

Fiscal & Financial System in Japan A

2010 Spring

Session 4 Interest Rates (Mishkin Ch.4)

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2. Money (continued)

M1

$$\begin{aligned} \text{M1} &= \text{Cash currency in circulation} \\ &+ \\ &\text{“Deposit money”} \\ &\quad \left\{ \begin{array}{l} \text{Demand deposits} \\ \text{Current deposits} \\ \text{Ordinary deposits} \\ \dots \\ \text{Checks \& Notes} \end{array} \right. \end{aligned}$$

Demand deposits can be converted into cash at almost no cost, thus are very close to cash currency in their function.



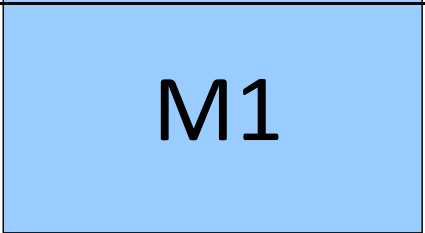
M2

$$\begin{aligned} \text{M2} &= \text{Cash currency in circulation} \\ &\quad + \\ &\quad \text{Deposit money} \\ &\quad + \\ &\quad \text{“Quasi-money”} \\ &\quad \quad \left\{ \begin{array}{l} \text{Time deposits} \\ \text{Foreign currency deposits} \end{array} \right. \\ &\quad + \\ &\quad \text{CD (Certificate of deposit)} \end{aligned}$$

Time deposits, CDs, and foreign currency deposits can be converted into cash at some but small cost, thus are relatively close to cash currency in their function.

Difference between M1 and M2

Financial products surveyed

	Cash currency Demand deposits	Time deposits Foreign currency deposits CDs
Bank of Japan Commercial Banks		 M2
Japan Post Bank Credit Unions	 M1	

M3 and L

M3 is a straight extension of M2.

M3 surveys the same range of financial products as M2, but a wider range of financial institutions than M2.

L surveys a wider range of financial products than M3, but the same range of financial institutions as M3

$$\begin{aligned} L = & M3 + \text{Pecuniary trusts} + \text{Investment trusts} \\ & + \text{Bank debentures} \\ & + \text{Straight bonds issued by banks} \\ & + \text{CPs issued by financial institutions} \\ & + \text{Government bonds} \\ & + \text{Foreign bonds} \end{aligned}$$

(type of money)

