

1. (20 marks) Suppose you buy a 7% coupon bond with the par value of 1000 Baht. The bond will mature in 1 year. The bond's YTM is 10%. You expect inflation rate at the end of the year to be 2%. What is the real interest rate you expect to receive from investing in the bond? [Please use the "full version" Fisher's equation.]

Fisher Equation shows the relationship between nominal interest rate, real interest rate and expected inflation rate. The Fisher equation is as follows.

$$(1 + i) = (1 + r)(1 + \pi^e) : 1 + r = \frac{1 + i}{1 + \pi^e} = \frac{1 + 0.10}{1 + 0.02}. \text{ Real interest rate} = \frac{1 + 0.10}{1 + 0.02} - 1 = 0.0784 = 7.84\%.$$

2. (20 marks) Consider all the market investors who want to lend money out in financial markets for a two-year period and who must therefore choose between one of the following two strategies.

Strategy 1: Buy a one-year bond today and when it matures, buy another one-year bond.

Strategy 2: Buy a two-year bond today and hold it to maturity.

Suppose, too, that the expected return on strategy 1 is higher than the expected return on strategy 2.

- (a) (10 marks) Suppose Expectation Theory holds true. Which strategy all investors will follow? How the investors' action affect the price and the interest rate of one-year bond?

All investors will follow strategy 1 (buying one-year bond) since it gives higher expected return. The expectations hypothesis assumes that investors are indifferent between short-term bonds and long-term bonds. Price of one-year bond increases and interest rate on one-year bond decreases.

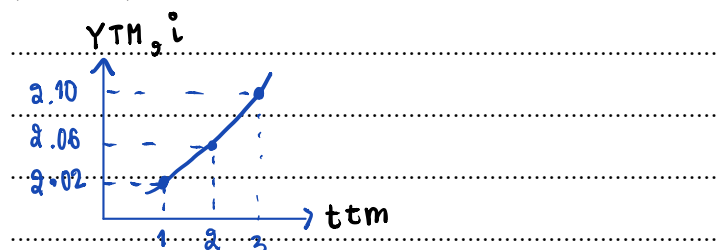
- (b) (10 marks) Suppose Expectation Theory holds true. How do expected rates of return on the two strategy compare in equilibrium?

Equilibrium is achieved when expected return on the two strategy are equal. If not, investors will follow the strategy which gives a higher return, causing the expected return to fall until the gap between the expected return on the two strategy is equal to zero.

3. (60 marks) The following is information on Government bond in 2020. Suppose now we are at the beginning of 2020.

- (a) (10 marks) Please draw the Yield Curve in 2020.

| TTM | YTM (%) | Liquidity Premium |
|-----|---------|-------------------|
| 1   | 2.02    | 0.00              |
| 2   | 2.06    | 0.03              |
| 3   | 2.10    | 0.05              |



- (b) (20 marks) According to Expectations Theory, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{aligned}
 i_{2,t} &= \frac{i_{1,t} + i_{1,t+1}^e}{2} & i_{2,2020} &= \frac{i_{1,2020} + i_{1,2021}^e}{2} & i_{1,2021}^e &= (2.06 \times 2) - 2.02 \\
 i_{2,2020} &= \frac{i_{1,2020} + i_{1,2021}^e}{2} & 2.06 &= \frac{2.02 + i_{1,2021}^e}{2} & &= 2.1\%
 \end{aligned}$$

The market expects interest rate to increase.

- (c) (10 marks) According to Liquidity Premium Hypothesis, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{aligned}
 i_{2,t} &= \frac{i_{1,t} + i_{1,t+1}^e}{2} + \eta_{2,t} & i_{2,2020} &= \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t} & i_{1,2021}^e &= ((2.06 - 0.03) \times 2) - 2.02 \\
 i_{2,2020} &= \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t} & 2.06 &= \frac{2.02 + i_{1,2021}^e}{2} + 0.03 & &= 2.04\%
 \end{aligned}$$

The market expects interest rate to increase.

- (d) (10 marks) Suppose Company A 7% coupon bond with the par value of 1000 Baht. The bond will mature in 2 years. The bond's YTM is 10%. Please calculate the risk premium on the Company A coupon bond.

Risk premium on Company A's bond = interest rate on Company A's bond - interest rate on Government bond with the same maturity. Risk premium on Company A's bond = 10% - 2.06% = 7.94%.

1. (20 marks) Suppose you buy a 10% coupon bond with the par value of 1000 Baht. The bond will mature in 1 year. The bond's YTM is 7%. You expect inflation rate at the end of the year to be 2%. What is the real interest rate you expect to receive from investing in the bond? [Please use the "full version" Fisher's equation.]

