Fiscal and Financial System in Japan

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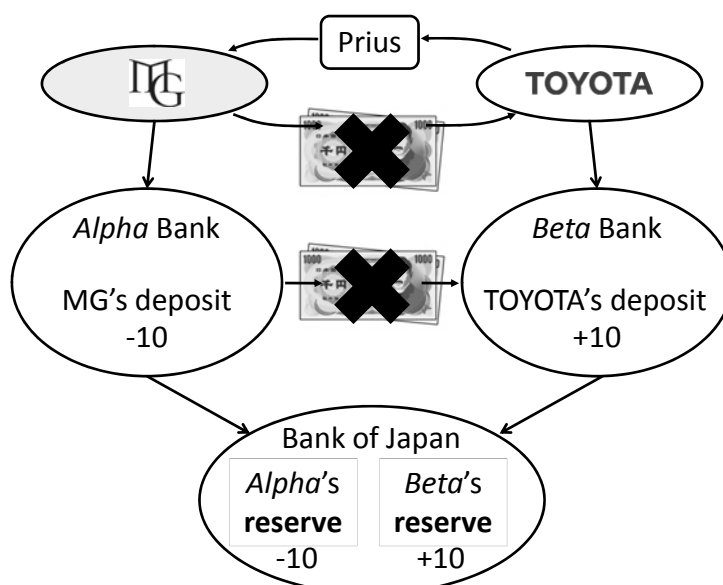
**MONEY SUPPLY PROCESSES (1)
MISHKIN CH.9, 15, 16**

Bank's Role in the Supply of Money

Deposits at banks are the largest component
of the money supply. (85% out of M1, April 09)

1 How is the supply of money determined?

   = How do BANKS create deposits?

2 How does the BOJ control the supply of money?

   = How does the BOJ affect the process of creation?

3

Deposits in the Process of Settlement

Prius

TOYOTA

Alpha Bank

MG's deposit
-10

Beta Bank

TOYOTA's deposit
+10

Bank of Japan

Alpha's **reserve**	*Beta*'s **reserve**
-10	+10

4

Banks and Balance Sheets

5

Bank's Balance Sheet

Balance sheet lists …

{ the sources of bank funds (liabilities)
  the uses to which the funds are put (assets)

Liabilities and assets always BALANCE.

ASSETS	LIABILITIES
Reserve Deposits at BOJ + Vault cash	Deposits

Securities
    Government securities +
    other securities
	Borrowings
	    BOJ loan (official discount loan),
	    loans from other banks

Loans	Bank Capital

6

Reserves

Reserves do not pay interest.
Then, why do banks hold reserves?

Because banks are legally required to hold
a certain fraction of deposits as reserves.

REQUIRED RESERVE RATIO

Reserves can be easily converted into cash
(highly liquid) and can be used to meet their
obligation when depositors withdraw funds.

7

EXAMPLE

ALPHA BANK

ASSETS		LIABILITIES	
Reserve	¥18 billion	Deposits	¥180 billion
Securities	¥10 billion	Borrowings	¥15 billion
Loans	¥182 billion	Bank Capital	¥15 billion

8

T-account

T-ACCOUNT lists "changes" in balance sheet items from an initial balance sheet.

EXAMPLE: I decide to open an account at *Alpha Bank* with ¥100,000 in cash.

ALPHA BANK

ASSETS	LIABILITIES
Reserve +¥100	Deposits +¥100

QUESTION: What if I decide to close this account? How does T-account look like?

9

EXAMPLE: MG buys Prius from TOYOTA.

MG		TOYOTA	
Prius +10		Prius -10	
deposit		deposit	
at *Alpha* -10		at *Beta* +10	

Alpha Bank		*Beta* Bank	
reserve -10	MG's deposit -10	reserve +10	Toyota's deposit +10

Bank of Japan	
	Alpha's reserve -10
	Beta's reserve +10

10

Bank of Japan, Commercial Banks,
and Multiple Creation of Deposits

11

Bank of Japan's Balance Sheet

ASSETS	LIABILITIES
Government Securities	Reserves
Discount Loans	Currency in Circulation

Monetary Base (MB)

The BOJ can increase/decrease the monetary base
and affect the amount of deposits at commercial banks.

EXAMPLE: What if the BOJ makes ¥100 million of loan to
　　　　　Alpha Bank?
　　　　　Assume that the required reserve ratio is 10%.

