Fiscal & Financial System in Japan A

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Session 8

Movements in Interest Rates

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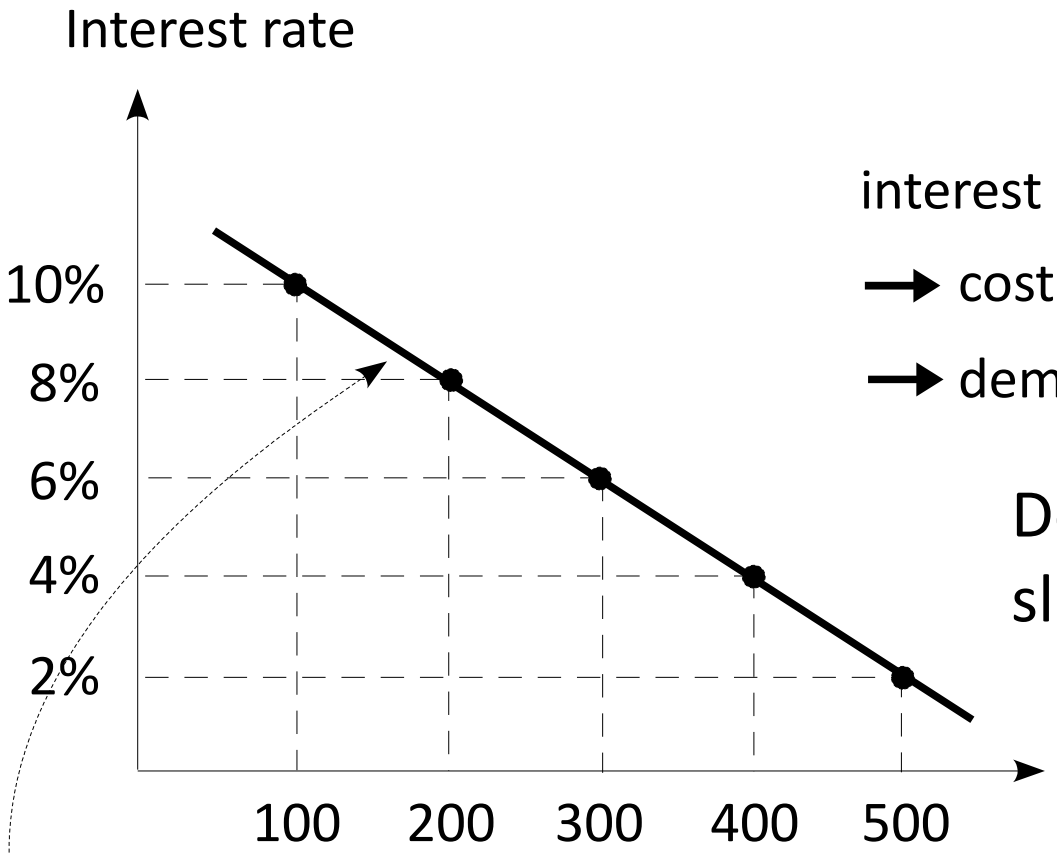
Review1: Demand for Money



interest rate ↓

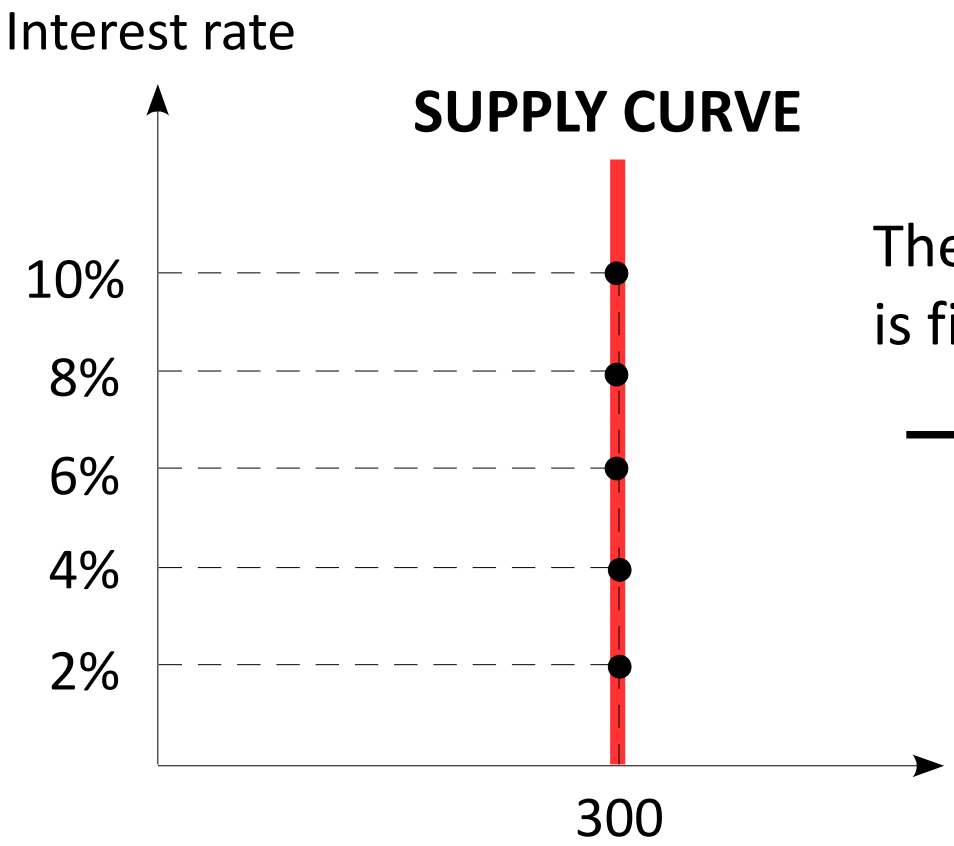
→ cost of holding money ↓

→ demand for money ↑

Demand curve for money slopes <u>downward</u>.