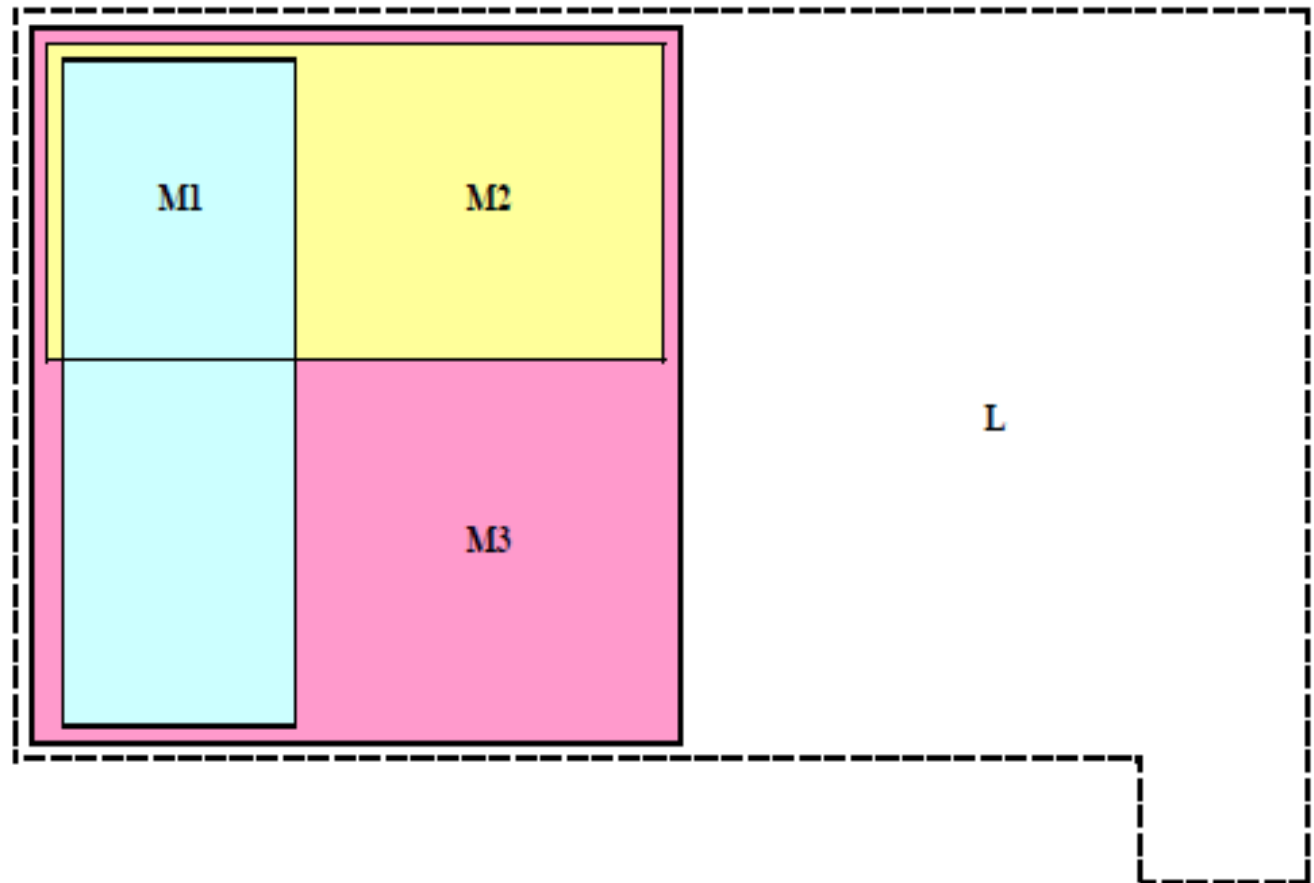
Cash Currency in Circulation Demand Deposits	Time Deposits etc. Foreign Currency Deposits CDs	Bank Debentures Straight Bonds issued by banks Pecuniary Trusts	Other Financial Products (Note 2)
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(money issuers)

Bank of Japan
domestic banks (ex. Japan Post Bank)
foreign banks in Japan
Shinkin banks
Shinkin Central Bank
Norinchukin Bank
Shoko Chukin Bank

Japan Post Bank
agricultural cooperatives
credit federations of agricultural cooperatives
fishery cooperatives
credit federations of fishery cooperatives
labour banks
Rokinren Bank
Shinkumi Banks
Shinkumi Federation Bank

insurance companies
Central Government
non-residents



Bank of Japan(2008), *Guide to Japan's Money Stock Statistics*

Japan's Money Stock (March 2010)

(average amounts outstanding, trillions of yen)

M1	487.9	
	Currency in circulation	Deposit money
	73.6	414.3
M2	766	
M3	1065.1	
L	1440.4	

3. Interest Rates

Types of Financial Instruments

Four different types of financial instruments

- | | |
|------|------------------------|
| Debt | (1) Simple loan |
| | (2) Fixed-payment loan |
| Bond | (3) Discount bond |
| | (4) Coupon bond |

Which one to choose for investment?

