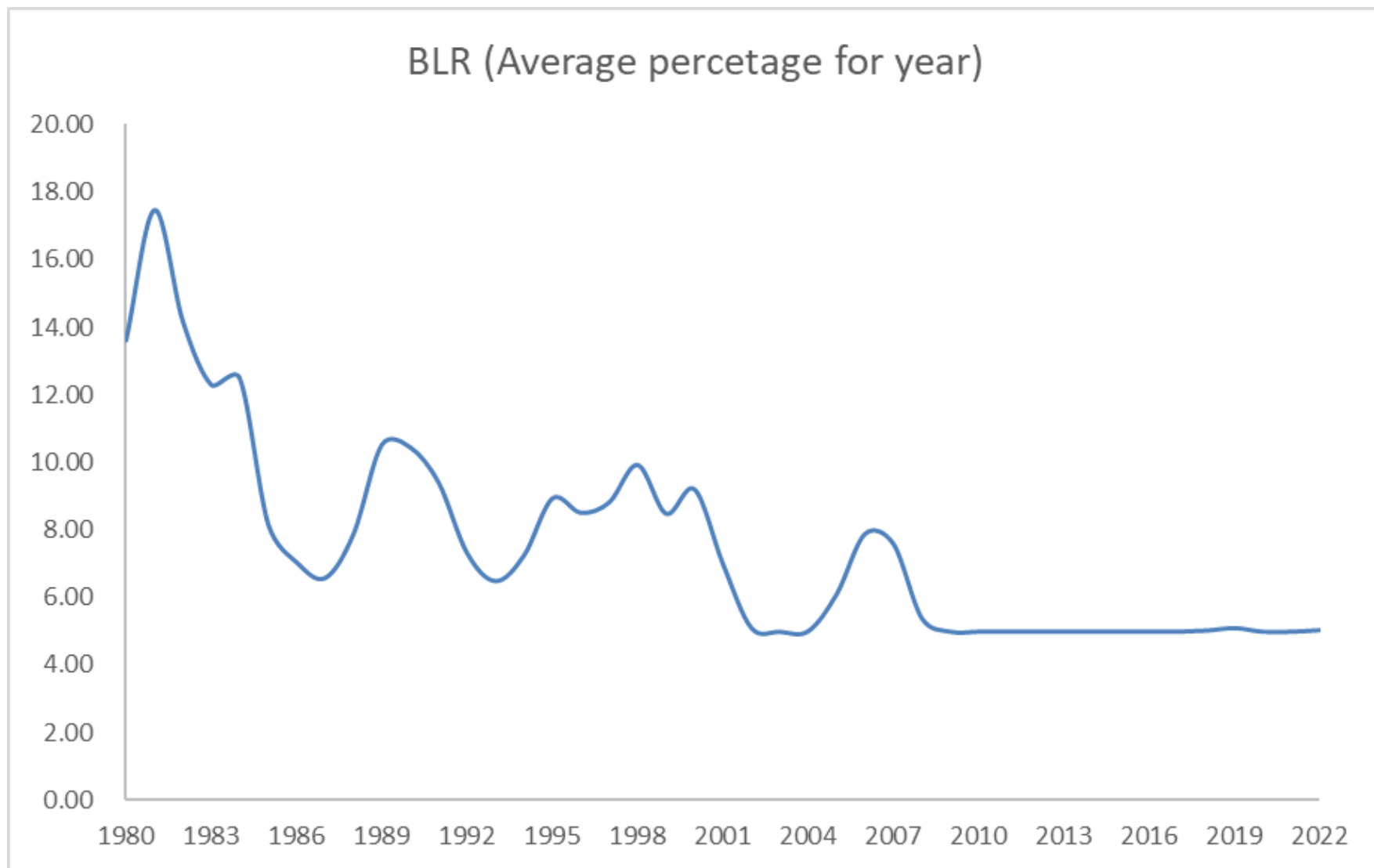
		Time deposit rate (deposits of less than HK\$ 100,000) (1)					Savings deposit rate (deposits of less than HK\$ 100,000) (1)	Best Lending Rate (2)
		(Percent for annum)					(Percent for annum)	(Percent for annum)
Deposit period		1 week	1 month	3 months	6 months	12 months	-	-
Year	Month							
2001		2.10	2.36	2.36	2.39	2.53	2.16	7.00
2002		0.16	0.34	0.40	0.50	0.74	0.14	5.11
2003		0.06	0.07	0.07	0.09	0.12	0.03	5.00
2004		0.02	0.03	0.04	0.09	0.27	0.02	5.02
2005		1.14	1.29	1.38	1.48	1.75	0.97	6.12
2006		2.65	2.70	2.78	2.84	3.02	2.50	7.90
2007		2.20	2.42	2.52	2.62	2.79	2.10	7.59
2008		0.14	0.45	0.67	0.79	0.97	0.14	5.39
2009		0.01	0.01	0.09	0.15	0.30	0.01	5.00
2010		0.01	0.01	0.01	0.05	0.16	0.01	5.00
2011		0.01	0.01	0.01	0.05	0.15	0.01	5.00
2012		0.01	0.01	0.01	0.05	0.16	0.01	5.00
2013		0.01	0.01	0.01	0.05	0.15	0.01	5.00
2014		0.01	0.01	0.01	0.05	0.16	0.01	5.00
2015		0.01	0.01	0.01	0.04	0.15	0.01	5.00
2016		0.01	0.01	0.01	0.04	0.15	0.01	5.00
2017		0.01	0.01	0.01	0.04	0.15	0.01	5.00
2018		0.03	0.04	0.05	0.09	0.20	0.04	5.03
2019		0.11	0.14	0.17	0.22	0.32	0.11	5.10
2020		0.04	0.06	0.07	0.11	0.20	[-\$31]	5.00
2021		[-\$31]	0.02	0.02	0.04	0.10	[-\$31]	5.00
2022		0.04	0.05	0.06	0.08	0.14	0.07	5.08
2023		0.48	0.49	0.50	0.52	0.61	0.67	5.76

Hong Kong Composite interest rate (2023)

As at end of 期末數字		(percent per annum) (年率)
Feb	2月	2.17
Mar	3月	2.13
Apr	4月	2.10
May	5月	2.20
Jun	6月	2.35
Jul	7月	2.46
Aug	8月	2.55
Sep	9月	2.68
Oct	10月	2.76
Nov	11月	2.86

The composite interest rate is a weighted average interest rate of all Hong Kong dollar interest-rate-sensitive liabilities, which include deposits from customers, amounts due to banks, negotiable certificates of deposit and other debt instruments, and all other liabilities that do not involve any formal payment of interest but the values of which are sensitive to interest rate movements (such as Hong Kong dollar non-interest bearing demand deposits) on the books of banks. The methodology of the compilation of the composite interest rate can be found in HKMA Research Memorandum, <http://www.hkma.gov.hk/media/eng/publication-and-research/research/working-papers/pre2007/RM26-2005.pdf>

Since June 2019, the composite interest rate has been calculated based on the new local "Interest rate risk in the banking book" (IRRBB) framework. As such, the figures are not strictly comparable with those of previous months



Sources:

https://www.censtatd.gov.hk/en/web_table.html?id=340-45021

What factors determine the level of interest rates?

What factors determine the interest rate for each different type of loan?

What is the difference between real and nominal interest rates?

“The real rate of interest is the price of a loan, which is paid not in the present but in the future.”

“Interest is paid at the end of the interest period.”

Source:

Fisher, I. (1930). Theory of interest: as determined by impatience to spend income and opportunity to invest it. Augustusm Kelly Publishers, Clifton. pp. 100

http://files.libertyfund.org/files/1416/Fisher_0219.pdf

“In modern economics, interest is defined as the rental price of money.”

Source:

Persky, J. (2007). Retrospectives: From usury to interest. Journal of Economic Perspectives, 21(1), 227-236.

The origins of interest

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graph LR; A[The origins of interest] --- B[On the impatience's side: Interest must be paid because most men suffer a disutility in saving.]; A --- C[On the opportunities' side: Interest can be paid because capital is productive];
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On the impatience's side: Interest must be paid because most men suffer a disutility in saving.

Assumption: Positive time preference

(Commodities available in the present are typically evaluated at higher prices than subjectively certain prospects of the same commodities available in the future --- Bohm Bawark.)

On the opportunities' side: Interest can be paid because capital is productive

The Pure Consumption Loan Model of Households

Let us consider one individual who knows with certainty that he will live only two period. He also knows with certainty the incomes to be received in each of the two period. These incomes are M_1 and M_2 . The individual is free to borrow or lend in the first period at a given market rate of interest r subject only to the constraint that any borrowing in the first period must be repaid with interest out of income received in the second period. The individual is assumed to choose the levels of consumption in the first and second periods, C_1 and C_2 so as to maximize his utility subject to the constraints imposed by the fixed incomes and the market rate of interest.

The Present Value of the individual's income stream

$$V_m = M_1 + \frac{M_2}{1+r}$$

The diagram illustrates the present value formula $V_m = M_1 + \frac{M_2}{1+r}$ with annotations indicating which variables are given:

- A blue arrow points from the word "Given" to V_m .
- A red arrow points from the word "Given" to M_1 .
- A red arrow points from the word "Given" to M_2 .
- A red arrow points from the word "Given" to r .

The Present Value of the individual's consumption stream

$$V_c = C_1 + \frac{C_2}{1+r}$$

Diagram illustrating the Present Value of the individual's consumption stream equation:

- V_c is labeled "Given" (blue arrow).
- C_1 is labeled "Unknown" (red arrow).
- C_2 is labeled "Unknown" (red arrow).
- $1+r$ is labeled "Given" (red arrow).