DEMAND CURVE:
The quantity of money people <u>desire</u> to hold at each level of interest rate

Review2: Supply of Money

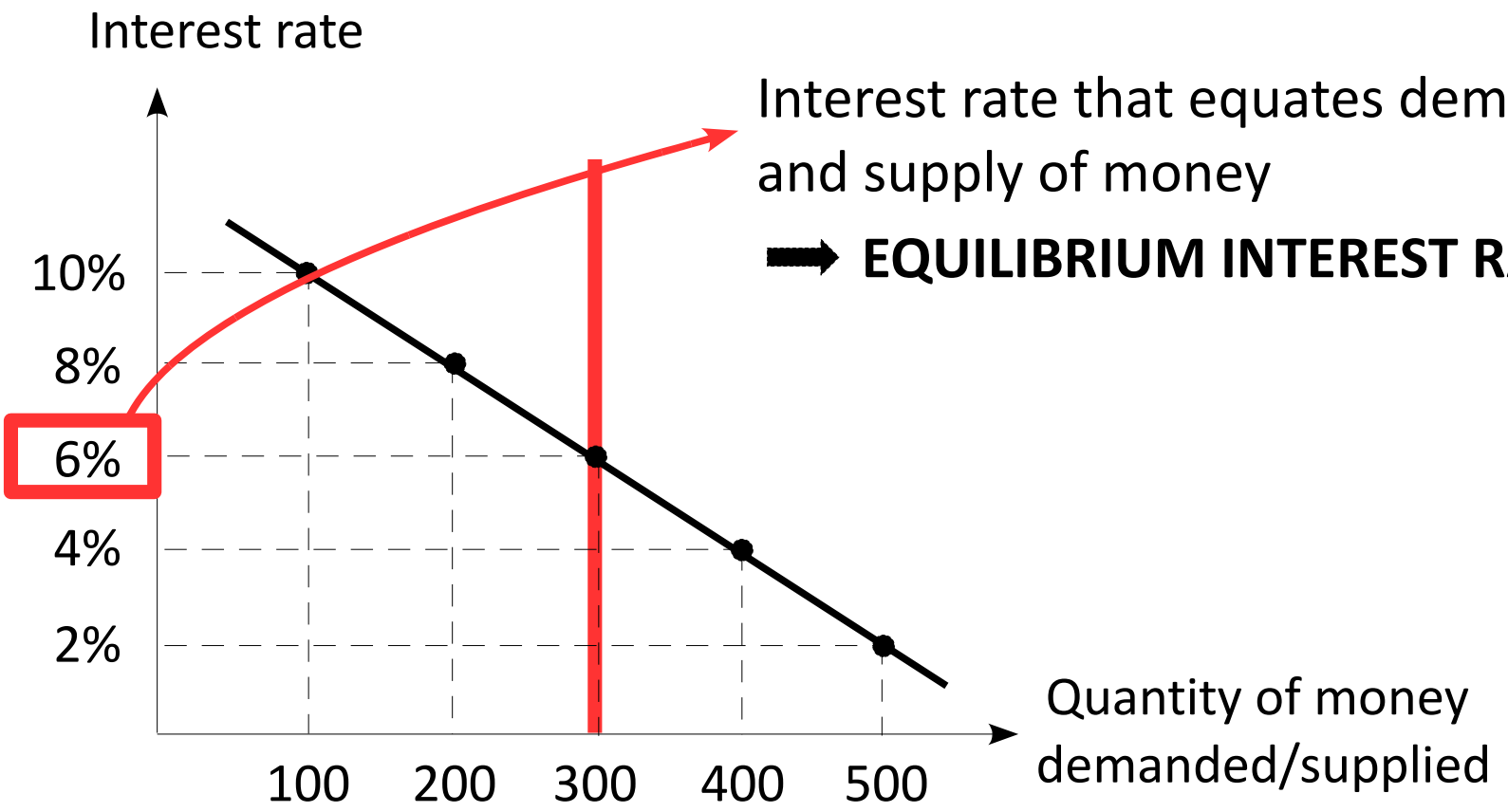


The quantity of money that we can hold is fixed, regardless of interest rates.

→ The supply curve is <u>vertical</u>.

Supply of money is controlled by the central bank, which bases its action on policy consideration, and hence is never affected by interest rates.

Review3: Equilibrium Interest Rate



Economic theory says that interest rate is “determined” at the equilibrium level.

Review3: Why Equilibrium?

(1) Because, at any other level of interest rate, people hold more/less money than they want, they try to sell/buy bonds and the market automatically starts to move toward the equilibrium .

(2) Once the market reaches the equilibrium, people hold the quantity of money that they want, and there is no motive to sell or buy bonds. The bond price, and thus interest rate, stays unchanged.

Markets "justify" the equilibrium interest rate alone.

We should pay attention to the equilibrium interest rate.

