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CB3044 Assignment 1

Q1.

According to the chart, the relationship is the interest rate on three-month Treasury bills is the lowest because of the highest liquidity and shortest term. Long-term Treasury bonds have a higher interest rate than three-month treasury as it have a longer term. The interest rate on Baa corporate bonds is the highest because it has a highest default risk.

First, we get the risk structure of interest rates. It means that bonds with the same term to maturity have different interest rates. For example, the Baa corporate bonds and long-term treasury bonds in the chart. The risk structure of interest rates is affected by factors such as default risk, liquidity and income tax. Long-term Treasury bonds are generally considered to have no default risk because the government can increase taxes at any time. However, the rating of Baa corporate bonds in the bond market is only medium, so its probability of default is higher than that of long-term treasury bonds. In addition, long-term government bonds have higher liquidity than Baa corporate bonds, because when investors buy large amounts, the price does not change significantly. Treasury bills are exempt from state and local income taxes, while interest on corporate bonds is fully taxable. Therefore, Baa corporate bonds and long-term government bonds have different interest rates.

Second, we get the term structure of interest rates. It means that bonds with the same risk may have different interest rates because the remaining time to maturity is different. It can be seen from the chart that the interest rates of three-month Treasury bills and long-term Treasury bills change together. When short rate is low, the yield curve tends to have a steep upward slope, and when short rate is high, the yield curve tends to have a downward slope.

Q2.

Primary markets is market in which users of funds raise funds by issuing financial instruments. New security issues sold to initial buyers and typically involves an investment bank who underwrites the offering. Secondary Market is securities previously issued are bought and sold. It Involves both brokers and dealers.

The statement "Because corporations do not actually raise any funds in secondary markets, they are less important to the economy than primary markets." is incorrect. Since it serves two important functions. First, provides liquidity, making it easy to buy and sell the securities of the companies. Second, establishes a price for the securities which is useful for company valuation.

Q3.

Asymmetric information means one party does not have enough information about other party. The first problem is adverse selection which occurs before transaction. The party who has more information most likely to produce adverse outcomes and put another party at a disadvantage in the transaction by providing less adverse information. The second problem is moral hazard which occurs after transaction. Hazard that the party who has more information has incentive to engage in undesirable activities making it more likely to produce adverse outcome. For example, in the online market, consumers can take advantage of Internet's powerful delivery and search advantages to change their information disadvantages

Q4.

No, because a dollar paid in the future is less valuable than a dollar paid in today and the state lottery that you won will be less than 10 million.

Present value of the state lottery

$$\begin{aligned} &= 1 + 1/(1+5\%) + 1/(1+5\%)^2 + 1/(1+5\%)^3 + 1/(1+5\%)^4 + 1/(1+5\%)^5 + 1/(1+5\%)^6 + 1/(1+5\%)^7 + 1/(1+5\%)^8 + 1/(1+5\%)^9 \\ &= 8.108 \text{ million} \end{aligned}$$

Q5.

I would buy long-term bonds over short-term bonds as I expect her interest rate to decline.

For 1 year bond, $N=1$, $PMT=10\%*1000=100$, $FV=1000$, $I/Y=5\%$, $PV=1047.62$

For 20 years bond, $N=20$, $PMT=10\%*1000=100$, $FV=1000$, $I/Y=5\%$, $PV=1386.09$

Long-term bonds have higher interest rate risk and the return are also higher.

Q6.

(a)

$$\begin{aligned} B^d &= B^s \\ -0.4Q + 940 &= Q + 500 \\ Q &= 314 \\ P &= Q + 500 \\ P &= 314 + 500 \\ P &= 814 \end{aligned}$$

(b)

Expected interest rate

$$i = (1000 - 814) / 814 = 22.85\%$$

Q7.

According to expectation theory,

Interest rate on two-year bond today:

$$(5\% + 6\%) / 2 = 5.5\%$$

Interest rate on three-year bond today:

$$(5\% + 6\% + 7\%) / 3 = 6\%$$

Interest rate on four-year bond today:

$$(5\% + 6\% + 7\% + 6\%) / 4 = 6\%$$

Interest rate on five-year bond today:

$$(5\% + 6\% + 7\% + 6\% + 5\%) / 5 = 5.8\%$$

Interest rate for one-to-five-year bonds today:

5%, 5.5%, 6%, 6% and 5.8%

According to liquidity premium theory,

Interest rate on two-year bond today:

$$0.5\% + (5\% + 6\%) / 2 = 6\%$$

Interest rate on three-year bond today:

$$0.75\% + (5\% + 6\% + 7\%) / 3 = 6.75\%$$

Interest rate on four-year bond today:

$$1.25\% + (5\% + 6\% + 7\% + 6\%) / 4 = 7.25\%$$

Interest rate on five-year bond today:

$$2\% + (5\% + 6\% + 7\% + 6\% + 5\%) / 5 = 7.8\%$$

Interest rate for one-to-five-year bonds today:

5%, 6%, 6.75%, 7.25% and 7.8%

Comparing with the interest rates for the expectation theory, liquidity premium theory produces yield curves more steeply upward sloped.

Q8.

Adverse selection occurs before transaction. It often lends to the party who lack of information to make bad decisions. For example, banks cannot understand the degree of risk of borrowers, they raise interest rates to protect them from possible losses. Raising interest rates before actually borrowing (in advance) causes all borrowers to become relatively risky

borrowers.

Q9.

The yearly coupon payment is $\$1000 \times 20\% = \$200$,

$$2300 = \frac{200}{1+i} + \frac{200}{(1+i)^2} + \frac{200}{(1+i)^3} + \dots + \frac{200}{(1+i)^{16}} + \frac{1000}{(1+i)^{16}}$$

$$i = 6.6\%$$