Deriving the budget equation

The individual's present value of consumption cannot exceed present wealth. Assuming that no income is left unspent at the end of the second period, we must have

$$V_c = V_m$$

By substituti on, we get $V_m = C_1 + \frac{C_2}{1+r}$

Constant

or $C_2 = (1+r)V_m - (1+r)C_1 \dots\dots\dots(1)$

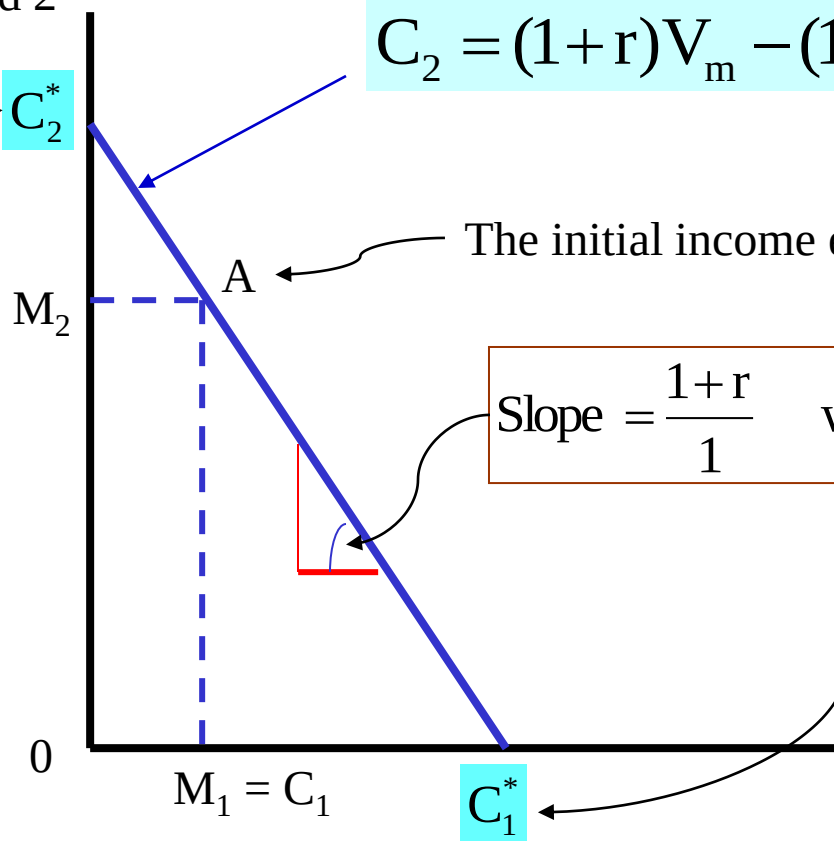
C_1 is the dependent variable and C_2 is the independent variable

The slope of the budget line

The budget line: no exchange between present and future consumption

Income and
consumption
in period 2

Maximum
consumption
in period 2 if no
consumption in
period 1

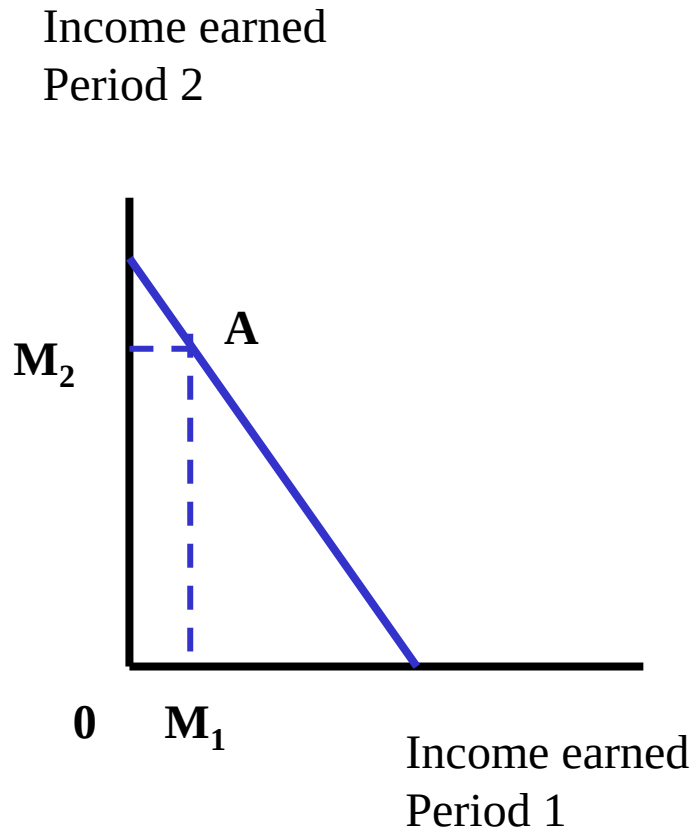


The initial income endowment

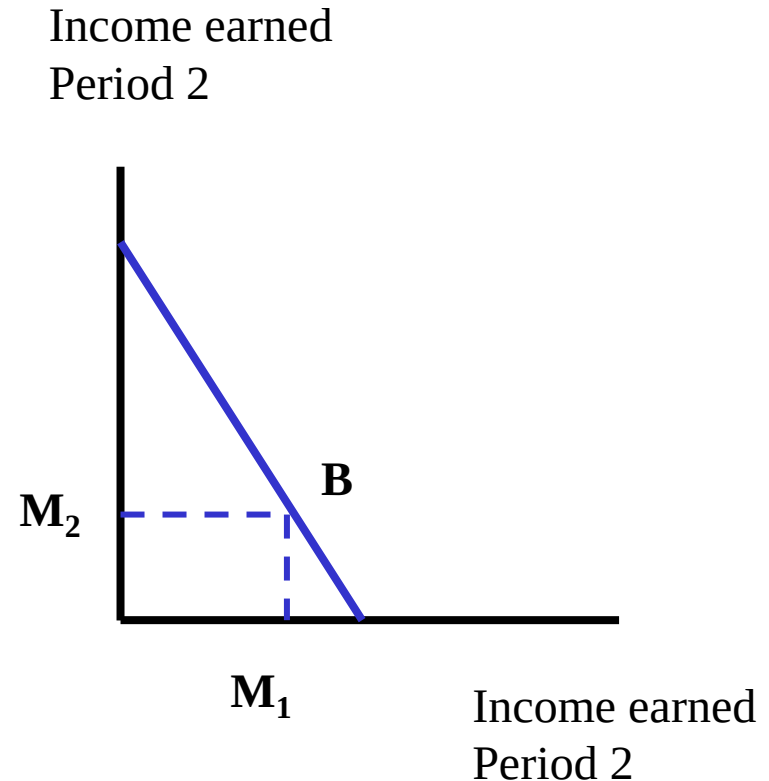
Maximum
consumption
in period 1 if no
consumption in
period 2

Income and
Consumption
in period 1

Who would be the lender and who would be the borrower?