5. Movements in Interest Rates (Mishkin Ch.5)

Behavior of Interest Rates

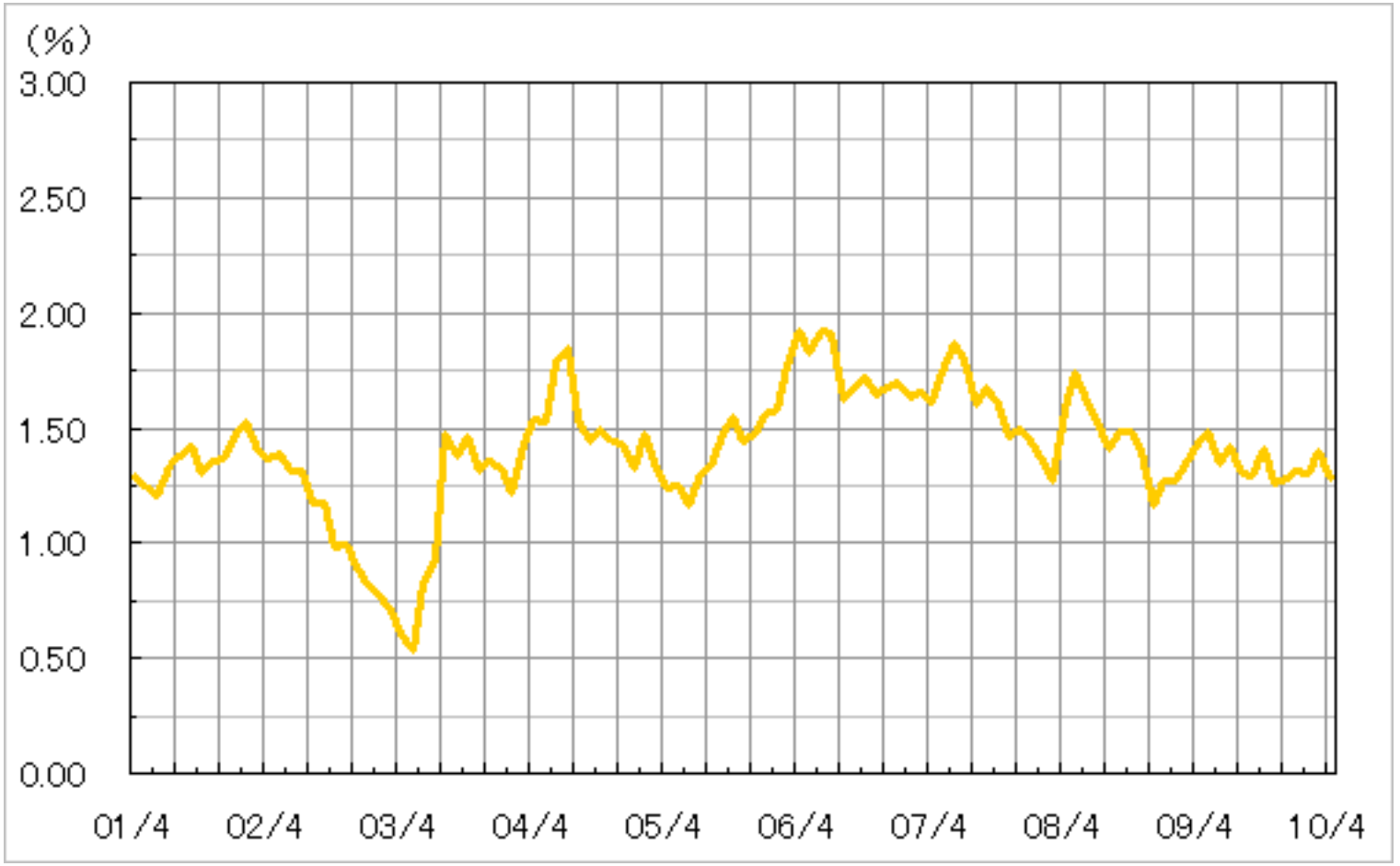


Figure: Long-term JGB yield (10-year newly issued bond)

Source: Japan Bond Trading Co., Ltd.
http://www.bb.jbts.co.jp/data/index_kinri.html

Changes in Interest Rates

Changes in interest rates we observe everyday are ...

NOT the process toward the equilibrium

BUT the changes in equilibrium itself

1. Does the equilibrium interest rate need to change SO FREQUENTLY?

The environment surrounding us changes every minute,
thus affecting desirable composition of our wealth,
therefore our demand for money.

The (equilibrium) interest rate is always pressured to change.

2. Do interest rates change SO QUICKLY?

Because we have already accumulated so large an amount of bonds, there will immediately be so large an amount of bond sales/purchases, which rapidly affects the price, and thus the interest rate.

The market “jumps” to the new equilibrium.
The market is always at the equilibrium,
and there is hardly no “interim period” where interest rates are off the equilibrium.

Changes in Equilibrium

What causes the equilibrium to change?

Shifts in demand and supply curves

What causes demand and supply curves to shift?

