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**Q1**. Suppose interest rate initially is 10 percent across all maturities. A one-year discount bond pays $2200 at maturity. A five-year discount bond pays $3221.02 at maturity. Calculate the present value of both discount bonds if (a) interest rate rises to 12 percent (b) falls to 8 percent.

**Answer:** Interest rate initially=10%

One-year discount bond pays= $2200

Five years’ discount bond pays= $3221.02

Present value of the discount bond=?

1. Interest rate rises to 12 percent
2. Falls to 8 percent

Value of discount bond=Payment at maturity/ (1+Market Interest) n

|  |  |  |
| --- | --- | --- |
| **Interest**  **Rate** | **One year pure Discount Bond** | **Five years pure discount bond** |
| 8% | $2200/1.08=$2037.037 | $3221.02/(1.08)5 =$2191.17 |
| 10% | $2200/1.10=$2000 | $3221.02/(1.10)5 =$2000 |
| 12% | 2200/1.12=$1964.9 | $3221.02/(1.12)5=$1828.047 |

**Q2. (a)** Will the duration of a risky bond shorter or longer than less risky bonds? Also, will prices of risky bonds fluctuate more or less in comparison to less risky bonds? Briefly explain your answer and provide the reason.

**Answer:** Most bond investors know that [rising interest rates](https://money.usnews.com/money/blogs/the-smarter-mutual-fund-investor/articles/2018-04-04/how-rising-interest-rates-affect-your-investments) undermine bond values, because investors would rather own newer bonds that pay more.

That interest-rate risk is measured by [a gauge called duration](https://money.usnews.com/investing/bonds/articles/2018-03-05/bond-investors-need-to-know-about-maturity-duration), expressed in years. A five-year duration means the bond or bond fund could lose 5 percent of its value for every one-percentage point rise in prevailing interest rates, while a drop in rates would push the bond price up by the same amount.

Shorter duration means less risk. But longer means greater potential return, because falling rates would drive prices up and because long duration means the bond has a longer maturity, which pays higher yield.

It's dangerous to shorten your holdings' duration just to be on the safe side, because shorter duration and maturity means lower yield. Too much safety means skimpy earnings

**(b)** Suppose you are long 1500 oz. of silver in the cash market. There are 200 oz. of silver per futures contract. For every $1.00 change in the futures price, the cash market changes by $0.70. You want to engage in a risk minimizing hedge. What position should you take in the futures market and why? Give reason. How many contracts should you use?

**Answer: Given Data:**

1500 oz. of silver in the cash market

200 oz. of silver per futures

$1.00 changes by $0.70

**Solution:**

Nf= (Q/Qf) x(∆s/∆f)

Nf= (1500/200) x (0.70/1.00)

Nf= (7.5) x (0.7)

Nf= 5.25

**Q3.** Calculate the effective maturity/ duration of a five-year 1 percent coupon bond with a face value of $100.

**Answer:** **Step#1**

|  |  |  |
| --- | --- | --- |
| **Year** | **Payment** | **Present Value By 1%** |
| 1 | 1 | 0.99 |
| 2 | 1 | 0.98 |
| 3 | 1 | 0.97059 |
| 4 | 1 | 0.96098 |
| 5 | 101 | 96.098 |

**Step#2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Years** | **Payment** | **Present Value of Payment** | **Relative value** | **Present Value of payment** |
| 1 | 1 | 0.99 | $0.99/100 | 0.0099 |
| **2** | 1 | 0.98 | 0.98/100 | 0.0098 |
| **3** | 1 | 0.97059 | 0.97059/100 | 0.0097059 |
| **4** | 1 | 0.96098 | 0.96098/100 | 0.00098 |
| **5** | 101 | 96.098 |  | 0.96098 |
|  |  | **$100** |  | **1.0** |

**Step#3**

|  |  |  |
| --- | --- | --- |
| **Years** | **Relative Value** | **Year X Relative Value** |
| **1** | 0.0099 | 0.0099 |
| **2** | 0.0098 | 0.0196 |
| **3** | 0.0097059 | 0.0291177 |
| **4** | 0.0096098 | 0.0384392 |
| **5** | 0.96098 | 4.8049 |
|  |  | **4.9019** |

**The effective Maturity of five years1%. Bond is 4.9019 years**

**Q4. (a)** Despite some major shortcomings of expert system of credit risk analysis, why do banks still use it? Briefly explain with the practical example of a bank using it for credit risk analysis.

**Answer: Part (a)**

In expert System the credit decision is left to be taken by branch lending officer and He grand credit on the basis of his expertise, subjective judgement and weighting other certain key factors.

Despite of Major Short Comings Banks are still using it because the branch lending officer of that specific area is well aware of his customers and the area and he better can evaluate the riskiness of the credit to be granted.

**Example:**

Sindh Bank using Expert System to grant credit in which their credit risk officer after evaluating each and everything grant the loan.

**(b)** Why does in standardized rating approach for credit risk analysis lending fully secured by mortgages on residential property are risk weighted at 35% while mortgages on commercial real estate are risk weighted at 100%? Briefly explain the reasons.

**Answer: Part (b)**

Standardize Rating approach weight the loan secured by mortgages on residential property at 35% because a residential property occupied by the browser or on rent is easy to be acquired in response of failure of credit return but on the contrary the commercial property has been a recurring cause of troubled asset in banking industry over the past few decades , the Basel Committee holds to the view that mortgages on commercial real estate do not, in principle, justify other than a 100% weighting of the loans secured and it’s very difficult for banks to vacate commercial properties so their risk is weighted 100% by Basel committee.

**(c)** A corn farmer argues "I do not use futures contracts for hedging. My real risk is not the price of corn. It is that my whole crop gets wiped out by the weather." Discuss his view point. Should the farmer estimate his or her expected production of corn and hedge and try to lock in a price for expected production? Briefly explain your answer.

**Answer: Part (c)**

If weather creates a significant uncertainty about the volume of corn that will be harvested, the farmer should not enter into short forward contracts to hedge the price risk on his or her expected production. The reason is as follows. Suppose that the weather is bad and the farmer’s production is lower than expected. Other farmers are likely to have been affected similarly. Corn production overall will be low and as a consequence the price of corn will be relatively high. The farmer’s problems arising from the bad harvest will be made worse by losses on the short futures position. This problem emphasizes the importance of looking at the big picture when hedging. The farmer is correct to question whether hedging price risk while ignoring other risks is a good strategy