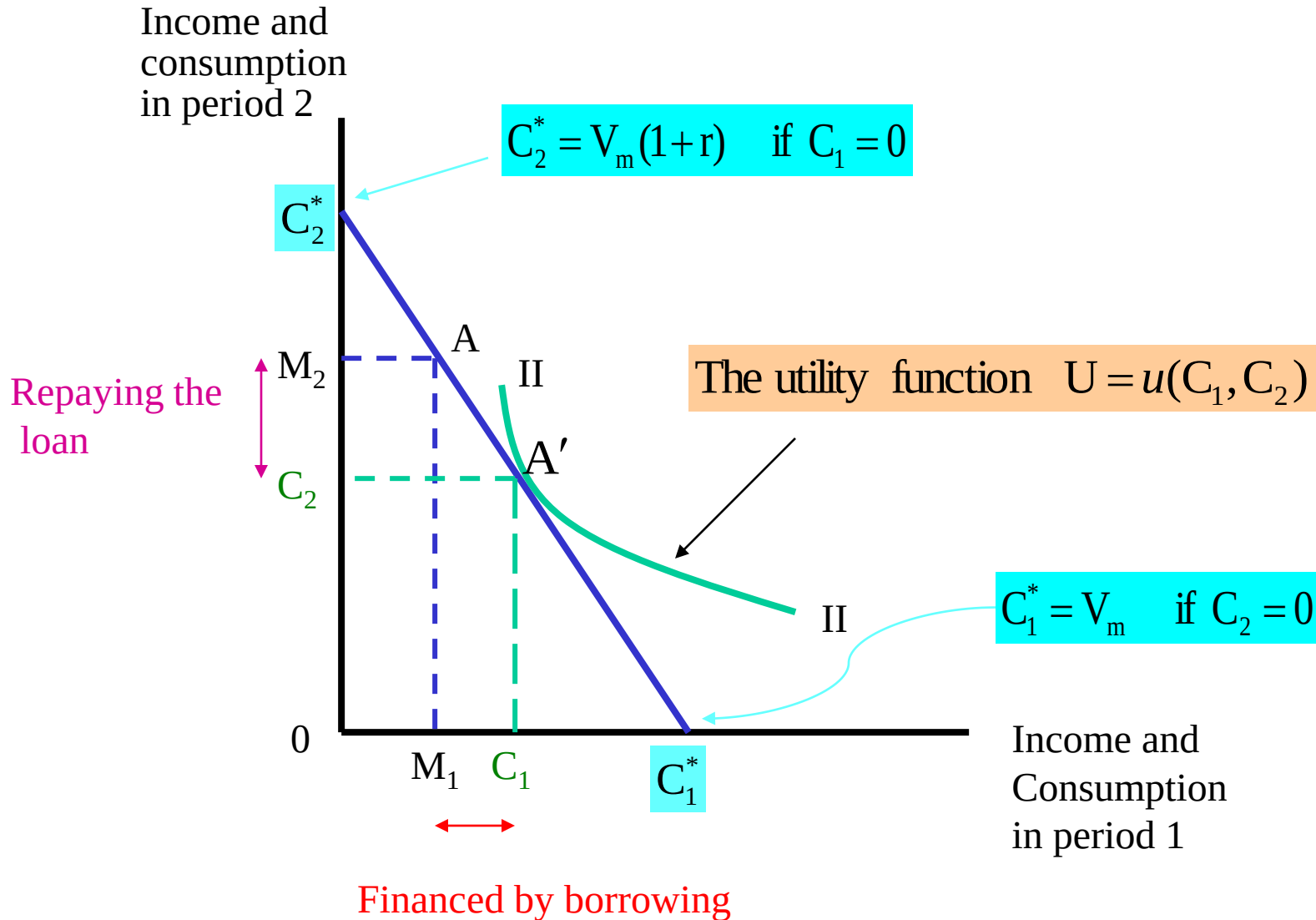


Individual A

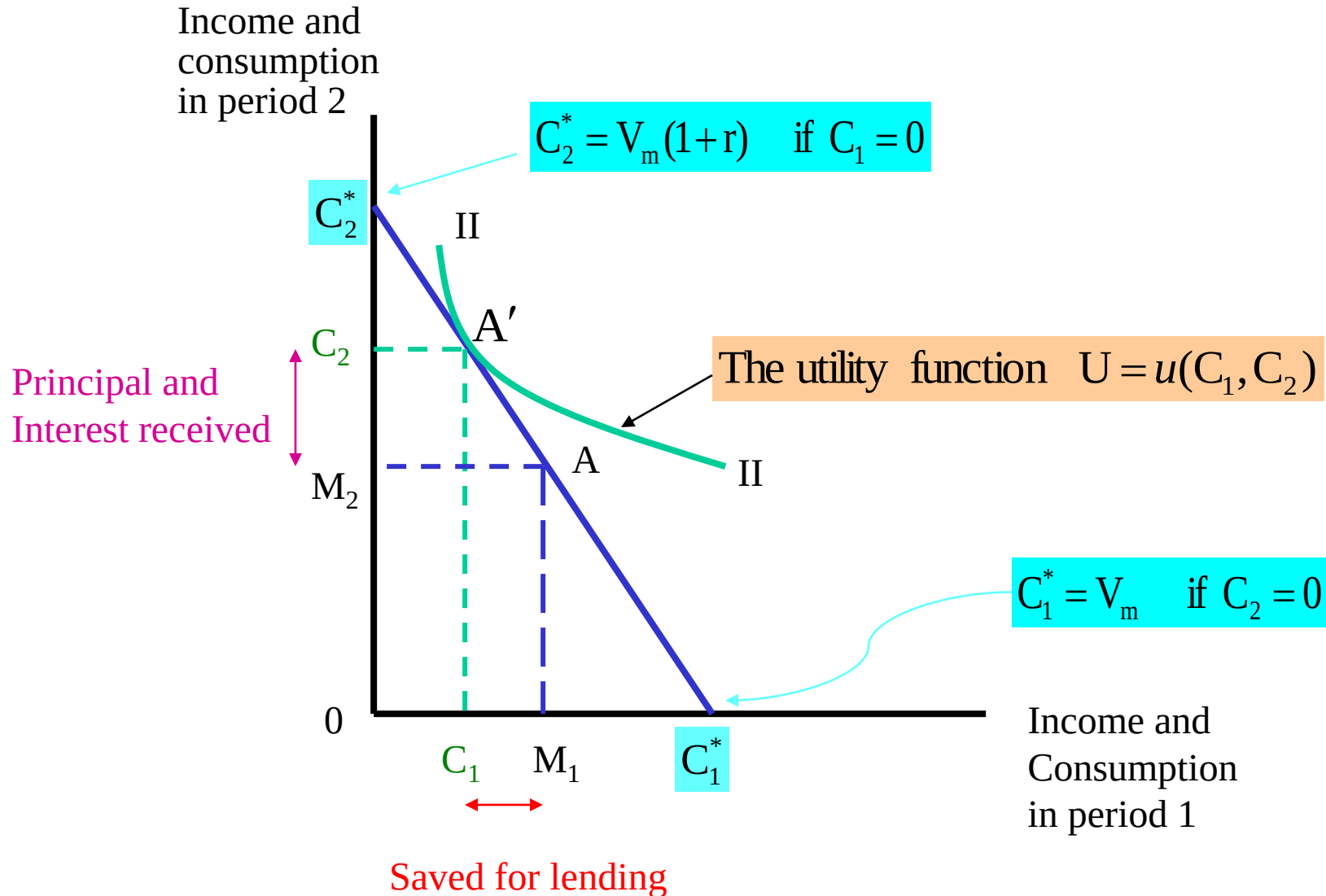


Individual B

Allowing for exchange between present and future consumption: The case of a borrower

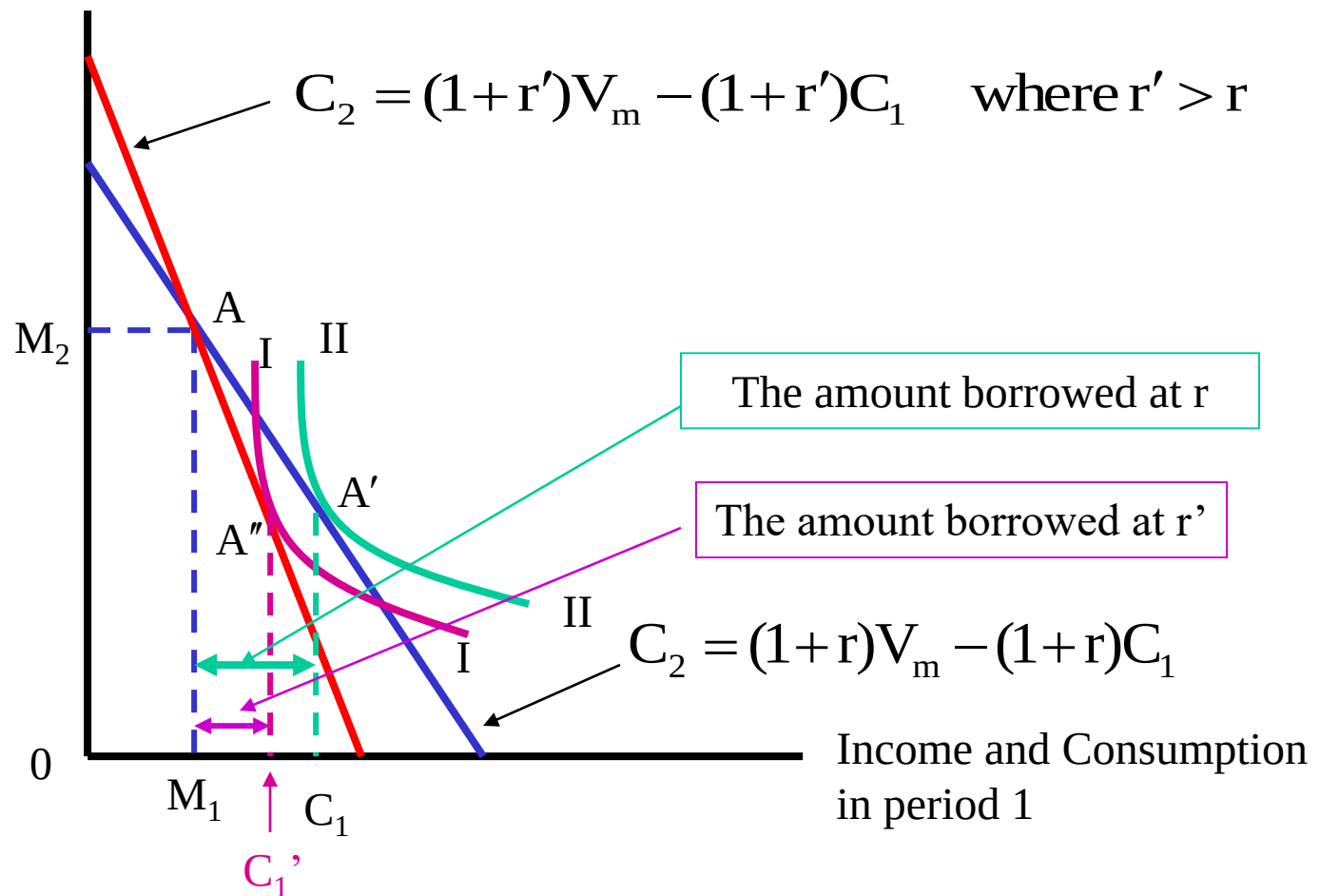


Allowing for exchange between present and future consumption: The case of a lender



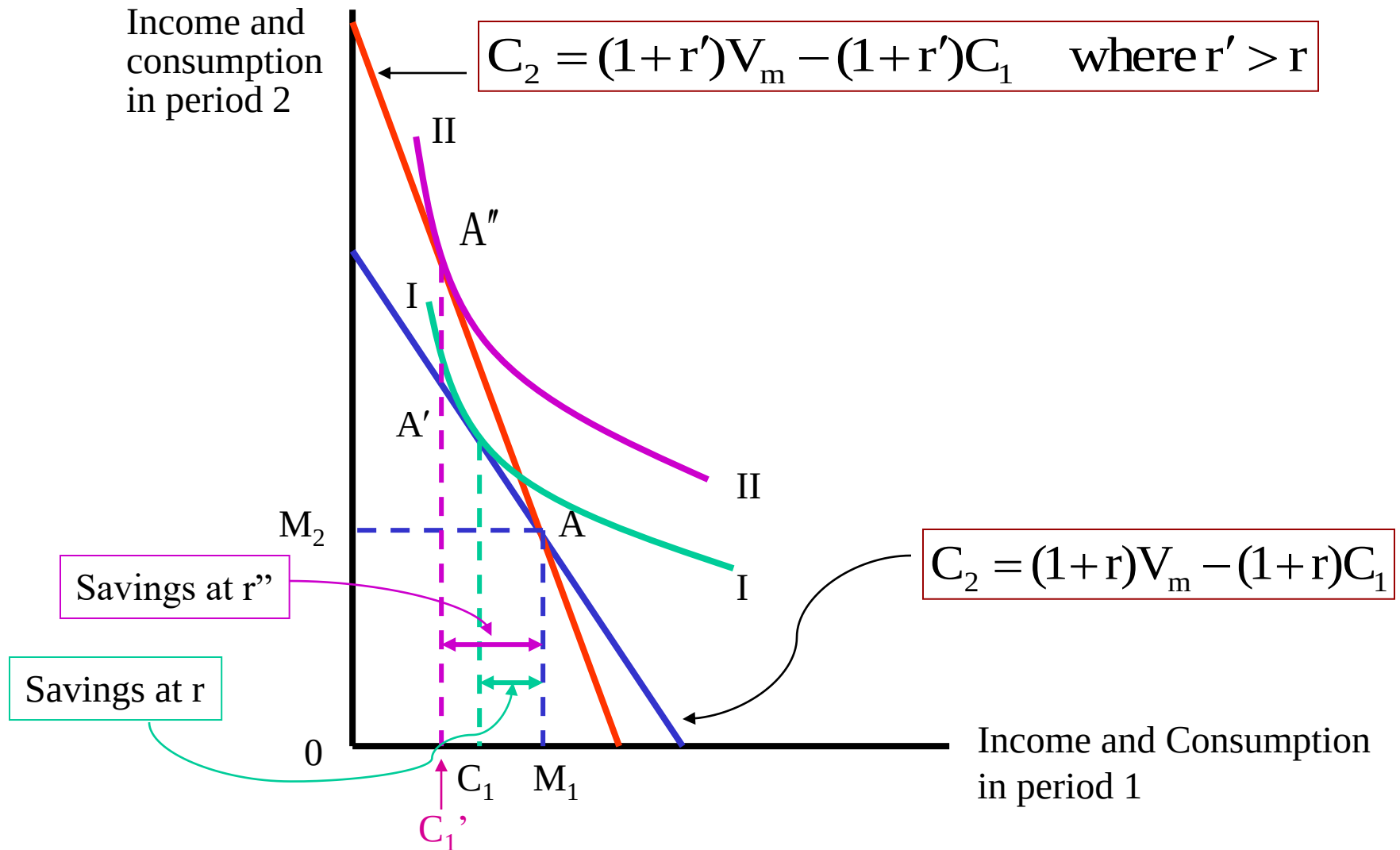
The effect of an increase in interest rate on borrowing behavior