Fisher Equation shows the relationship between nominal interest rate, real interest rate and expected inflation rate. The Fisher equation is as follows.

$$(1 + i) = (1 + r)(1 + \pi^e) : 1 + r = \frac{1 + i}{1 + \pi^e} = \frac{1 + 0.07}{1 + 0.02}. \text{ Real interest rate} = \frac{1 + 0.07}{1 + 0.02} - 1 = 0.0490 = 4.90\%.$$

2. (20 marks) Consider all the market investors who want to lend money out in financial markets for a two-year period and who must therefore choose between one of the following two strategies.

Strategy 1: Buy a one-year bond today and when it matures, buy another one-year bond.

Strategy 2: Buy a two-year bond today and hold it to maturity.

Suppose, too, that the expected return on strategy 2 is higher than the expected return on strategy 1.

- (a) (10 marks) Suppose Expectation Theory holds true. Which strategy all investors will follow? How the investors' action affect the price and the interest rate of two-year bond?

All investors will follow strategy 2 (buying two-year bond) since it gives higher expected return. The expectations hypothesis assumes that investors are indifferent between short-term bonds and long-term bonds. Price of two-year bond increases and interest rate on two-year bond decreases.

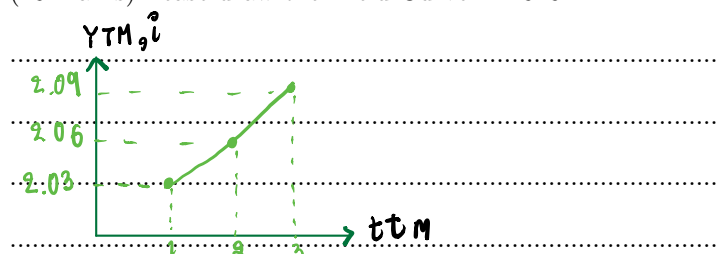
- (b) (10 marks) Suppose Expectation Theory holds true. How do expected rates of return on the two strategy compare in equilibrium?

Equilibrium is achieved when expected return on the two strategy are equal. If not, investors will follow the strategy which gives a higher return, causing the expected return to fall until the gap between the expected return on the two strategy is equal to zero.

3. (60 marks) The following is information on Government bond in 2020. Suppose now we are at the beginning of 2020.

- (a) (10 marks) Please draw the Yield Curve in 2020.

| TTM | YTM  | Liquidity Premium |
|-----|------|-------------------|
| 1   | 2.03 | 0.00              |
| 2   | 2.06 | 0.02              |
| 3   | 2.09 | 0.03              |



- (b) (20 marks) According to Expectations Theory, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{array}{lcl}
 i_{2,t} = \frac{i_{1,t} + i_{1,t+1}^e}{2} & \left| \quad i_{2,2020} = \frac{i_{1,2020} + i_{1,2021}^e}{2} \quad \right| & i_{1,2021}^e = (2.06 \times 2) - 2.03 \\
 i_{2,2020} = \frac{i_{1,2020} + i_{1,2021}^e}{2} & \left| \quad 2.06 = \frac{2.03 + i_{1,2021}^e}{2} \quad \right| & = 2.09\%
 \end{array}$$

The market expects interest rate to increase.

- (c) (20 marks) According to Liquidity Premium Hypothesis, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{array}{lcl}
 i_{2,t} = \frac{i_{1,t} + i_{1,t+1}^e}{2} + \eta_{2,t} & \left| \quad i_{2,2020} = \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t} \quad \right| & i_{1,2021}^e = ((2.06 - 0.02) \times 2) - 2.03 \\
 i_{2,2020} = \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t} & \left| \quad 2.06 = \frac{2.03 + i_{1,2021}^e}{2} + 0.02 \quad \right| & = 2.05\%
 \end{array}$$

The market expects interest rate to increase.

- (d) (20 marks) Suppose Company A 8% coupon bond with the par value of 1000 Baht. The bond will mature in 3 years. The bond's YTM is 9%. Please calculate the risk premium on the Company A coupon bond.

Risk premium on Company A's bond = interest rate on Company A's bond - interest rate on Government bond with the same maturity. Risk premium on Company A's bond = 9% - 2.09% = 6.91%.

1. (20 marks) Suppose you buy a 10% coupon bond with the par value of 1000 Baht. The bond will mature in 1 year. The bond's YTM is 6%. You expect inflation rate at the end of the year to be 4%. What is the real interest rate you expect to receive from investing in the bond? [Please use the "full version" Fisher's equation.]