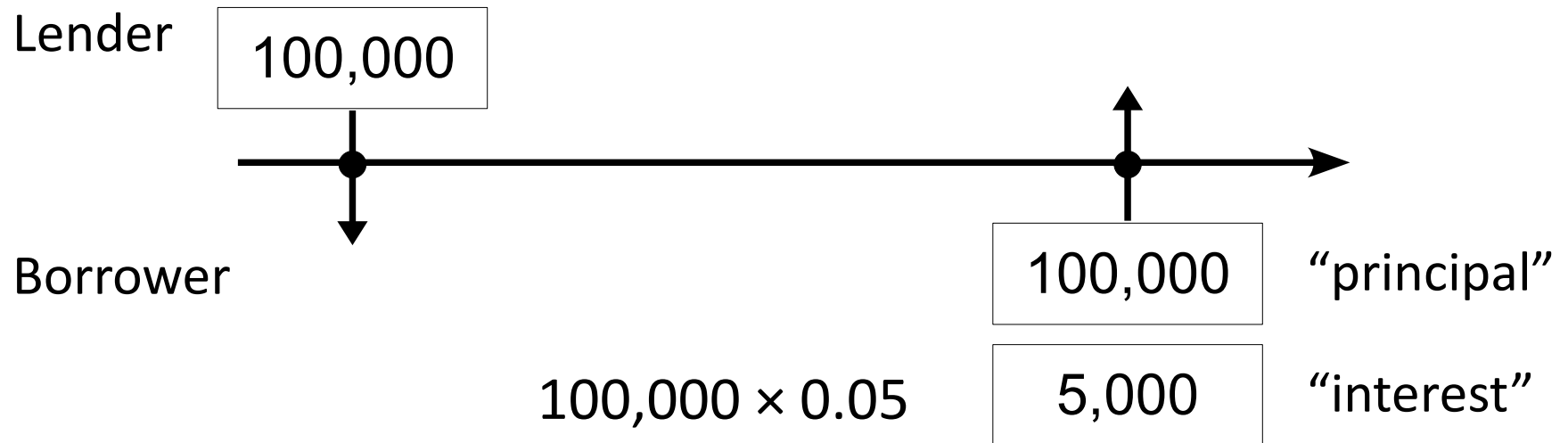
Which one to choose for borrowing?

“Profitability” --- how large income they earn

How do we measure the profitability?

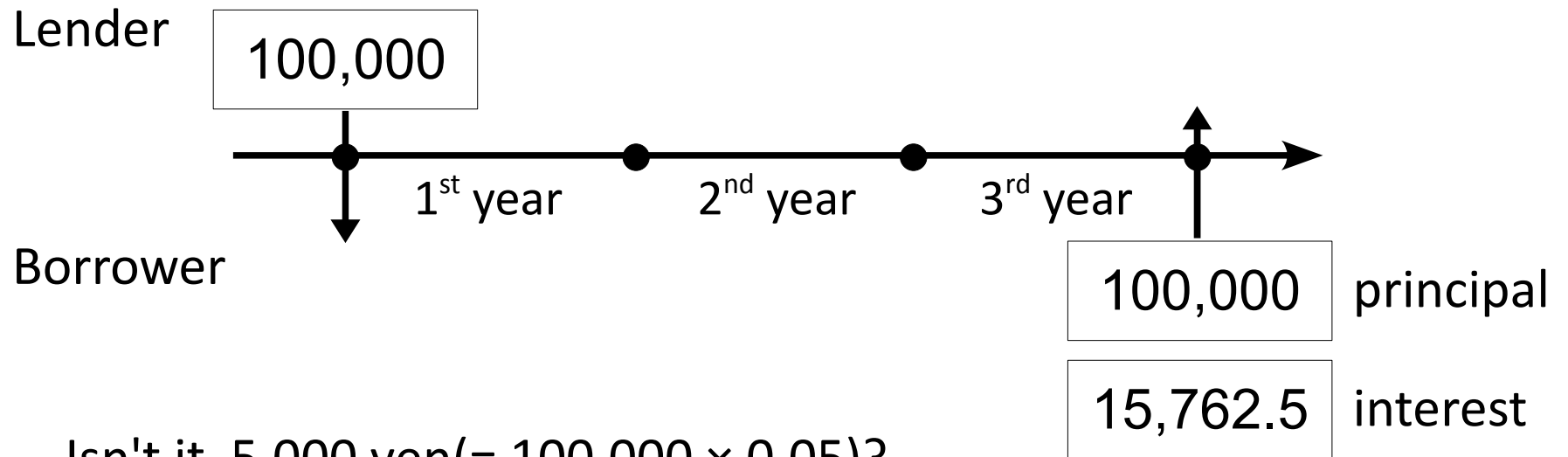
Simple Loan

A simple loan of 100,000 yen
with an annual interest rate of 5 %
and a maturity of one year



Simple Loan (2)