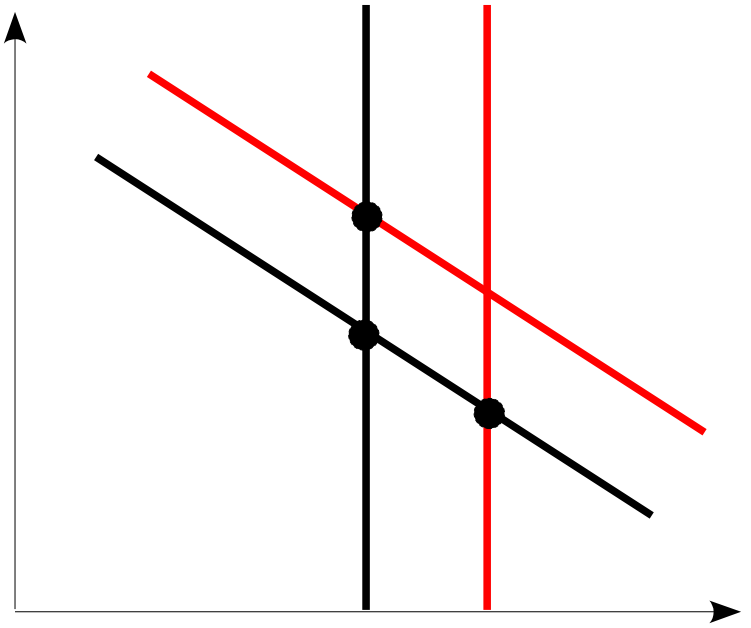
(1) Shifts in demand curve

a. Changes in income

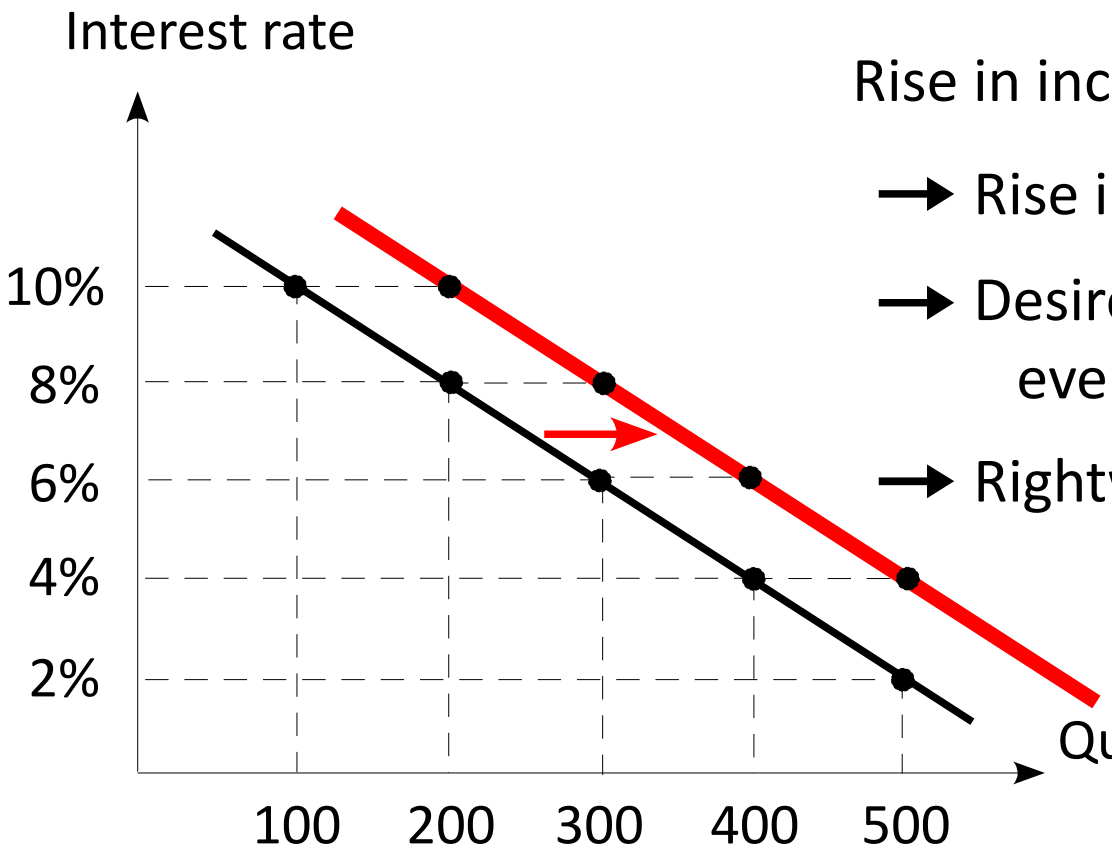
b. Changes in price level

(2) Shifts in supply curve

Changes in money supply



Changes in Income



Rise in income

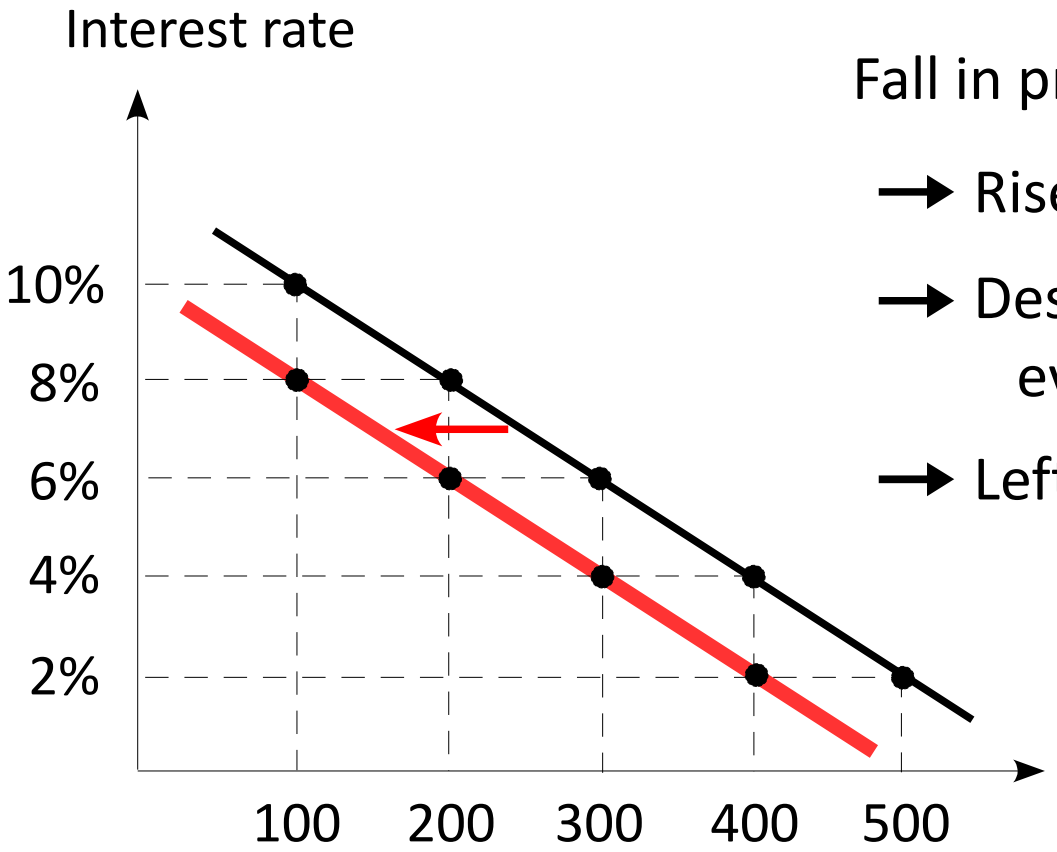
→ Rise in transactions

→ Desire to hold more money even at the same interest rate

→ Rightward shift of demand curve

Rises in income shift money demand curve to the right.
Falls in income shift money demand curve to the left.