Income and consumption in period 2



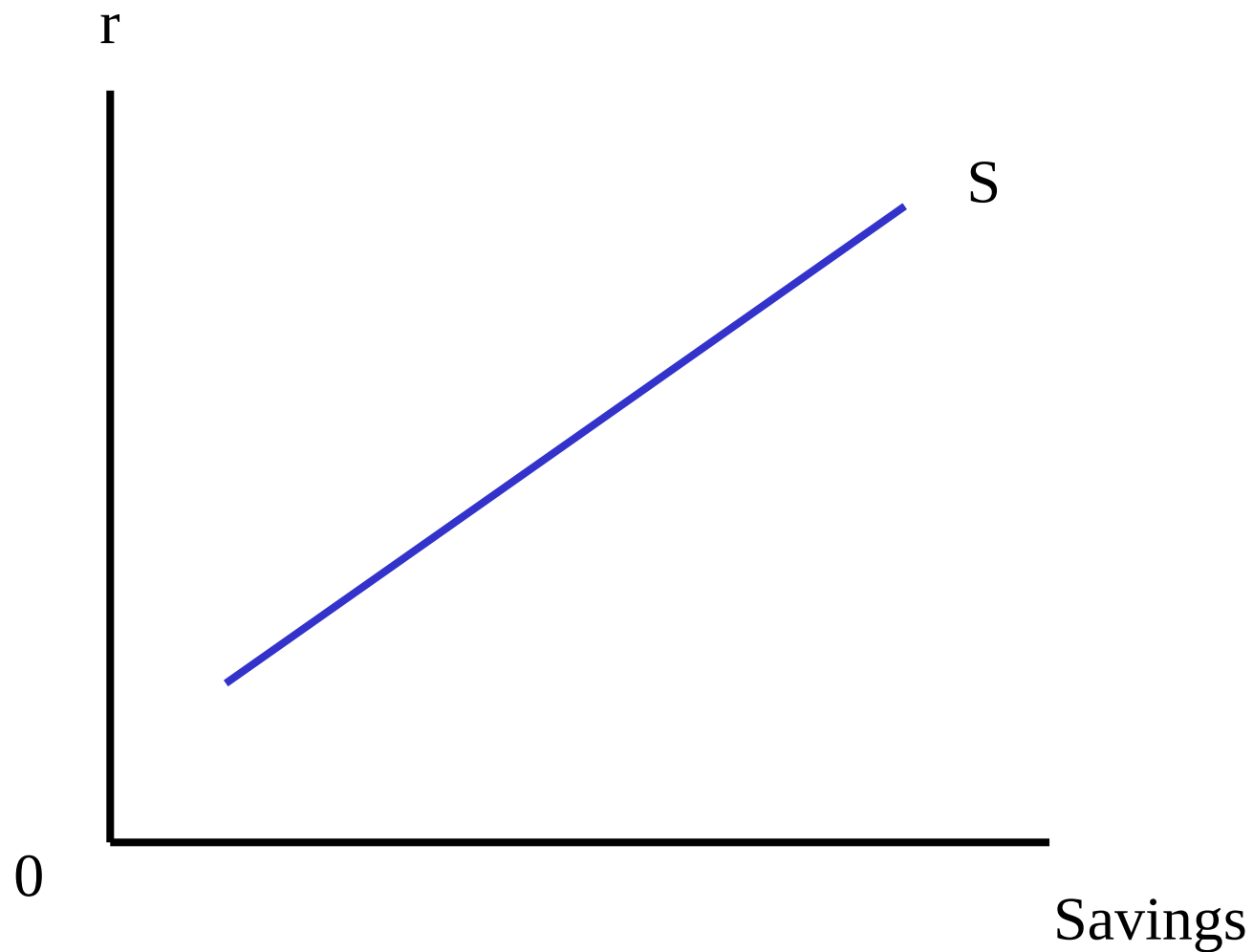
An increase in the market interest rate rotates the budget line clockwise: that is, it becomes more steeply sloped