12

Bank of Japan

loan	+100	reserve	+100

BOJ lends ¥100 million to *Alpha Bank*.

Alpha Bank

reserve	+100	BOJ loan	+100
loan	+100		
reserve	-100		

Alpha Bank lends 100 to B Corporation, which has an account at *Beta Bank*.

Beta Bank

reserve	+100	deposit	+100
loan	+90		Increase in deposits
reserve	-90		

Beta Bank lends an excess reserve of 90 to C Construction, which has an account at *Gamma Bank*.

13

Gamma Bank

reserve	+90	deposit	+90
loan	+81		Increase in deposits
reserve	-81		

Gamma Bank lends an excess reserve of 81 to D Store, which has an account at *Delta Bank*.

Delta Bank

reserve	+81	deposit	+81
loan	+72.9		Increase in deposits
reserve	-72.9		

Delta Bank lends an excess reserve of 72.9 to Mr.E, who has an account at *Epsilon Bank*.

Epsilon Bank

reserve	+72.9	deposit	+72.9
			Increase in deposits

The process continues …

14

Sum of increases in deposits =

$$100 \quad + 90 \quad + 81 \quad + 72.9 \quad + \cdots$$

Any regularity?

Beta 100

Gamma $(100 - 100 \times 0.1) = \boxed{100 \times (1 - 0.1)}$

Delta $[100 \times (1 - 0.1) - 100 \times (1 - 0.1) \times 0.1]$

$$= 100 \times (1 - 0.1) \times (1 - 0.1) = \boxed{100 \times (1 - 0.1)^2}$$

Epsilon $[100 \times (1 - 0.1)^2 - 100 \times (1 - 0.1)^2 \times 0.1]$

$$= 100 \times (1 - 0.1)^2 \times (1 - 0.1) = \boxed{100 \times (1 - 0.1)^3}$$

15

Sum of increases in deposits =

$$100 + 100 \times (1 - 0.1) + 100 \times (1 - 0.1)^2 + 100 \times (1 - 0.1)^3 + \cdots$$

$$\boxed{\begin{array}{c} a + a \times r + a \times r^2 + a \times r^3 + a \times r^4 + \cdots = \dfrac{a}{1 - r}, \\[2mm] if \ -1 < r < 1. \end{array}}$$

Applying the formula (with $a = 100, r = 1 - 0.1$)

$$\frac{100}{1 - (1 - 0.1)} = \frac{100}{0.1} = 100 \times 10 = 1{,}000$$

16

8

Increase in money supply $= \dfrac{100}{0.1} = 100 \times \boxed{\dfrac{1}{0.1}}$

An increase in deposits are 10 times as large
as an initial increase in the monetary base.

(Simple) Money Multiplier

Inverse of required reserve ratio

What if all the borrowers withdraw some of
the deposits and hold cash currency?

17

An increase in deposits at a bank causes
an equal amount of increase in its reserve.

But …
a "required" increase in reserve is 10 % of
an increase in deposits, and 90% is excess
reserve which the bank does not want to hold.

Therefore …
the bank lends the excess reserve to some individuals
or corporations, increasing deposits at other banks.

$\boxed{\text{initial increase in MB}} < \boxed{\text{total increase in deposits}}$

18

Brief Review of the Course

1. Roles of Financial Markets
    → How do they help us be better off?

2. Functions and Definitions of Money
    → Medium of Exchange, Unit of Account, Store of Value
        Three Definitions of Money Stock by BOJ

3. Interest Rates
    → How can we calculate interest rates?
        What do yields to maturity mean?

19

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4. Determination of Interest Rates
    → How is the equilibrium interest rate determined?
        When and how does the interest rate change?

5. Term Structure of Interest Rates
    → Three Empirical Facts about Yield Curves
        Expectations Theory, Segmented Markets Theory,
        Liquidity Premium Theory

6. Money Supply Processes
    → T-account, Process of Multiple Deposit Creation,
        Money Multiplier

Midterm exam will also be a hint.

20

Final Exam

The final exam is held at 9:20-10:20 on July 21.
(As was scheduled at the beginning of the course.)

The volume is reduced to about 60% of the midterm.
(No extra time)

The final exam covers all of the lectures.
(The lectures before the midterm are also covered.)

21