Changes in Price Level



Fall in price level

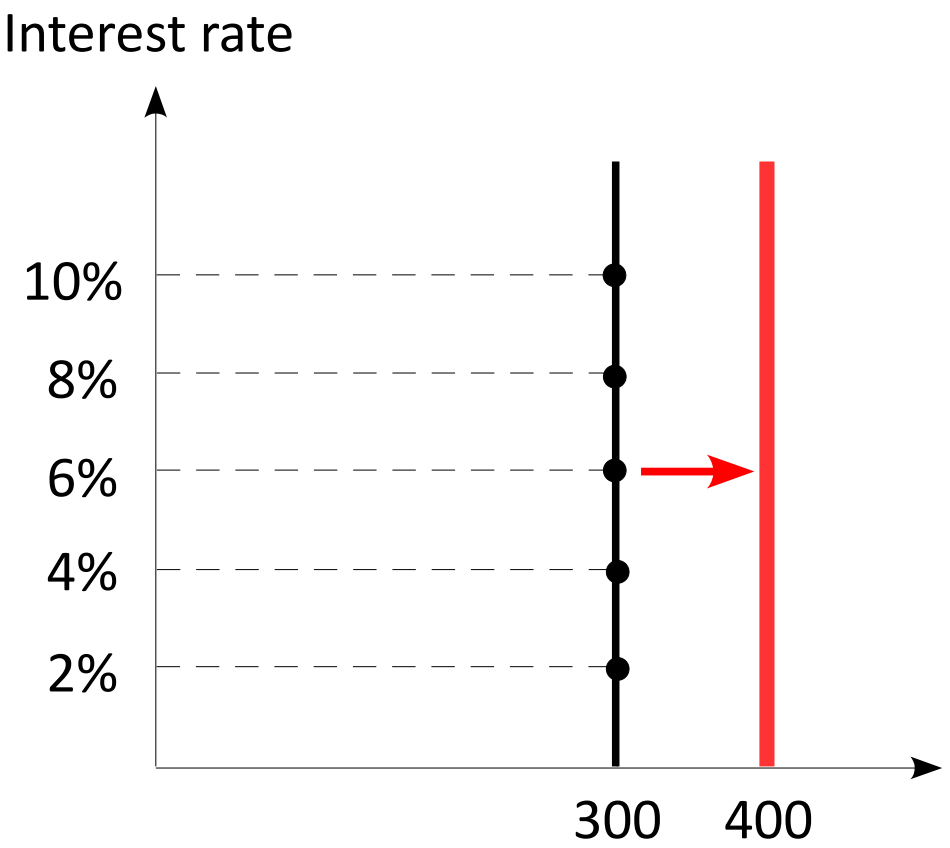
→ Rise in purchasing power

→ Desire to hold less money even at the same interest rate

→ Leftward shift of demand curve

Rises in price level shift money demand curve to the right.
Falls in price level shift money demand curve to the left.

Changes in Money Supply



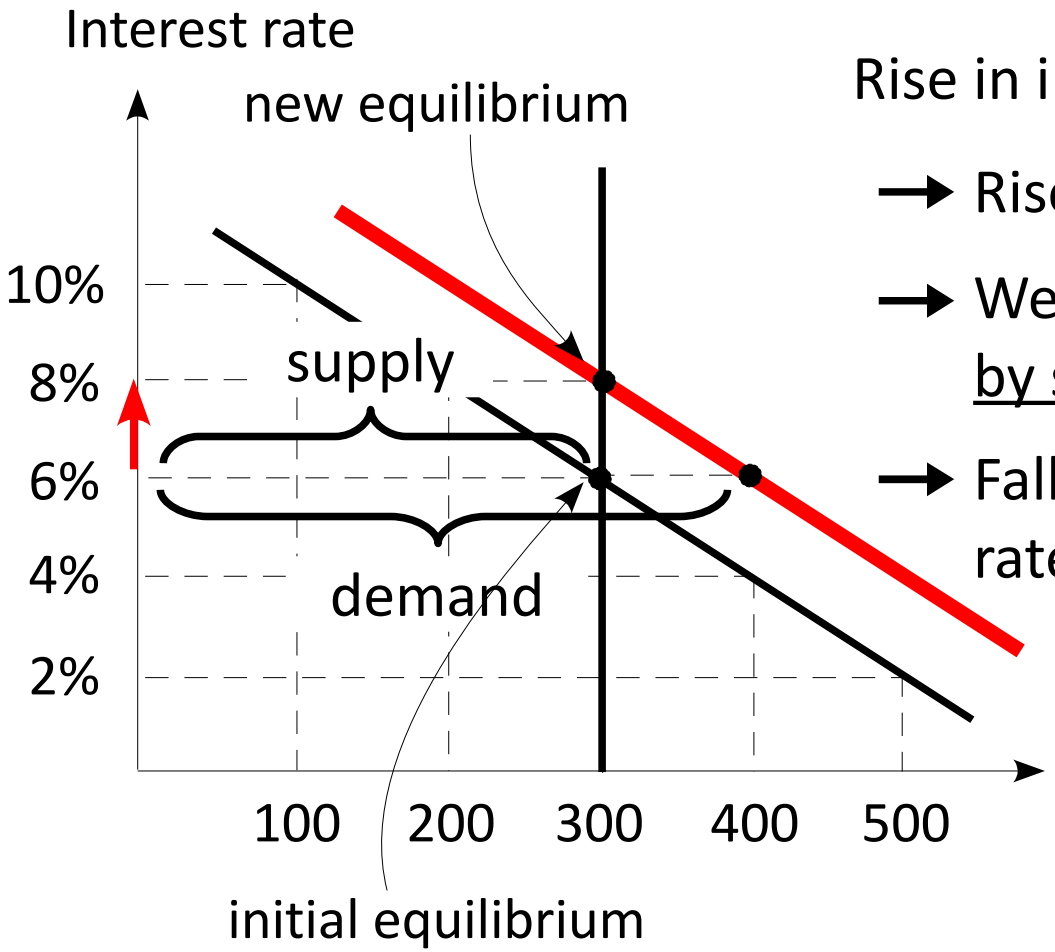
The central bank controls the stock of money in the economy.

On policy consideration, it increases or decreases the money stock.

Increases in money supply shift the supply curve to the right.

Reductions in money supply shift the supply curve to the left.