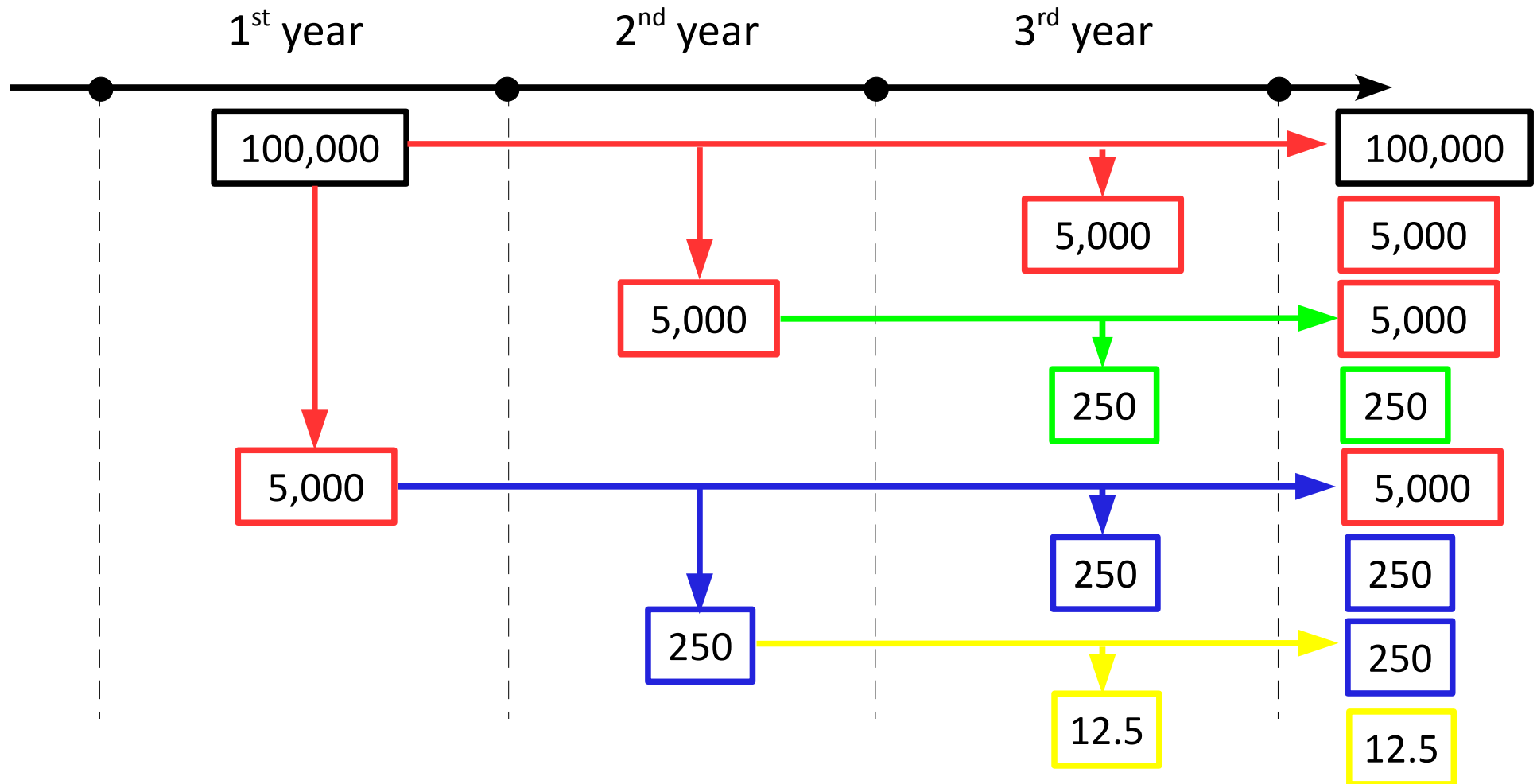
A simple loan of 100,000 yen
with an annual interest rate of 5 %
and a maturity of 3 years



Isn't it 5,000 yen(= 100,000 × 0.05)?

Isn't it 15,000 yen(= 5,000 + 5,000 + 5,000)?

Interests Compounded



Interests yield interests until the maturity.
Interests are compounded.