The effect of an increase in interest rate on lending behavior



An increase in the market interest rate induces the individual to save more

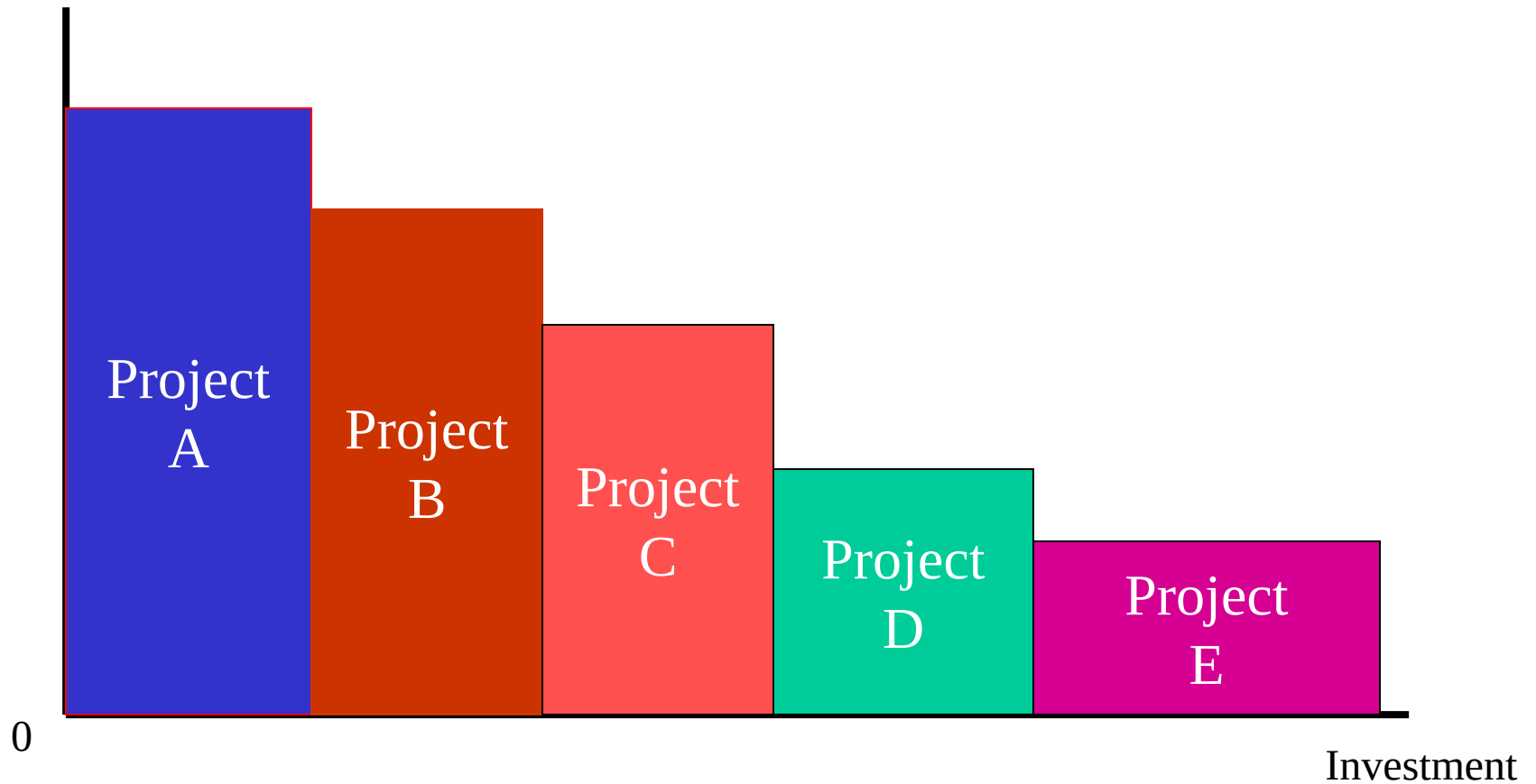
The Saving Function



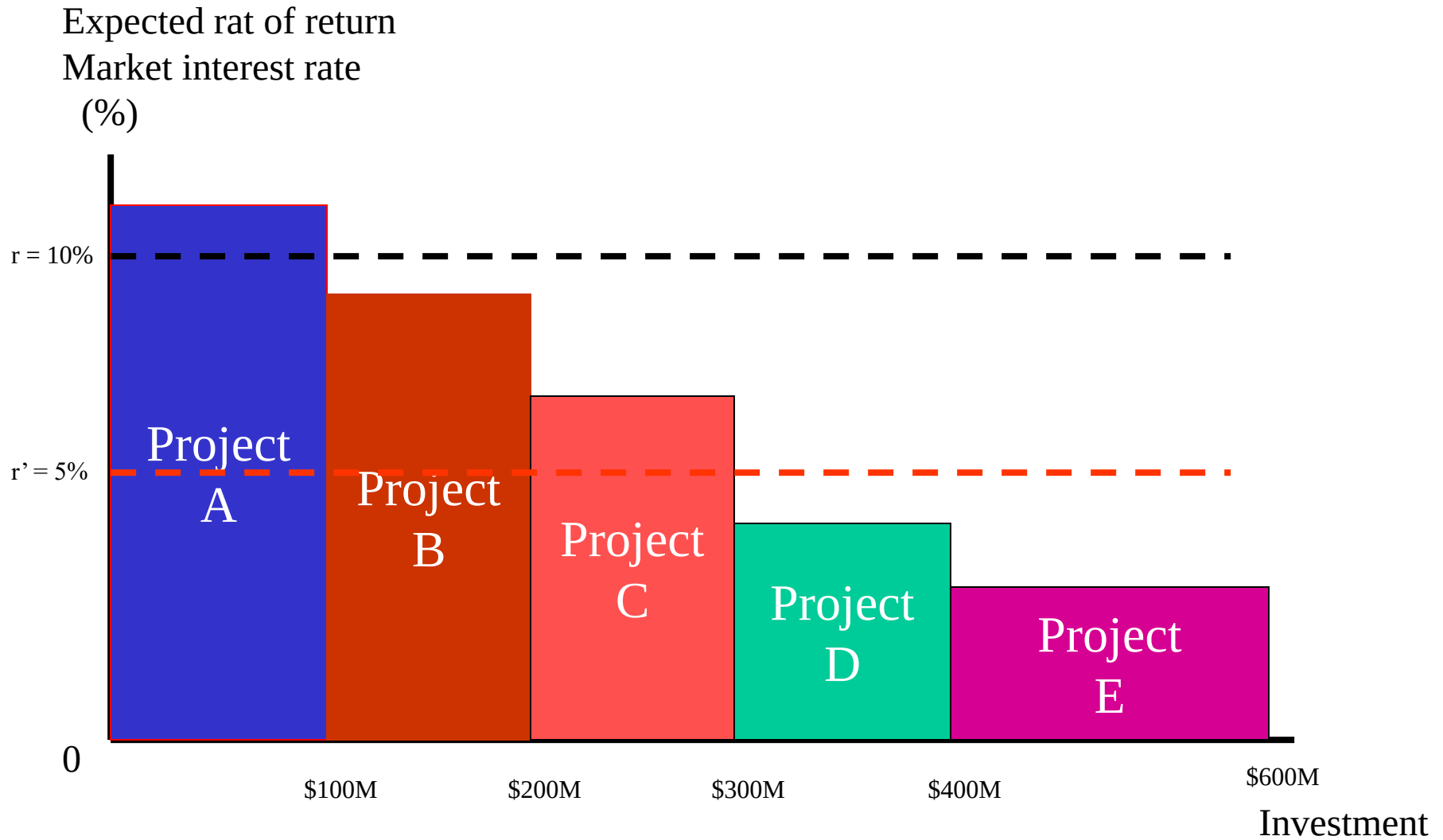
The Investment Opportunity

Expected Investment return

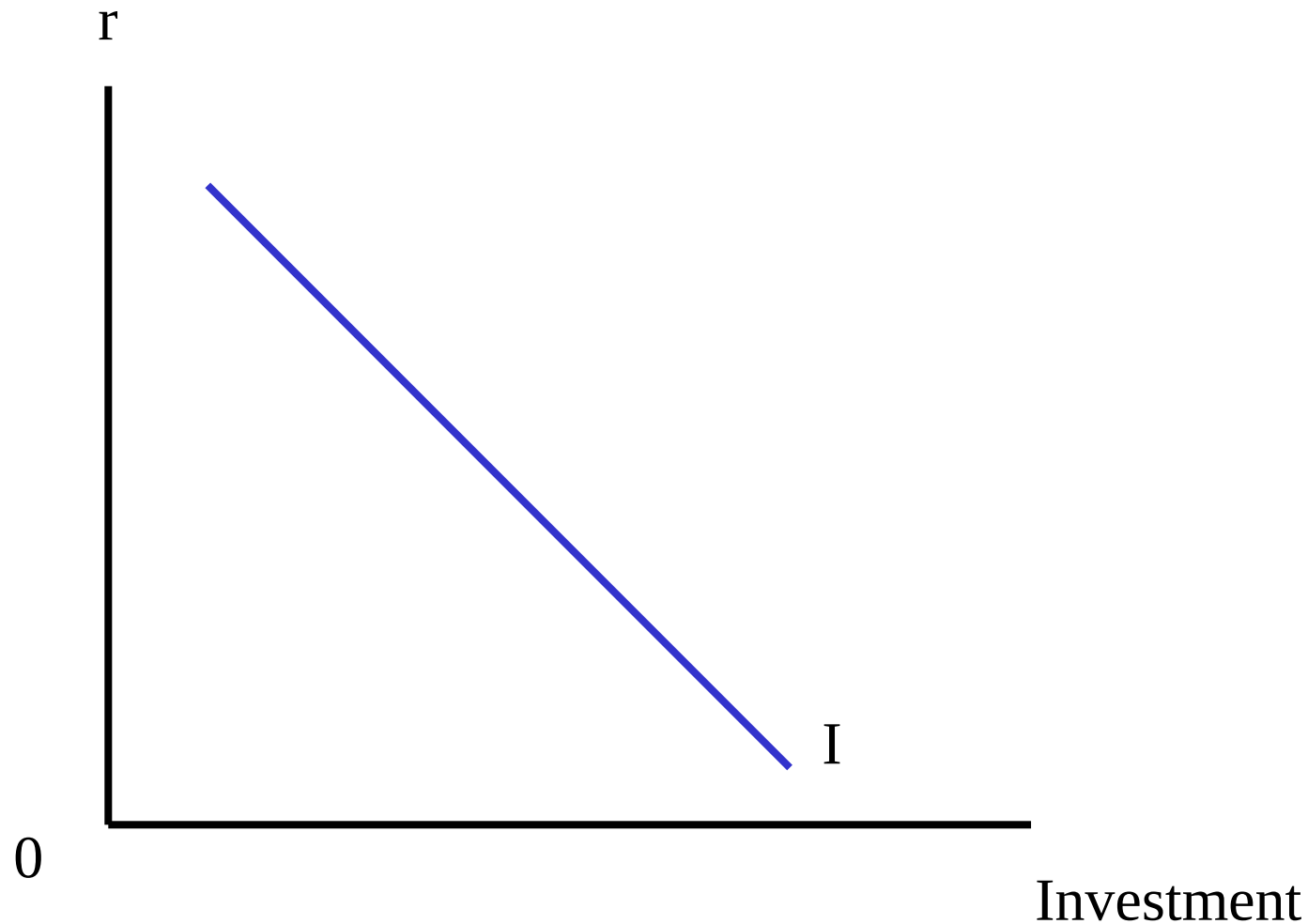
Expected rate
of return (%)



