

SOE & WISE, Xiamen University, SEM II, AY2022-2023
Financial Economics/Asset Pricing
Homework 2

1. Fill in the missing exchange rates in the following table:

	U.S. Dollar	Euro	Danish Krone	Japanese Yen
U.S. Dollar	\$1	1.5576	0.2088	0.009594
Euro	0.6420			
Danish Krone	4.7898			
Japanese Yen	104.23			

Answer:

	<i>U.S. Dollar</i>	<i>Euro</i>	<i>Danish Krone</i>	<i>Japanese Yen</i>
<i>U.S. Dollar</i>	<i>\$1</i>	<i>1.5576</i>	<i>0.2088</i>	<i>0.009594</i>
<i>Euro</i>	<i>0.6420</i>	<i>1 Euro</i>	<i>0.1340</i>	<i>0.006159</i>
<i>Danish Krone</i>	<i>4.7898</i>	<i>7.46074</i>	<i>1 Krone</i>	<i>0.45954</i>
<i>Japanese Yen</i>	<i>104.23</i>	<i>162.35</i>	<i>21.761</i>	<i>Yen 1</i>

2. You observe that the dollar price of the Mexican peso is \$0.09618 and the dollar price of the Canadian dollar is \$0.9997. What must the exchange rate between the Mexican peso and the Canadian dollar be for there to be no arbitrage opportunity?

Answer:

$$\begin{aligned} \text{CAD/MXN} &= \frac{0.09618}{0.9997} \\ &= 0.096208 \text{ CAD/MXN} \end{aligned}$$

3. Suppose that the exchange rate is \$0.2970 to the Israeli shekel. How could you make arbitrage profits with \$10,000 if the dollar price of gold is \$200 per ounce and the shekel price is 750 ILS per ounce?

Answer: Take \$10,000 and buy 50 ounces of gold at \$200 per ounce. Sell 50 ounces of gold in Israel for 37,500 ILS (750 ILS per ounce). Take 37,500 ILS and exchange it into dollars that are worth \$11,137.50. The arbitrage profit is \$1,137.50.

4. A firm's earnings per share are \$5.50 and the industry average P/E multiple is 8. What would be an estimate of the value of a share of the firm's stock? Is it possible for firms being classified in the same industry to have different price/earnings multiples?

Answer:

$$\begin{aligned} \text{Estimated value share of stock} &= \text{Firm's EPS} \times \text{Industry average P/E} \\ &= \$5.50 \times 8 \\ &= \$44.00 \end{aligned}$$

Firms classified as being in the same industry may have different opportunities for growth in the future and may therefore differ in their P/E multiples.

5. BHM stock is trading for \$47 per share on the NYSE and \$45 per share on the Sydney Stock Exchange. Assume that the costs of buying and selling BHM stock are negligible.

- How can you make an arbitrage profit?
- Over time what would you expect to happen to stock prices in New York and Sydney?
- Now assume that the cost of buying and selling shares of BHM are 2% per transaction. How does this affect your answers?

Answer:

- You could buy BHM stock in Sydney and simultaneously sell it in New York. Your arbitrage profit would be \$2 per share.
- The prices would become equal.
- There could remain a 2% discrepancy between the prices which would be \$1.84 in this instance.

6. Suppose you have \$50,000 in a bank account earning an interest rate of 3.5% per year. At the same time you have an unpaid balance on your credit card of \$13,000 on which you are paying an interest rate of 21% per year. What is the arbitrage opportunity you face?

Answer: You could take \$13,000 out of your bank account and pay down your credit card balance. You would give up 3.5% per year in interest earnings (\$455) but you would save 21% per year in interest expenses (\$2,730). So the arbitrage opportunity is worth \$2,275 per year.

7. Consider a five-year fixed-income security which promises \$120 per year. Calculate the value of the security if the market interest rate rises from 5% to 6% per year.

Answer:

<i>n</i>	<i>i</i>	<i>PV</i>	<i>PMT</i>	<i>Result</i>
5	5	?	\$120	<i>PV</i> = \$519.54

<i>n</i>	<i>i</i>	<i>PV</i>	<i>PMT</i>	<i>Result</i>
5	6	?	\$120	<i>PV</i> = \$505.48

The price drops by \$14.06.

8. Consider a four-year fixed-income security which promises \$120 per year. Calculate the value of the security if the market interest rate falls from 7% to 6% per year.

Answer:

<i>n</i>	<i>i</i>	<i>PV</i>	<i>PMT</i>	<i>Result</i>
4	7	?	\$120	<i>PV</i> = \$406.47

<i>n</i>	<i>i</i>	<i>PV</i>	<i>PMT</i>	<i>Result</i>
4	6	?	\$120	<i>PV</i> = \$415.81

The price increases by \$9.34.

9. A four-year bond has a coupon rate of 6% per year, a price of \$950, and a face value of \$1,000. Calculate its current yield and yield to maturity.

Answer:

$$\begin{aligned}\text{Current yield} &= \text{coupon/price} \\ &= 60/950 \\ &= 6.32\%\end{aligned}$$

To calculate yield to maturity:

<i>n</i>	<i>i</i> = YTM	<i>PV</i>	<i>FV</i>	<i>PMT</i>	<i>Result</i>
4	?	-\$950	\$1,000	\$60	YTM = 7.49%

10. Calculate the coupon rate, current yield, and the yield to maturity for a bond that has \$1,000 par value, pays a coupon of \$85 annually, matures in 20 years, and has a current price of \$985.25.

Answer:

$$\begin{aligned}\text{Coupon rate} &= 85/1,000 \\ &= 8.5\% \text{ per year}\end{aligned}$$

$$\begin{aligned}\text{Current yield} &= \text{coupon/price} \\ &= 85/985.25 \\ &= 8.63\%\end{aligned}$$

For yield to maturity:

<i>n</i>	<i>i</i> = YTM	<i>PV</i>	<i>FV</i>	<i>PMT</i>	<i>Result</i>
20	?	-985.25	1,000	85	YTM = 8.66%

11. Suppose our want to know the price of a 15-year 8% coupon bond which pays interest annually. The face value of the bond is \$1,000.

- (a) You have been told the yield to maturity is 9%. What is the price? Assume coupons are paid annually.
- (b) What is the price if coupons are paid semi-annually and the yield to maturity is 9% per year?

Answer:

(a) If coupons are paid annually:

<i>n</i>	<i>i</i>	<i>PV</i>	<i>FV</i>	<i>PMT</i>	<i>Result</i>
15	9	?	\$1,000	\$80	PV = \$919.39

(b) If coupons are paid semi-annually:

<i>n</i>	<i>i</i>	<i>PV</i>	<i>FV</i>	<i>PMT</i>	<i>Result</i>
30	4.5	?	\$1,000	\$40	PV = \$918.56