115,762.5

Calculation of Interests

At the end of the 1st year

$$100,000 + 100,000 \times 0.05 = 100,000 \times (1 + 0.05)$$

At the end of the 2nd year

$$[100,000 \times (1 + 0.05)] \times (1 + 0.05) = 100,000 \times (1 + 0.05)^2$$

At the end of the 3rd year

$$[100,000 \times (1 + 0.05)^2] \times (1 + 0.05) = 100,000 \times (1 + 0.05)^3$$

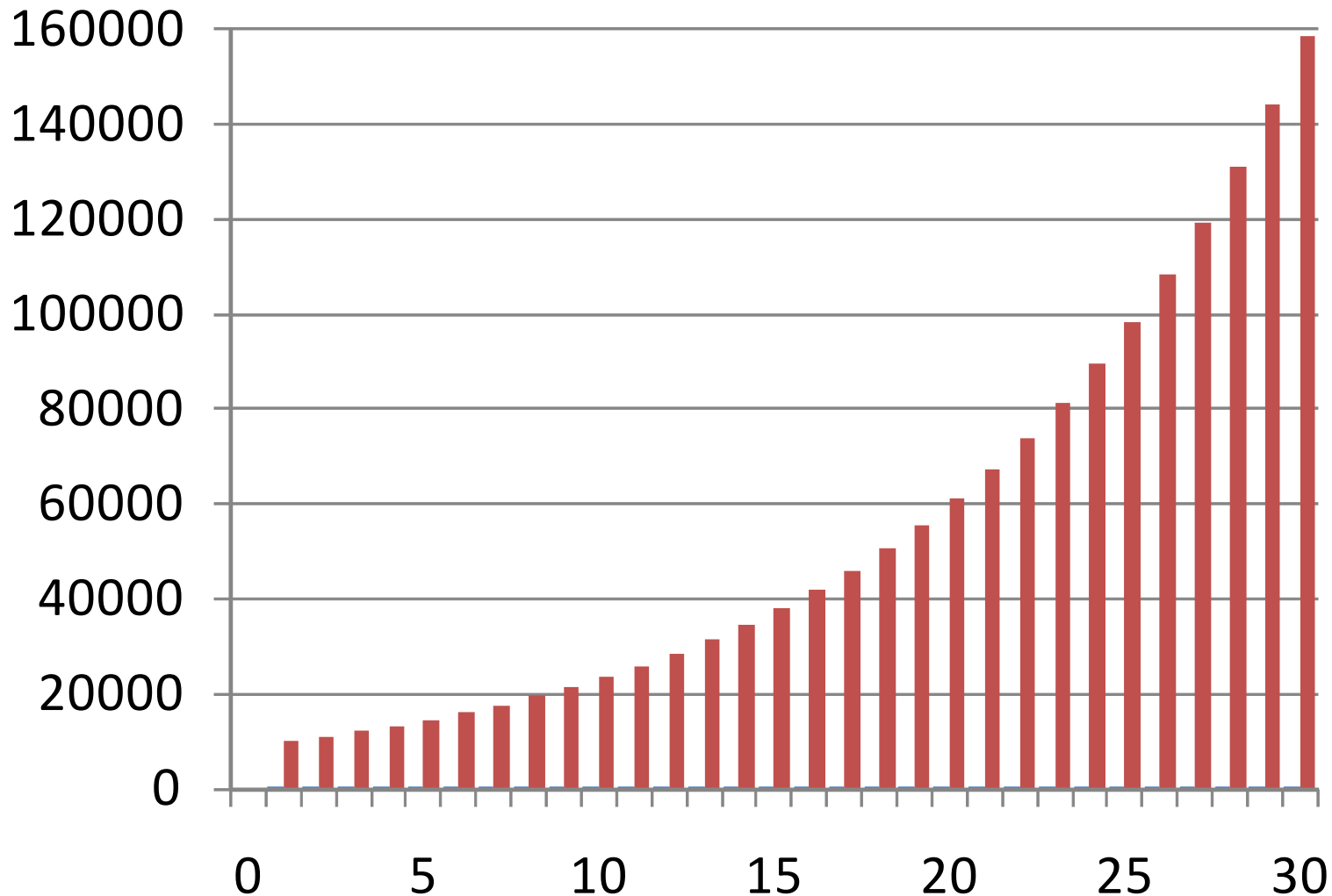
Formula for Calculation

If you make a simple loan of P yen
with an annual interest rate of i
and a maturity of n years,
he finally repays you ...