Fisher Equation shows the relationship between nominal interest rate, real interest rate and expected inflation rate. The Fisher equation is as follows.

$$(1 + i) = (1 + r)(1 + \pi^e) : 1 + r = \frac{1 + i}{1 + \pi} = \frac{1 + 0.06}{1 + 0.04}. \text{ Real interest rate} = \frac{1 + 0.06}{1 + 0.04} - 1 = 0.0192 = 1.92\%.$$

2. (20 marks) Consider all the market investors who want to lend money out in financial markets for a two-year period and who must therefore choose between one of the following two strategies.

Strategy 1: Buy a one-year bond today and when it matures, buy another one-year bond.

Strategy 2: Buy a two-year bond today and hold it to maturity.

Suppose, too, that the expected return on strategy 1 is higher than the expected return on strategy 2.

- (a) (10 marks) Suppose Expectation Theory holds true. Which strategy all investors will follow? How the investors' action affect the price and the interest rate of one-year bond?

All investors will follow strategy 1 (buying one-year bond) since it gives higher expected return. The expectations hypothesis assumes that investors are indifferent between short-term bonds and long-term bonds. Price of one-year bond increases and interest rate on one-year bond decreases.

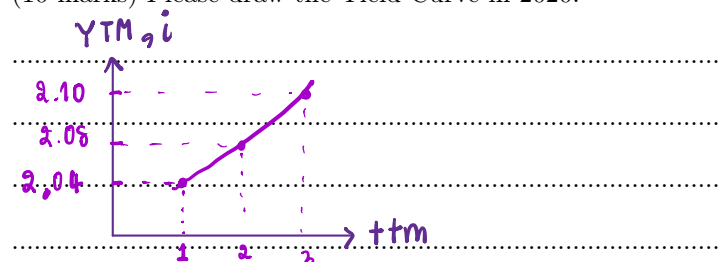
- (b) (10 marks) Suppose Expectation Theory holds true. How do expected rates of return on the two strategy compare in equilibrium?

Equilibrium is achieved when expected return on the two strategy are equal. If not, investors will follow the strategy which gives a higher return, causing the expected return to fall until the gap between the expected return on the two strategy is equal to zero.

3. (60 marks) The following is information on Government bond in 2020. Suppose now we are at the beginning of 2020.

- (a) (10 marks) Please draw the Yield Curve in 2020.

| TTM | YTM  | Liquidity Premium |
|-----|------|-------------------|
| 1   | 2.04 | 0.00              |
| 2   | 2.08 | 0.05              |
| 3   | 2.10 | 0.09              |



- (b) (20 marks) According to Expectations Theory, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{array}{lcl}
 i_{2,t} & = & \frac{i_{1,t} + i_{1,t+1}^e}{2} \\
 i_{2,2020} & = & \frac{i_{1,2020} + i_{1,2021}^e}{2} \\
 2.08 & = & \frac{2.04 + i_{1,2021}^e}{2} \\
 i_{1,2021}^e & = & (2.08 \times 2) - 2.04 \\
 & = & 2.12\%
 \end{array}$$

The market expects interest rate to increase.

- (c) (20 marks) According to Liquidity Premium Hypothesis, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{array}{lcl}
 i_{2,t} & = & \frac{i_{1,t} + i_{1,t+1}^e}{2} + \eta_{2,t} \\
 i_{2,2020} & = & \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t} \\
 2.08 & = & \frac{2.04 + i_{1,2021}^e}{2} + 0.05 \\
 i_{1,2021}^e & = & ((2.08 - 0.05) \times 2) - 2.04 \\
 & = & 2.02\%
 \end{array}$$

The market expects interest rate to decrease.

- (d) (10 marks) Suppose Company A 7% coupon bond with the par value of 1000 Baht. The bond will mature in 2 years. The bond's YTM is 5%. Please calculate the risk premium on the Company A coupon bond.

Risk premium on Company A's bond = interest rate on Company A's bond - interest rate on Government bond with the same maturity. Risk premium on Company A's bond = 5% - 2.08% = 2.92%.

1. (20 marks) Suppose you buy a 7% coupon bond with the par value of 1000 Baht. The bond will mature in 1 year. The bond's YTM is 5%. You expect inflation rate at the end of the year to be 2%. What is the real interest rate you expect to receive from investing in the bond? [Please use the "full version" Fisher's equation.]