Expected Investment return



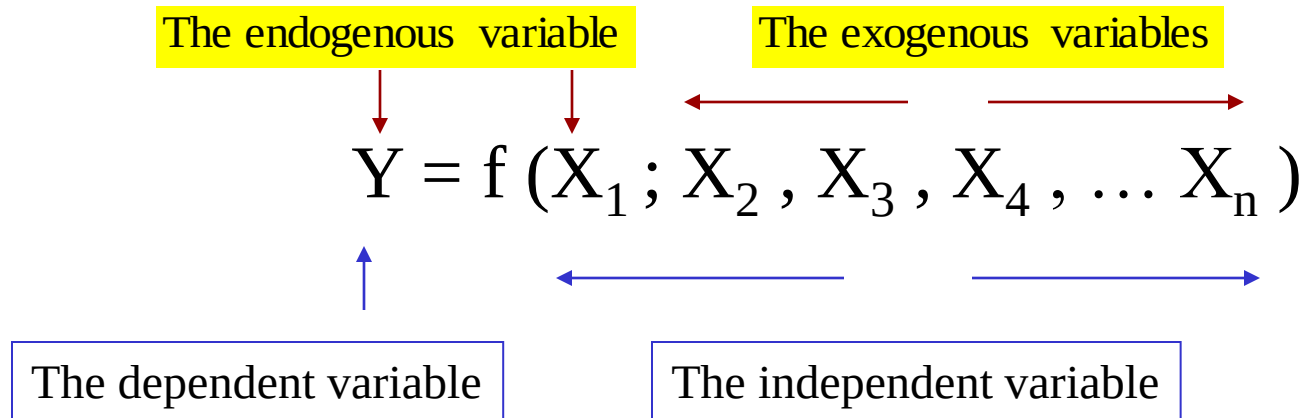
The Investment Function



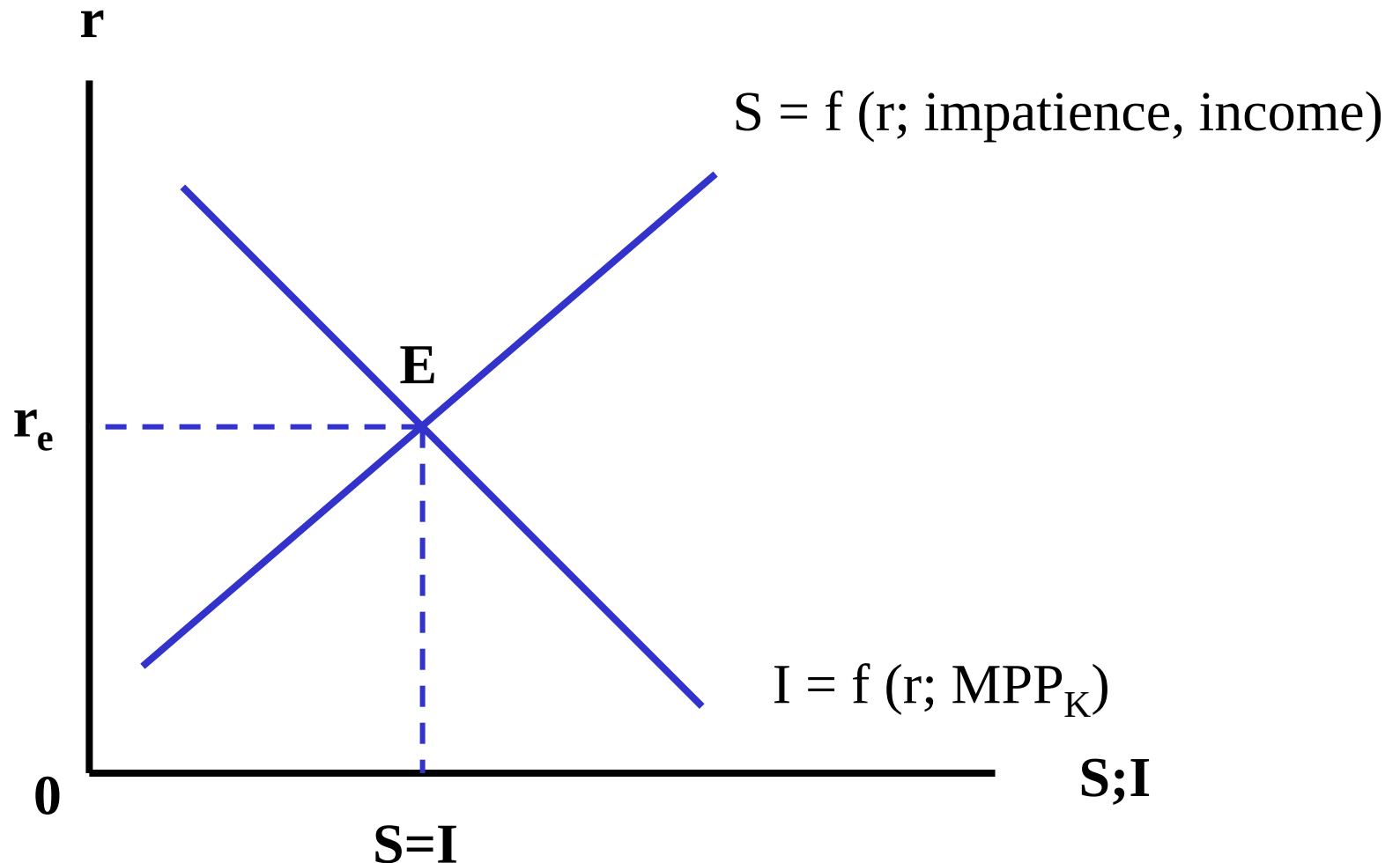
Theory of Interest Rate Determination

Endogenous and exogenous variables

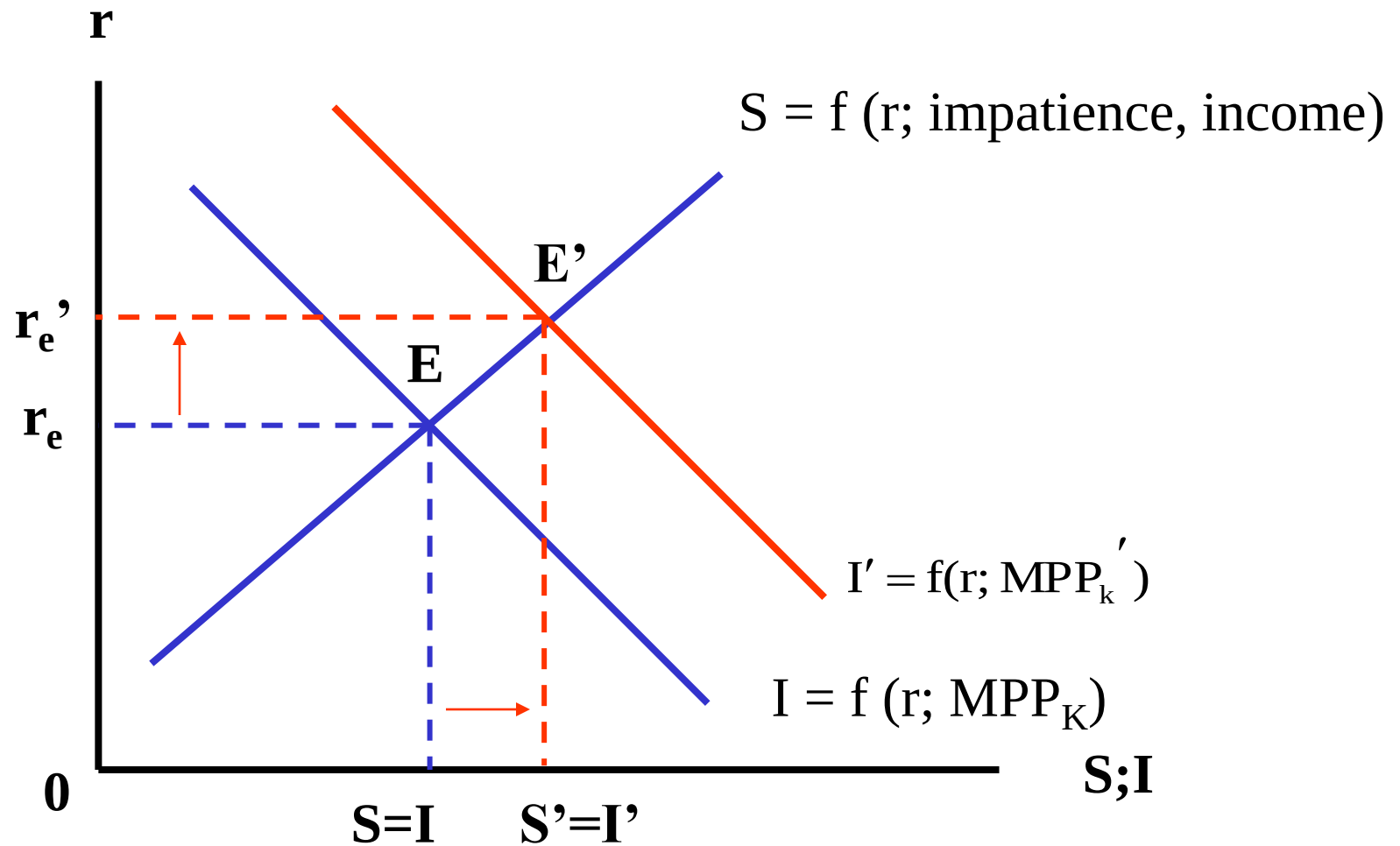
- An endogenous variable is a variable whose value is determined by forces within the model.
- An exogenous variable is a variable whose value is determined by forces outside the model, it always be an independent variable. (A change in an exogenous variable is classified as an autonomous change.)



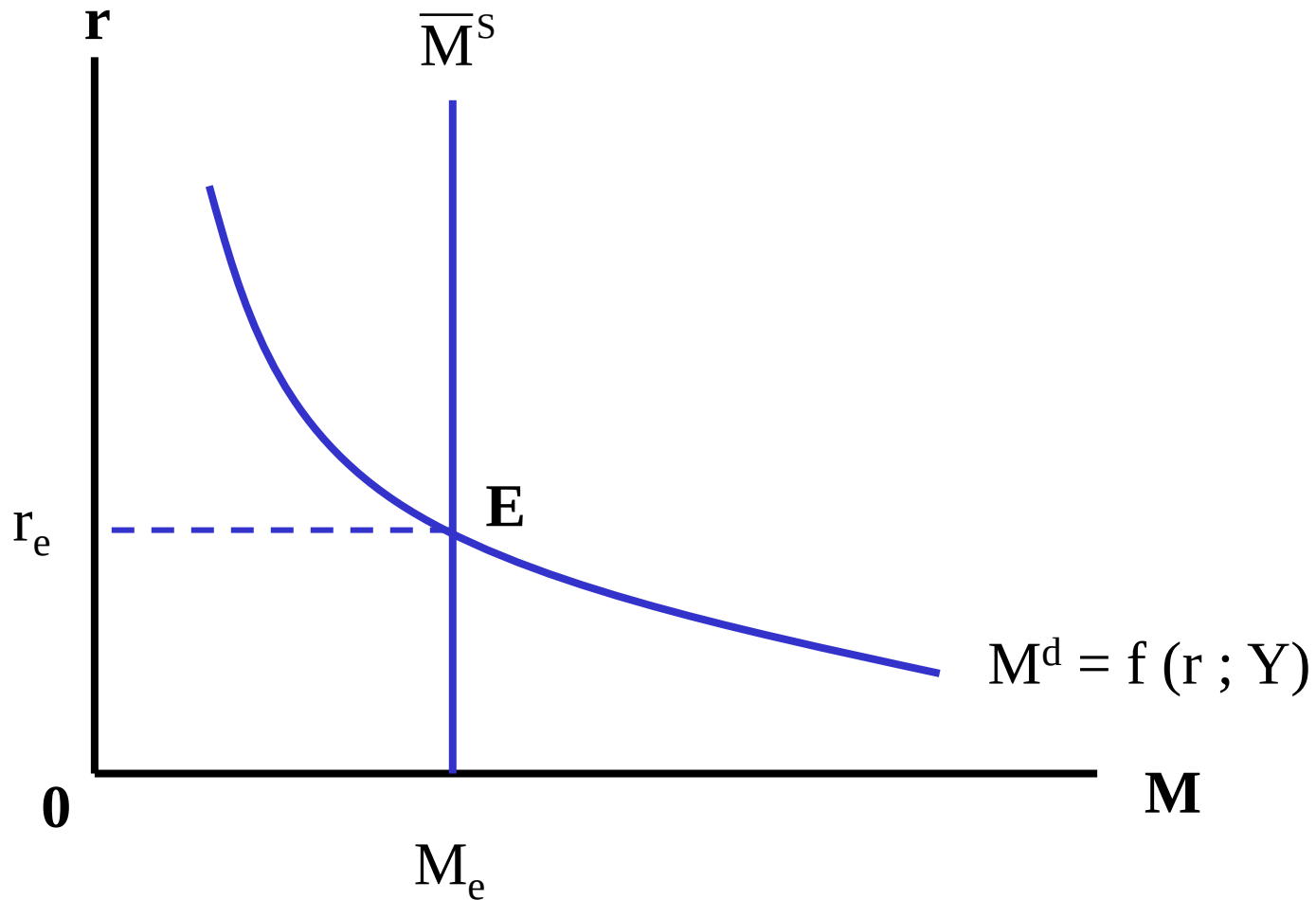
Classical Model of Real Interest Rate



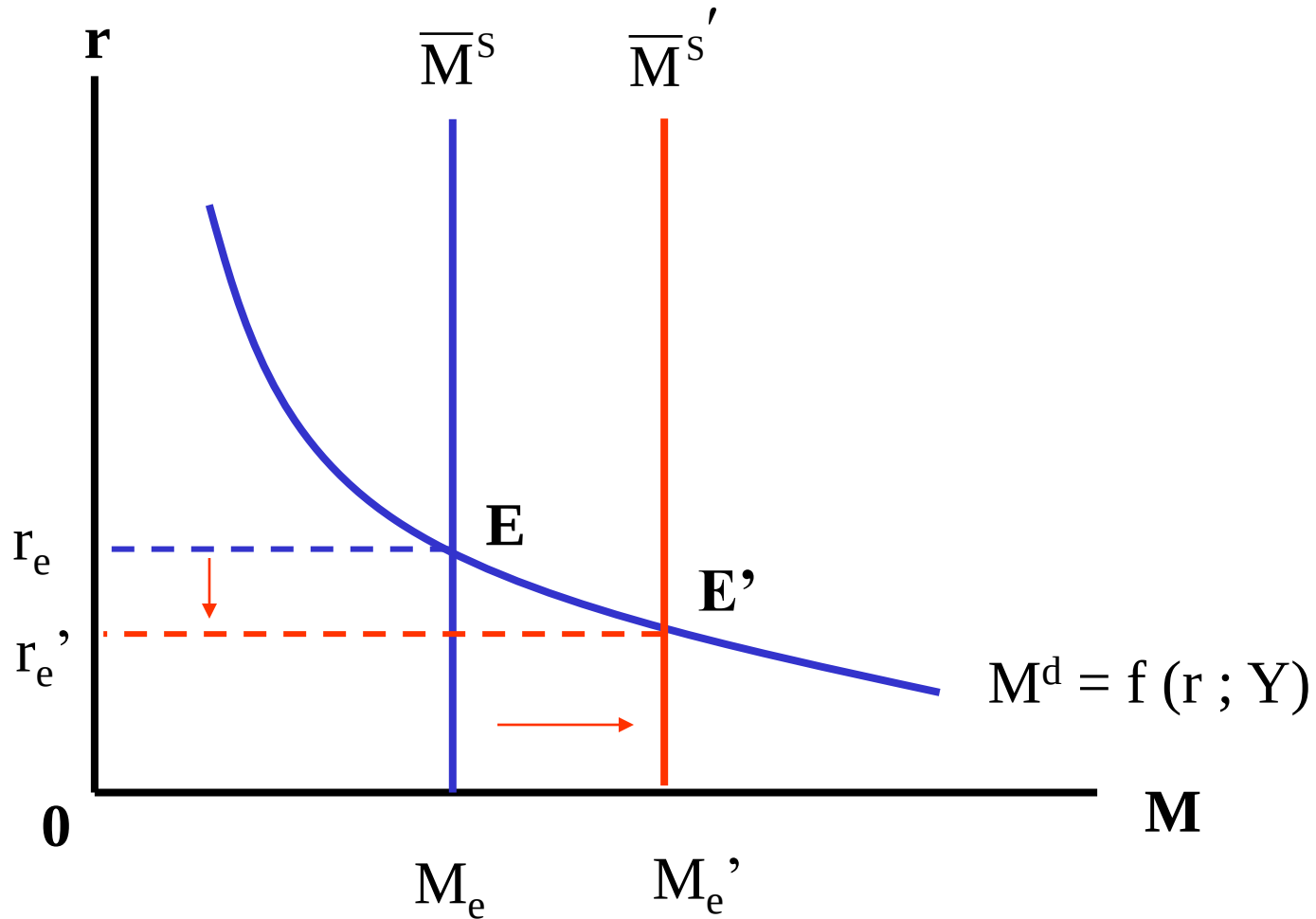
Classical Model of Real Interest Rate: An increase in productivity