$$P \times (1 + i)^n$$

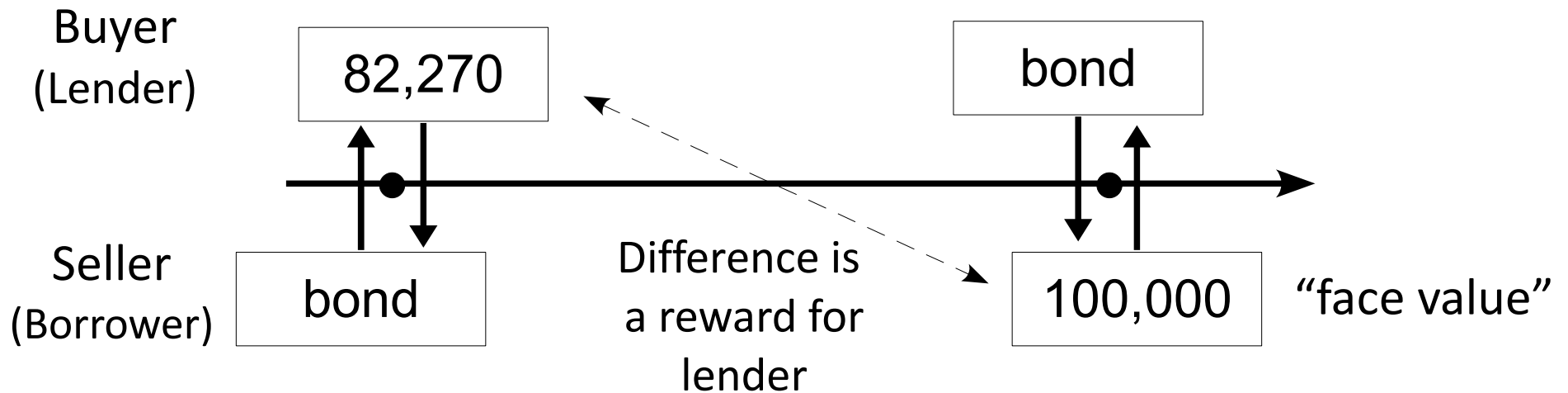
	year									
	1	2	3	4	5	6	7	8	9	10
0.01	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10
0.05	1.05	1.10	1.16	1.22	1.28	1.34	1.41	1.48	1.55	1.63
0.1	1.1	1.21	1.33	1.46	1.61	1.77	1.95	2.14	2.36	2.59

Annual Increments in Liabilities (with a 10-percent interest rate)



Discount Bond

If you buy a one-year discount bond sold at 82,270 yen with the face value of 100,000 yen ...