Fisher Equation shows the relationship between nominal interest rate, real interest rate and expected inflation rate. The Fisher equation is as follows.

$$(1 + i) = (1 + r)(1 + \pi^e) : 1 + r = \frac{1 + i}{1 + \pi^e} = \frac{1 + 0.05}{1 + 0.02}. \text{ Real interest rate} = \frac{1 + 0.05}{1 + 0.02} - 1 = 0.0294 = 2.94\%.$$

2. (20 marks) Consider all the market investors who want to lend money out in financial markets for a two-year period and who must therefore choose between one of the following two strategies.

Strategy 1: Buy a one-year bond today and when it matures, buy another one-year bond.

Strategy 2: Buy a two-year bond today and hold it to maturity.

Suppose, too, that the expected return on strategy 2 is higher than the expected return on strategy 1.

- (a) (10 marks) Suppose Expectation Theory holds true. Which strategy all investors will follow? How the investors' action affect the price and the interest rate of two-year bond?

All investors will follow strategy 2 (buying two-year bond) since it gives higher expected return. The expectations hypothesis assumes that investors are indifferent between short-term bonds and long-term bonds. Price of two-year bond increases and interest rate on two-year bond decreases.

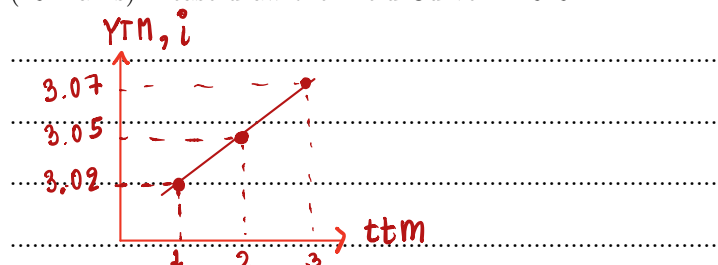
- (b) (10 marks) Suppose Expectation Theory holds true. How do expected rates of return on the two strategy compare in equilibrium?

Equilibrium is achieved when expected return on the two strategy are equal. If not, investors will follow the strategy which gives a higher return, causing the expected return to fall until the gap between the expected return on the two strategy is equal to zero.

3. (60 marks) The following is information on Government bond in 2020. Suppose now we are at the beginning of 2020.

- (a) (10 marks) Please draw the Yield Curve in 2020.

| TTM | YTM  | Liquidity Premium |
|-----|------|-------------------|
| 1   | 3.02 | 0.00              |
| 2   | 3.05 | 0.04              |
| 3   | 3.07 | 0.07              |



- (b) (20 marks) According to Expectations Theory, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{array}{lcl}
 i_{2,t} & = & \frac{i_{1,t} + i_{1,t+1}^e}{2} \\
 i_{2,2020} & = & \frac{i_{1,2020} + i_{1,2021}^e}{2}
 \end{array}
 \quad \left| \quad
 \begin{array}{lcl}
 i_{2,2020} & = & \frac{i_{1,2020} + i_{1,2021}^e}{2} \\
 3.05 & = & \frac{3.02 + i_{1,2021}^e}{2}
 \end{array}
 \quad \left| \quad
 \begin{array}{lcl}
 i_{1,2021}^e & = & (3.05 \times 2) - 3.02 \\
 & = & 3.08\%
 \end{array}$$

The market expects interest rate to increase.

- (c) (20 marks) According to Liquidity Premium Hypothesis, what are the expected interest rates on one-year government bond in 2021? Which direction does the market expect interest rate to change?

$$\begin{array}{lcl}
 i_{2,t} & = & \frac{i_{1,t} + i_{1,t+1}^e}{2} + \eta_{2,t} \\
 i_{2,2020} & = & \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t}
 \end{array}
 \quad \left| \quad
 \begin{array}{lcl}
 i_{2,2020} & = & \frac{i_{1,2020} + i_{1,2021}^e}{2} + \eta_{2,t} \\
 3.05 & = & \frac{3.02 + i_{1,2021}^e}{2} + 0.04
 \end{array}
 \quad \left| \quad
 \begin{array}{lcl}
 i_{1,2021}^e & = & ((3.05 - 0.04) \times 2) - 3.02 \\
 & = & 3.00\%
 \end{array}$$

The market expects interest rate to decrease.

- (d) (10 marks) Suppose Company A 7% coupon bond with the par value of 1000 Baht. The bond will mature in 2 years. The bond's YTM is 5%. Please calculate the risk premium on the Company A coupon bond.

Risk premium on Company A's bond = interest rate on Company A's bond - interest rate on Government bond with the same maturity. Risk premium on Company A's bond = 5% - 3.05% = 1.95%.