Income Effects on Interest Rates



Rise in income

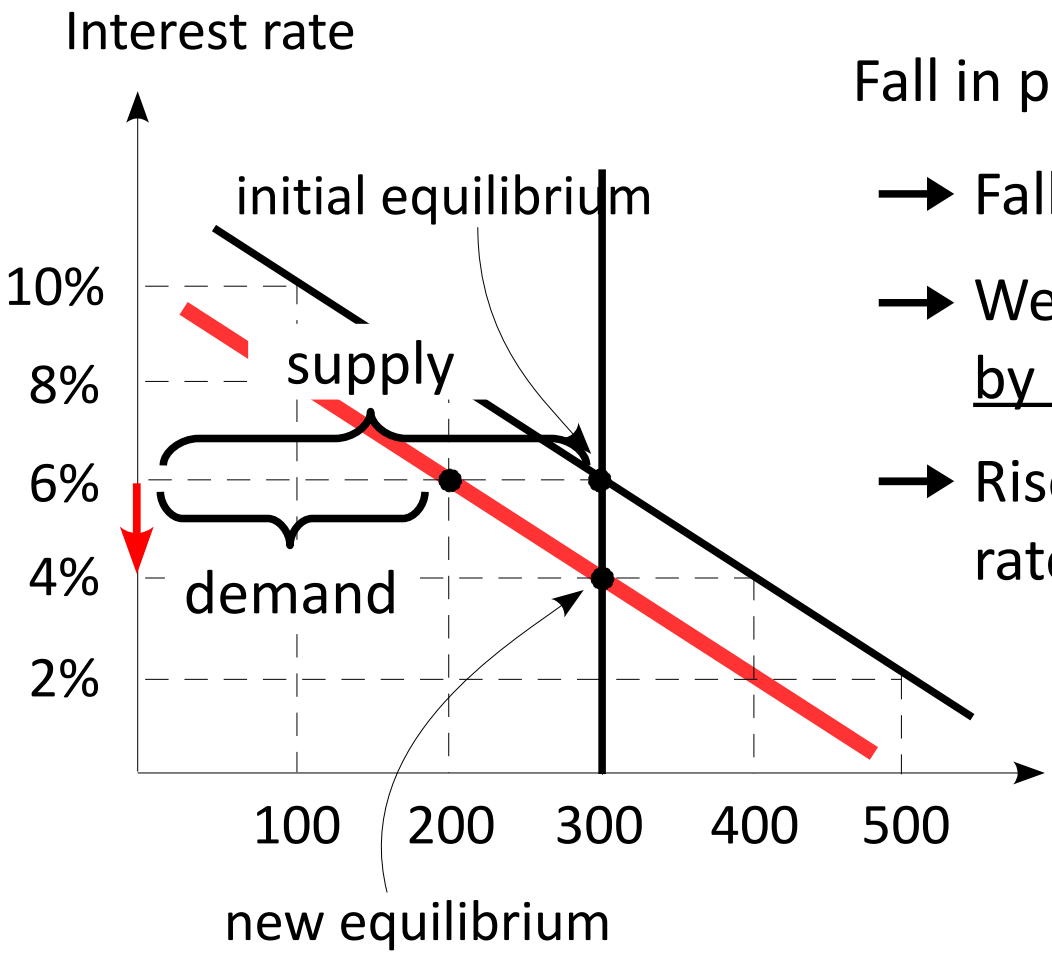
→ Rise in demand at the initial rate

→ We try to hold more money <u>by selling bonds</u>

→ Fall in bond price, rise in interest rate

Rises(falls) in income drive the (equilibrium) interest rate up(down).

Price Level Effects



Fall in price level

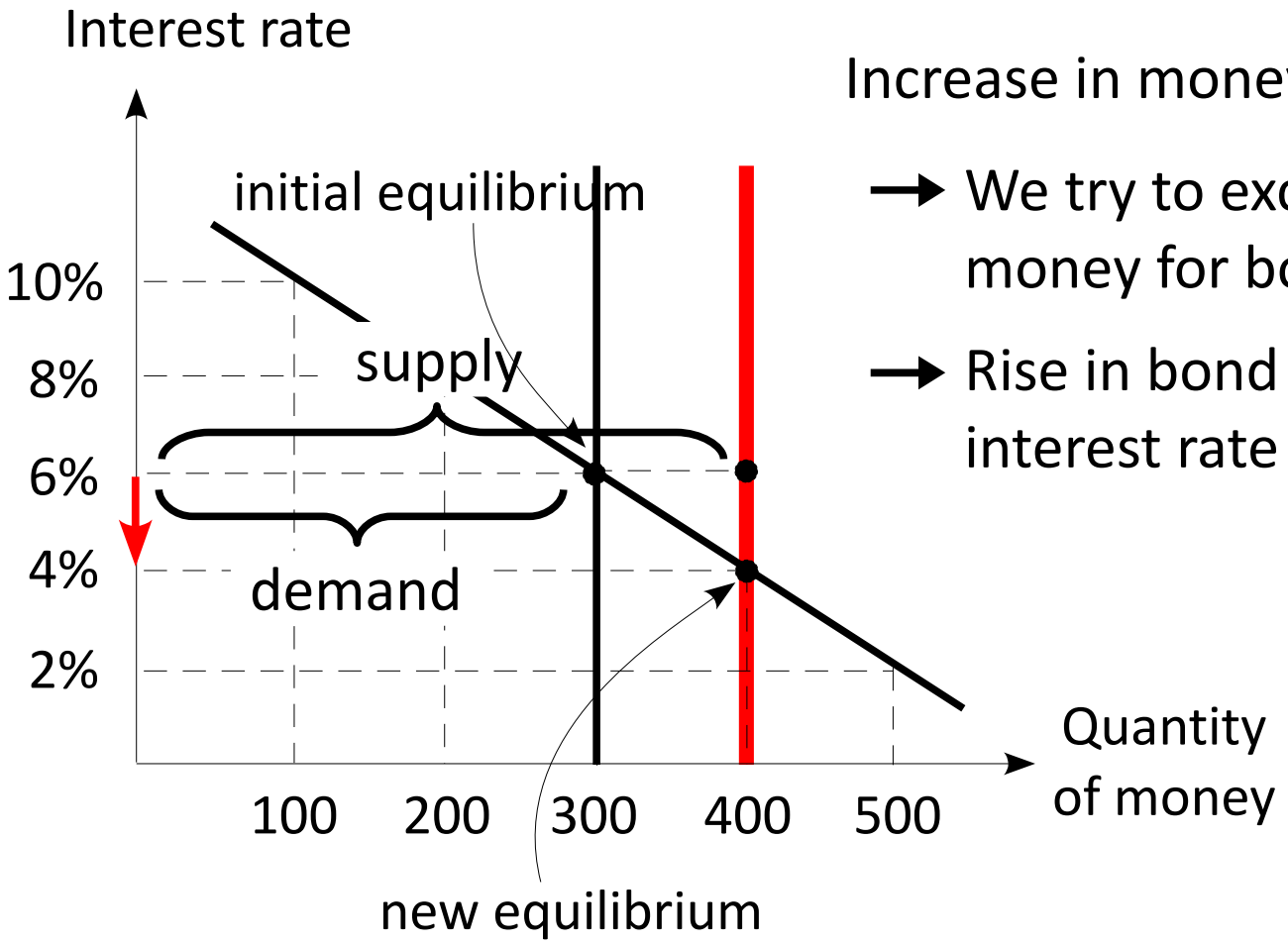
→ Fall in demand for money

→ We try to hold less money by buying bonds

→ Rise in bond price, fall in interest rate

Rises(falls) in price level drive the (equilibrium) interest rate up(down).

Money Supply Effects



Increase in money supply

→ We try to exchange the excessive money for bonds

→ Rise in bond price, fall in interest rate

Rises(falls) in money supply drive the interest rate down(up).

Conclusion

The (equilibrium) interest rates change as the levels of income, prices, or money stock changes.