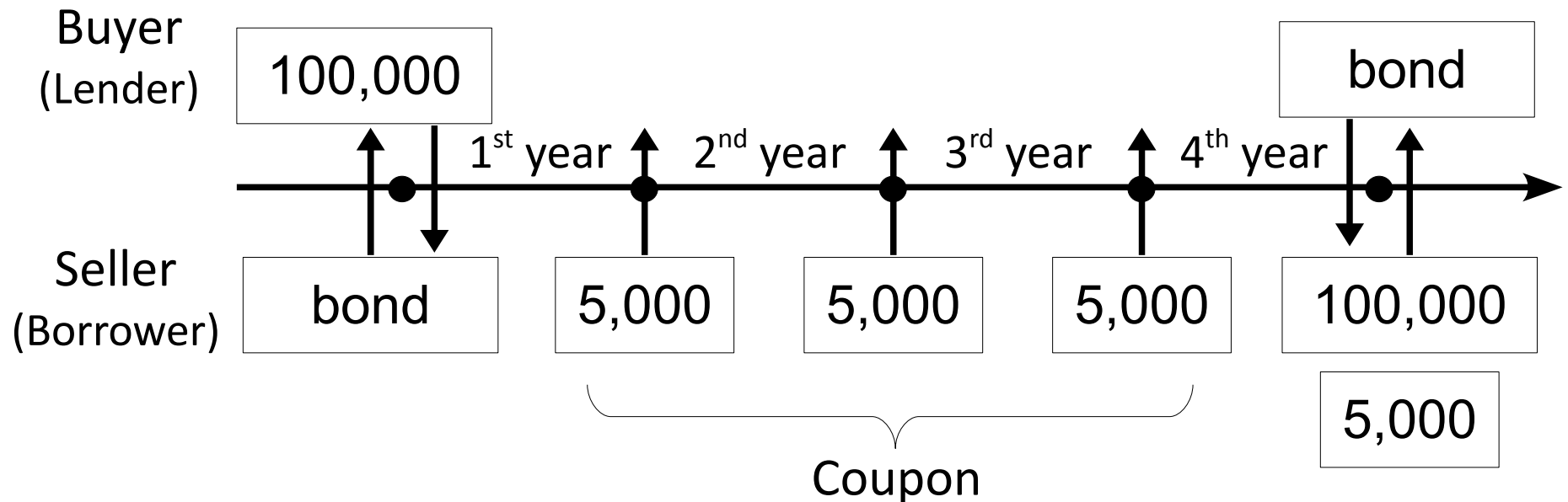


The issuer sells a bond at some market-determined price
“bond price”

which he promises to buy back at an initially specified price.
“face value”

Coupon Bond

If you buy a coupon bond with the face value of 100,000 yen, a coupon rate of 0.05, and a maturity of 4 years ...



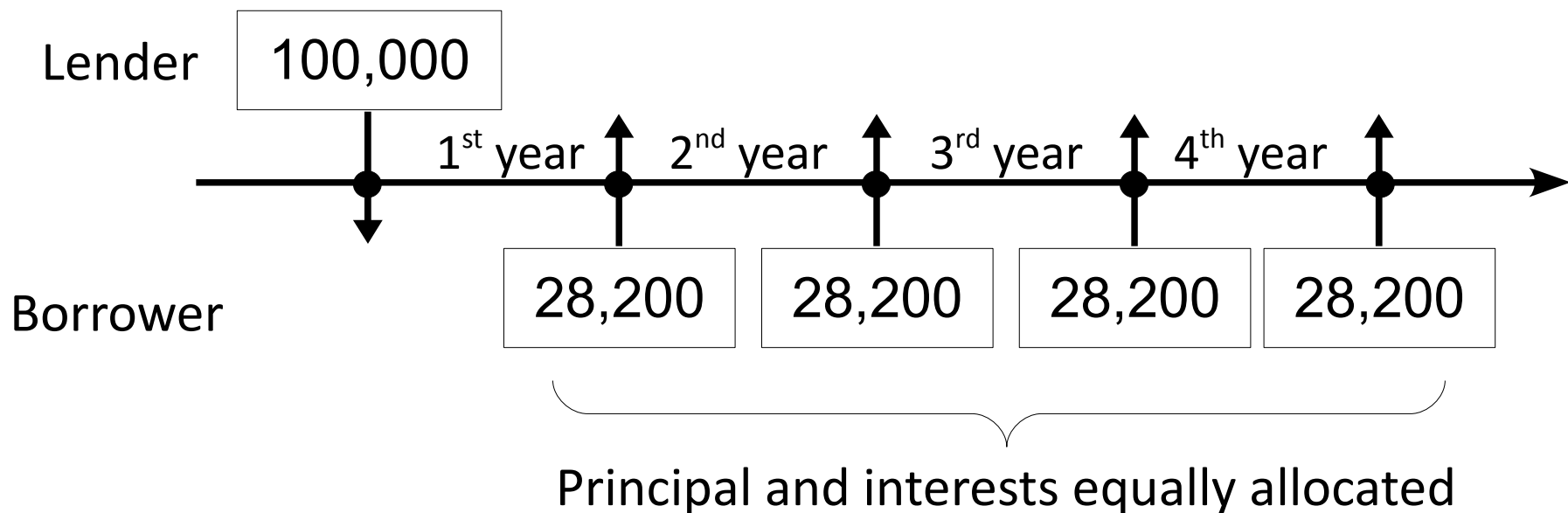
The issuer sells a bond at some initially specified price
“face value”

to the holder of which he promises to pay 5,000 yen every period, and
“coupon”

which he promises to buy back at the same price at the maturity.

Fixed-Payment Loan

If you make your friend a fixed-payment loan of 100,000 yen with a maturity of 4 years ...



Borrower repays the same fixed amount of money at every period which consists of the principal and interests.

No lump-sum payment at the maturity.