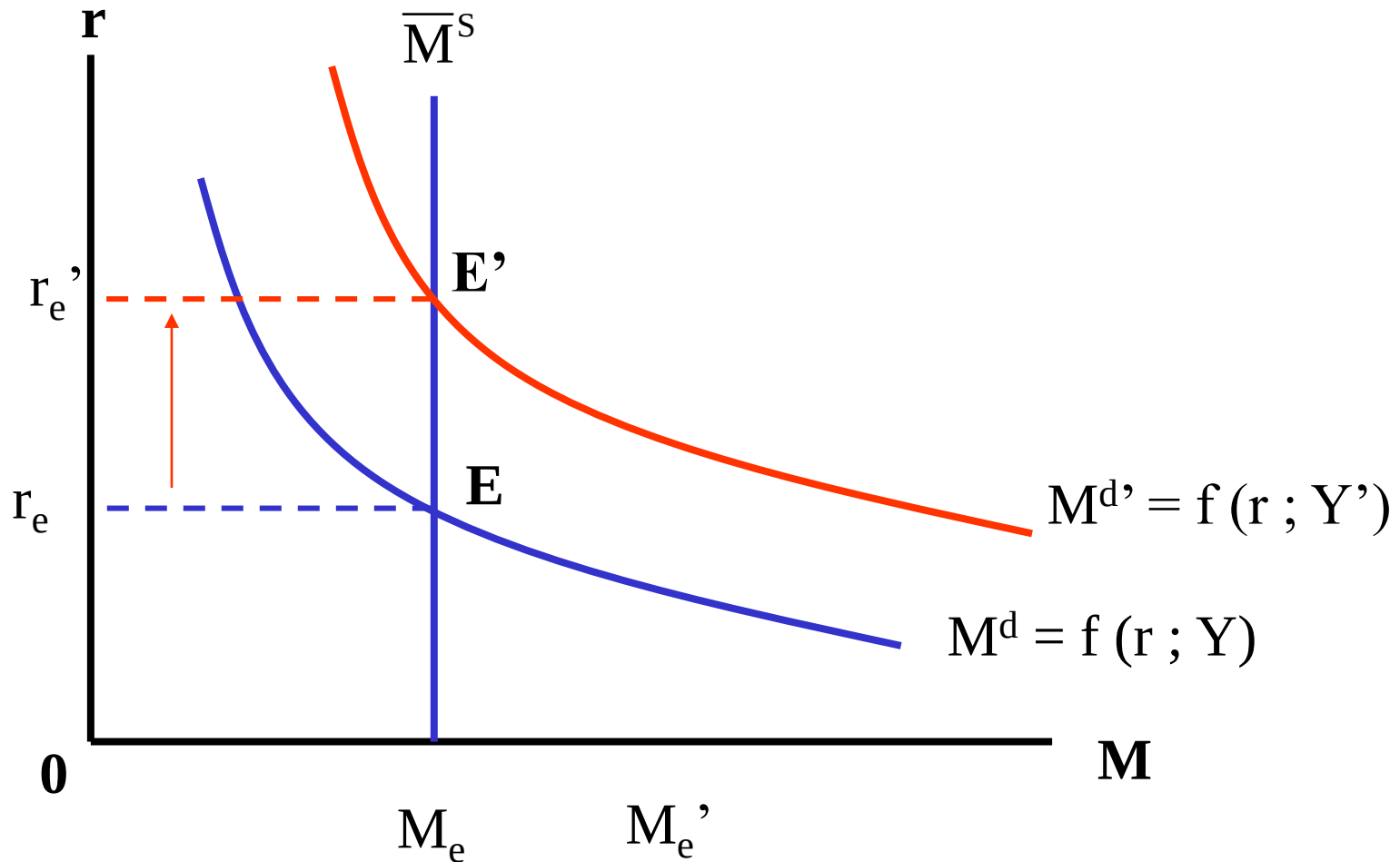
Keynesian Money Market Model



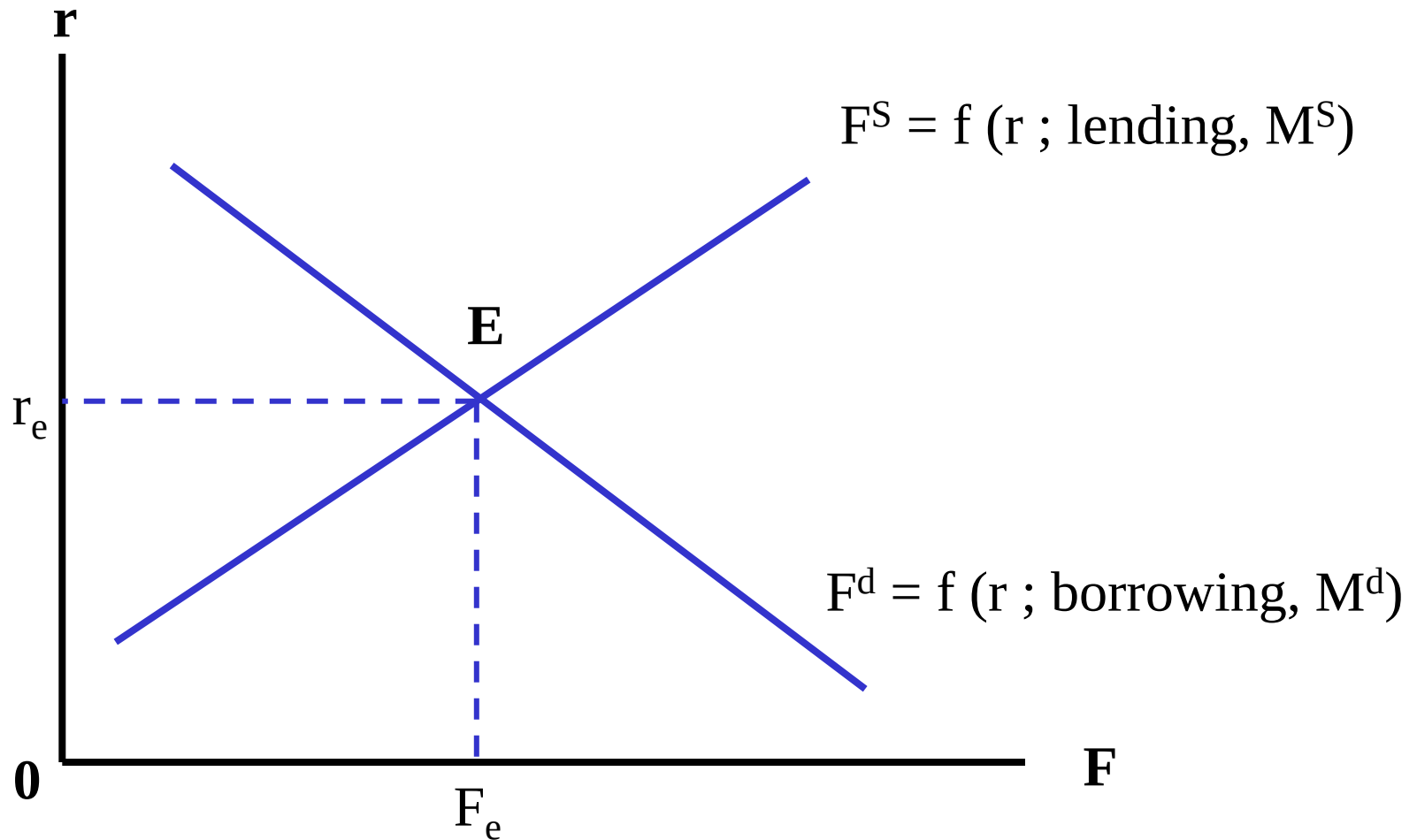
Keynesian Money Market Model: An increase in money supply by the central bank



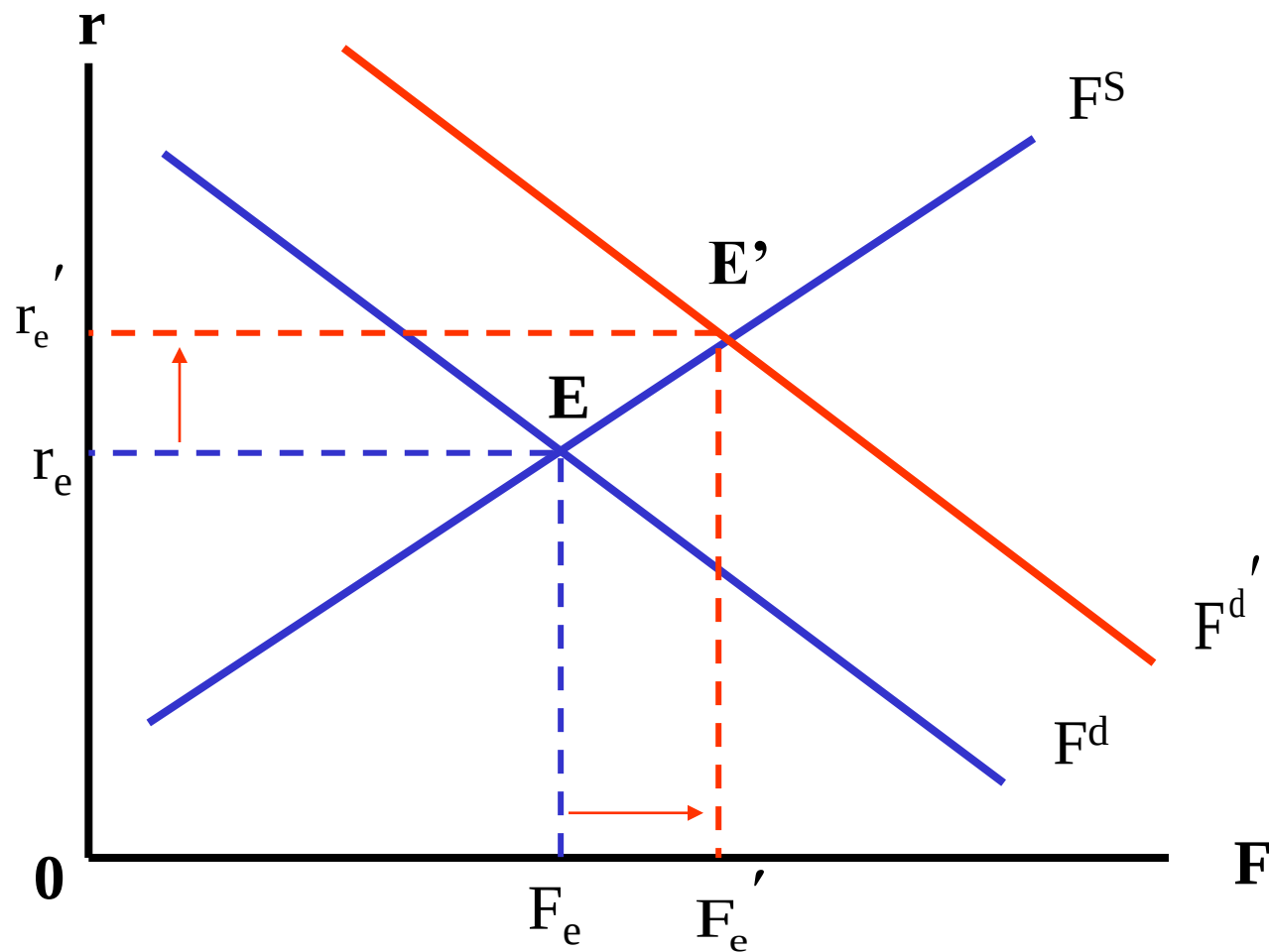
Keynesian Money Market Model: An increase in money demand resulting from a higher income level



