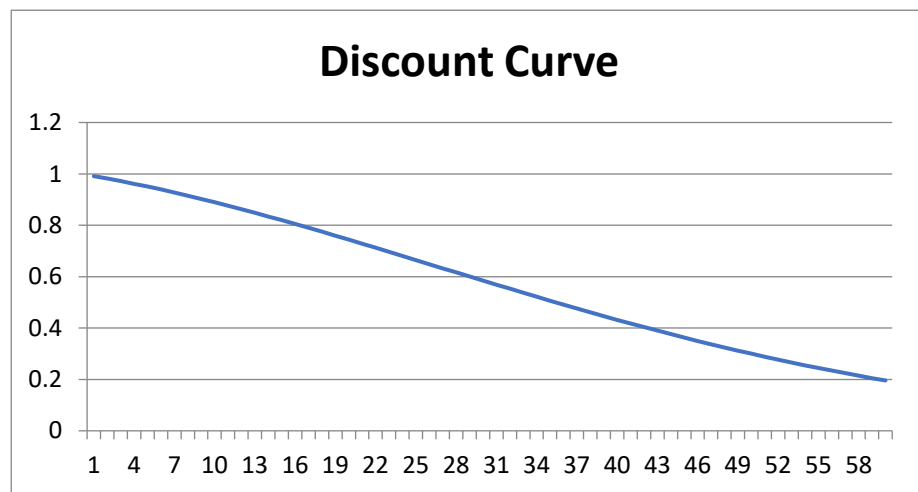


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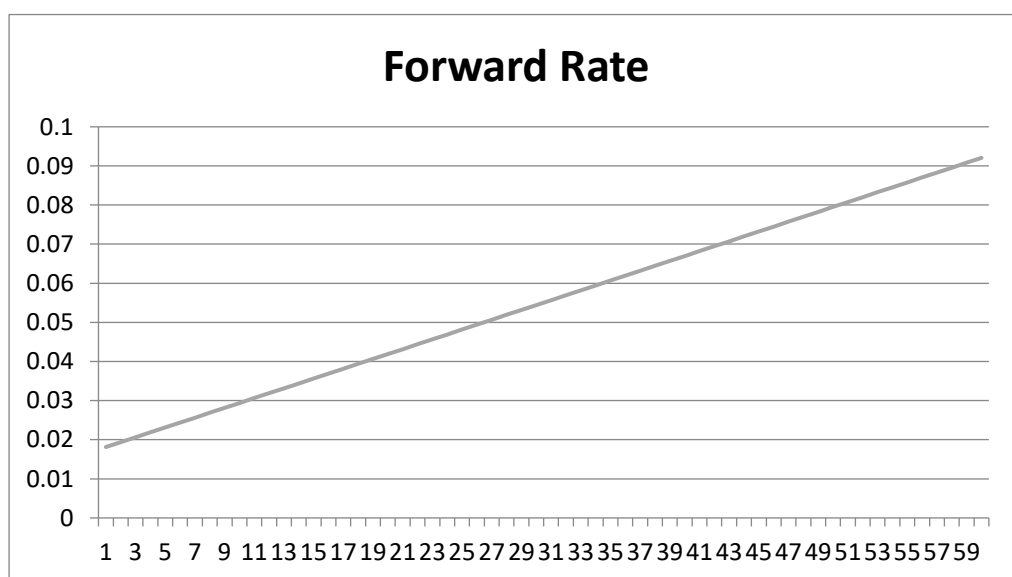
$$3.9 \hat{r}(i/4) = 0.0175 + 0.00125 * (i-1) / 4$$

a).  $d(t) = \frac{1}{(1 + \frac{\hat{r}(t)}{4})^{4t}}$  for quarterly compounding,