Income ↑ (↓)	(Equilibrium) Interest rate ↑ (↓)
Prices ↑ (↓)	(Equilibrium) Interest rate ↑ (↓)
Money supply ↑ (↓)	(Equilibrium) Interest rate ↓ (↑)

Appendix: Walras' Law

We have been focusing on how money market finds its equilibrium.

But how about bond market?

Should we focus also on bond market?

No, by Walras' Law.

(* Leon Walras … A French economist in the 19th century)

B_S Outstanding stock of bonds = Supply of bonds

B_D Desirable quantity of bond holding = Demand for bonds

M_S Outstanding stock of money = Supply of money

M_D Desirable quantity of money holding = Demand for money

$$B_S + M_S = B_D + M_D$$

"Demand must be equal to wealth."
Simply a budget constraint,
which must always be satisfied.

Rearranging and collecting terms...

$$(M_S - M_D) + (B_S - B_D) = 0$$

implying

$$M_S - M_D < 0 \quad \leftrightarrow \quad B_S - B_D > 0$$

$$M_S - M_D > 0 \quad \leftrightarrow \quad B_S - B_D < 0$$

$$M_S - M_D = 0 \quad \leftrightarrow \quad B_S - B_D = 0$$

When money market is in equilibrium,
bond market is also in equilibrium.

We can focus only on money market.

6. The Term Structure of Interest Rats (Mishkin Ch.6)

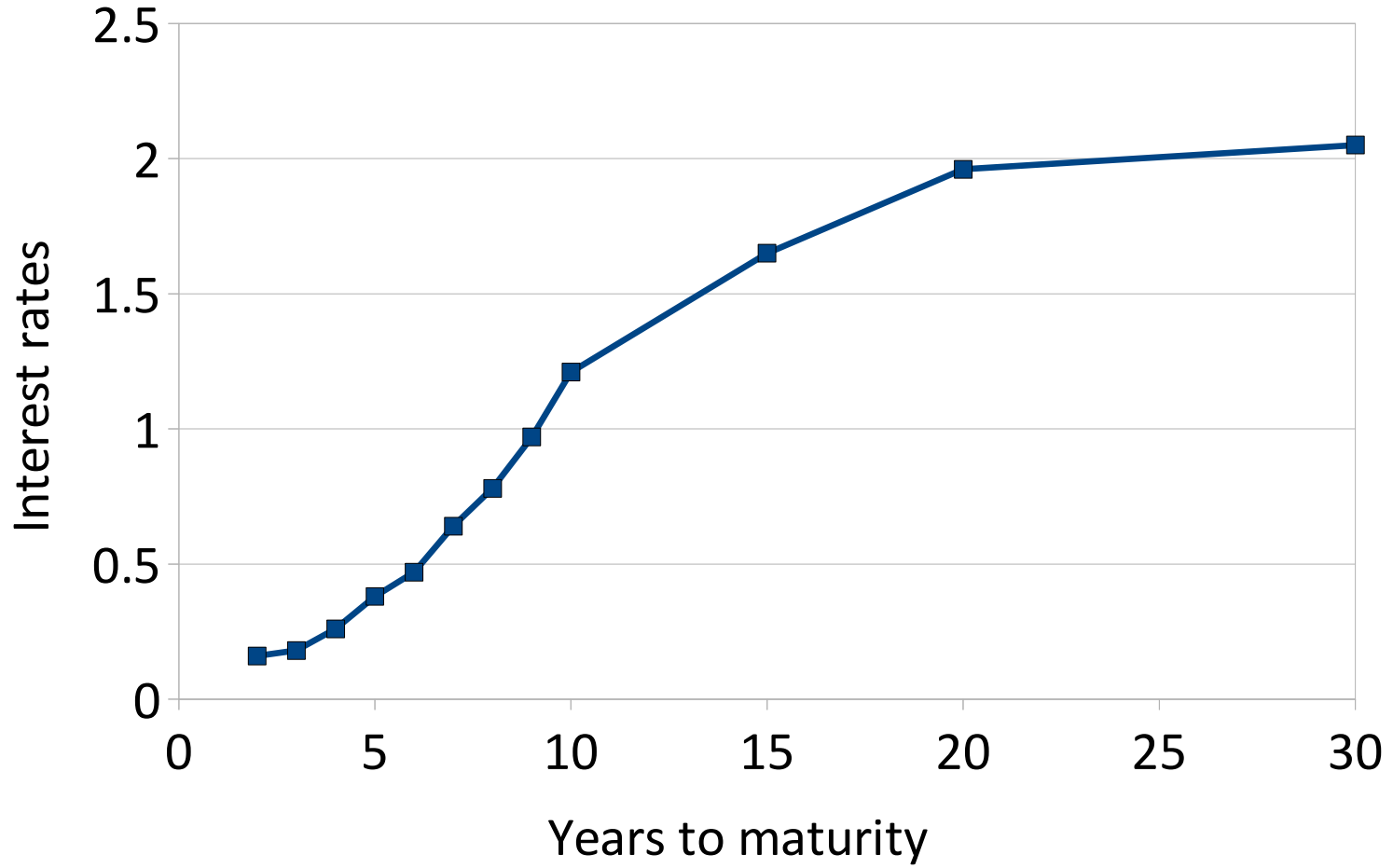
Interest rates on Japanese government bonds
(as of June 9, 2010)

Years to maturity	Maturity date	Interest rate
2	06/15/2012	0.16
3	03/20/2013	0.18
4	03/20/2014	0.26
5	03/20/2015	0.38
6	03/20/2016	0.47
7	06/20/2017	0.64
8	03/20/2018	0.78
9	03/20/2019	0.97
10	06/20/2020	1.21
15	03/20/2025	1.65
20	03/20/2030	1.96
30	03/20/2040	2.05

Source: Bloomberg.co.jp(http://www.bloomberg.co.jp/index.html)

Yield Curve

Yield Curve … Plot of yields on bonds with different maturities, but the same risk and liquidity