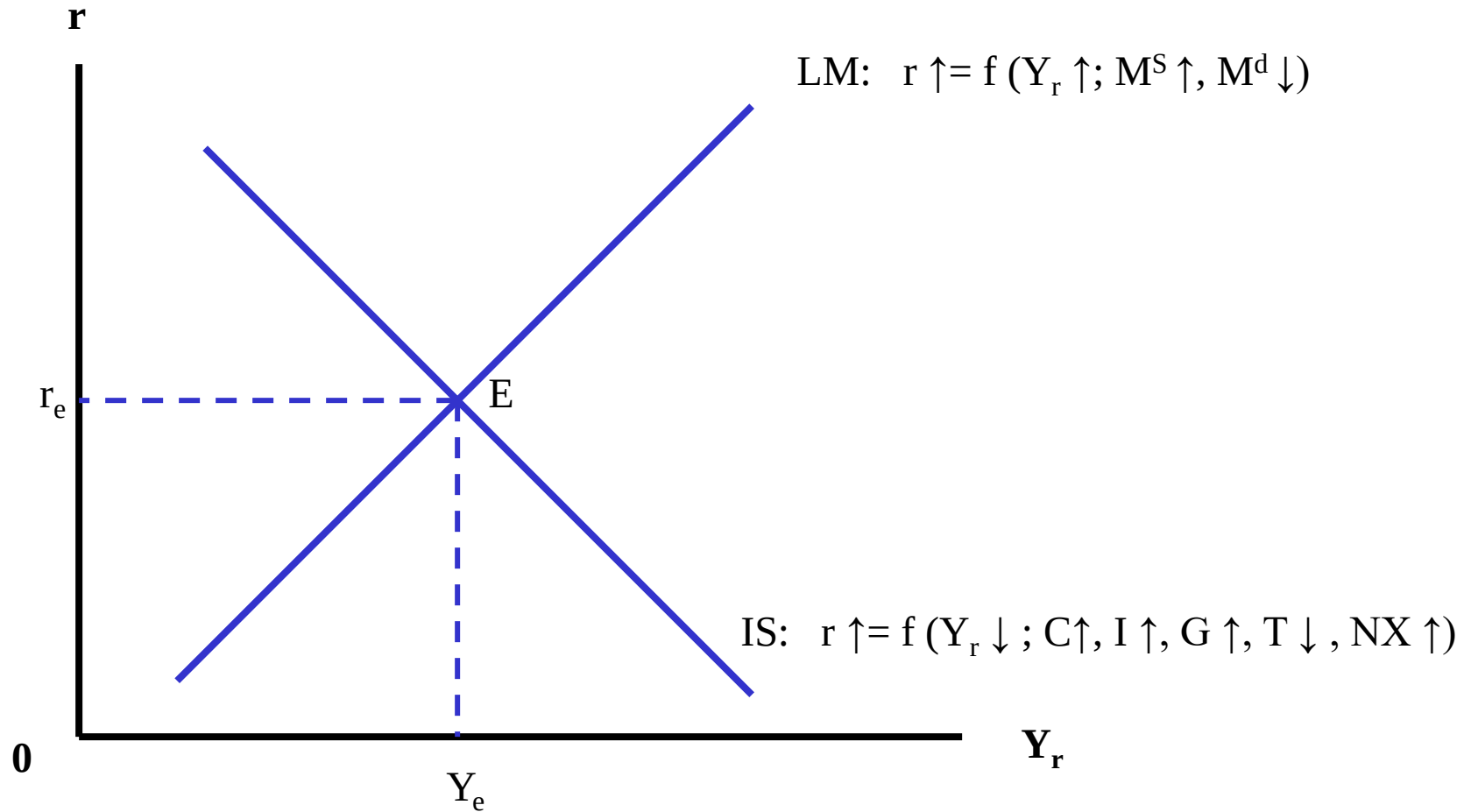
The Loanable Fund Model



The effect of a government bond issue on the level of market interest rates

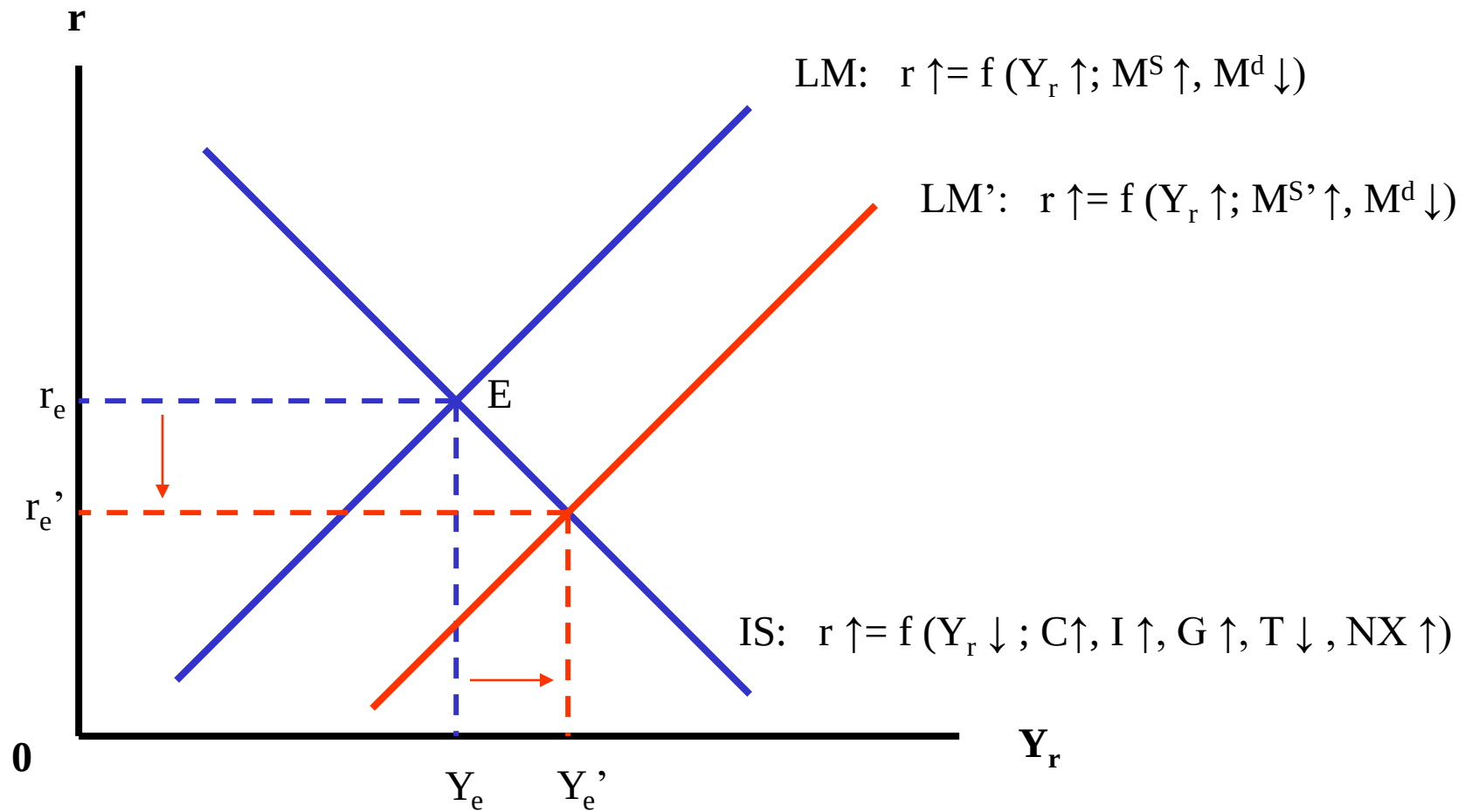


The Hicksian IS/LM Model



Hicks: Under full employment situations, we shall not attempt to use the IS/LM analysis.

The Hicksian IS/LM Model: An increase in money supply



Nominal versus real Interest Rates

Definition

The Fisher Equation of Interest:

$$\begin{array}{|c|} \hline \text{Nominal} \\ \text{interest rate} \\ \hline (r) \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Real} \\ \text{interest rate} \\ \hline (r_r) \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Expected} \\ \text{inflation rate} \\ \hline (\pi^e) \\ \hline \end{array}$$

Example: If both the borrower and lender to a loan (Maturity = one year, Principal = HK\$100, and interest rate = 10%) expect that inflation rate will be 10%. At the end of the interest period, in addition to repaying the principal of \$100 and paying the \$10 interest, the borrower must pay \$10 to compensate for the loss of purchasing power of the principal by 10%.

The real bank interest rates in Hong Kong

Bank deposits

Time period	Interest rate	Expected inflation rate	Real interest rate
1 Jan 2023 to 31 Dec 2023	3%	4%	-1%

Loss: The creditors (Savers: deposited their savings with Banks) who want to earn interest.

Benefit: The debtors (Banks: received deposits from savers to pay interest) who need to pay interest.

Bank loans

Time period	Residential mortgage interest rate	Expected inflation rate	Real interest rate
1 Jan 2023 to 31 Dec 2023	5%	4%	1%

Loss: The creditors (Banks: lent money to their clients) who want to earn interest.

Benefit: The debtors (Borrowers: borrower money from banks) who need to pay interest.

Thank you
for your attention!