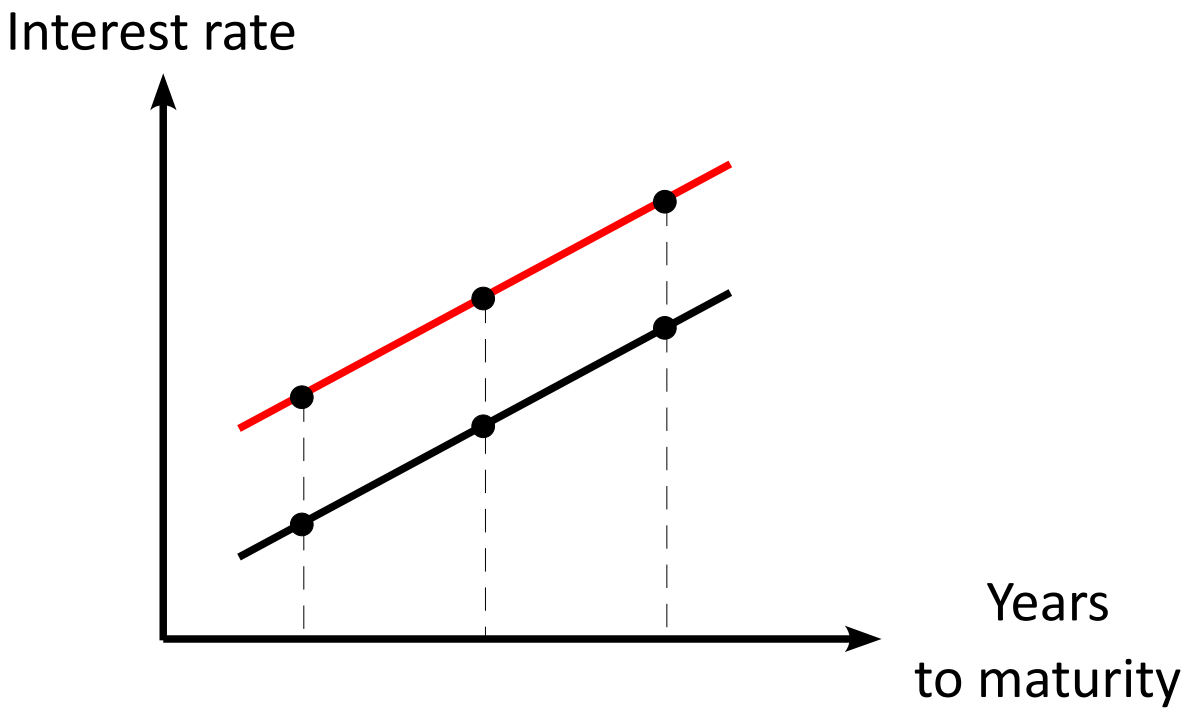


Example: Yield curve for Japanese government bonds

Three Empirical Facts on Yield Curves

Fact 1

Interest rates on bonds with different maturities move together over time.

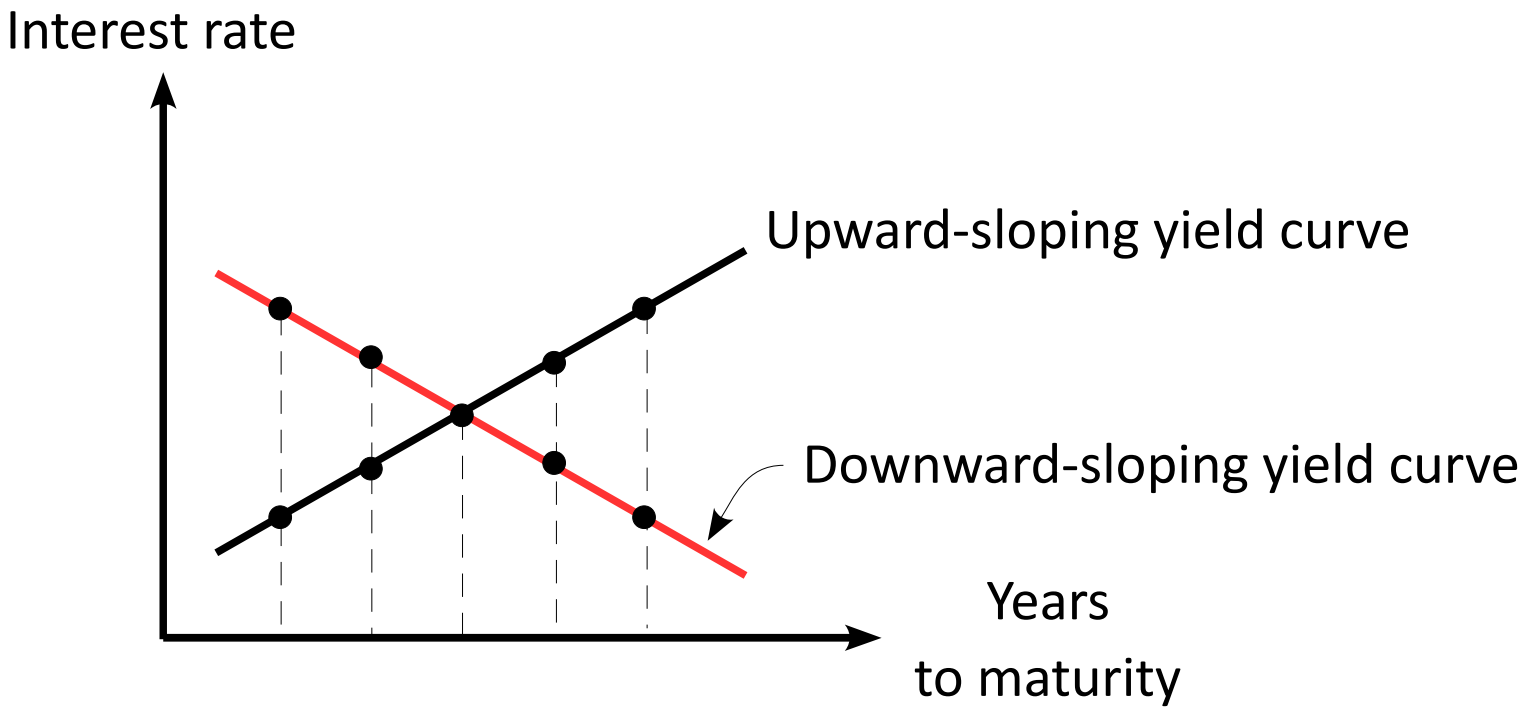


Fact 2

When short-term interest rates are low, yield curves tend to slope upward;
when short-term interest rates are high, yield curves tend to slope downward.

Fact 3

Yield curves almost always slope upward.



Term Structure and Economic Theory

Find a theory that explains all of the "three empirical facts" consistently.

Economists have developed three theories.

1. Expectations theory
2. Segmented markets theory
3. Liquidity premium theory