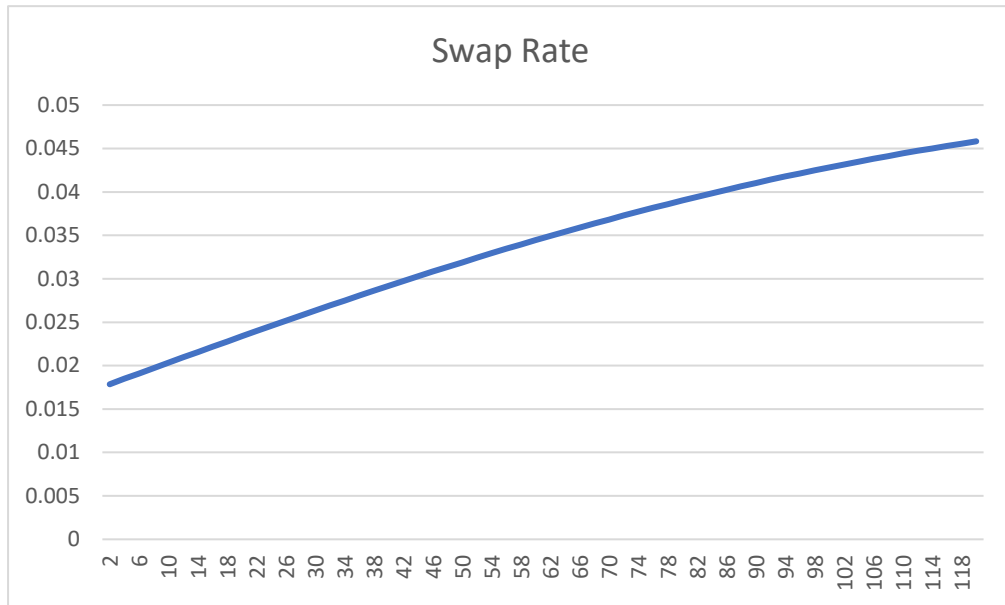
$$d(\bar{i}/4) = \frac{1}{(1 + \frac{\hat{r}(\bar{i}/4)}{4})^i}$$



b).  $f(\bar{i}/4) = 4 \left( \frac{d(\bar{i}/4)}{d(\bar{i}/4)} - 1 \right)$



3.9(6) . 
$$S(T) = \frac{1 - d(T)}{\sum_{i=1}^{2T} \frac{1}{2} d(\frac{i}{2})}$$



d). For 10-year swap:  $s(20) = 0.02936791$ , and after one year, it becomes 9-year swap, the update  $s(18)_{\text{new}} = 0.027473682$ .

The P&L of the payer's swap (for a buyer):  $(s(18)_{\text{new}} - s(20)) \times \frac{1}{2} \times$

$$\sum_{i=3}^{20} d(\frac{i}{2}) = -0.015191265.$$

3.10 a).  $f(1.25) = 4 \left( \frac{d(1)}{d(1.25)} - 1 \right) = 0.02051282$ , the fixed rate for the trade should be 2.05%.

b). Since the 3m LIBOR rate (2.85%) is larger than 2.05%, the cash flow of A is that it pays fixed rate at 2.05% of \$100m and receives 3m LIBOR rate at 2.85% of \$100m, so the P&L of A

$$= d(1, 1.25) (2.85\% - 2.05\%) (100m) \left(\frac{1}{4}\right)$$

$$= \frac{1}{\left(1 + \frac{2.85\%}{4}\right)} (2.85\% - 2.05\%) (100m) \left(\frac{1}{4}\right)$$

$$= \$0.1986m.$$

c). The cash flow of B is that it pays 3m LIBOR rate at 2.85% of \$100m, receiving fixed rate of 2.05% of \$100m.

$$P\&L \text{ of B} = d(1, 1.25) (2.05\% - 2.85\%) (100m) \left(\frac{1}{4}\right) = -\$0.1986m.$$

3.11 a). 6 months later,  $f(0.75) = 4 \left( \frac{d(0.5)}{d(0.75)} - 1 \right) = 0.06185567$ ,  
 MtM value of FRA,  $d(0.75) (100m) \left(\frac{1}{4}\right) (6.19\% - 2.05\%) = \$1.00395m.$

b) P&L for party A is \$1.00395m.

$$3.12 a). f(2.25) = 4 \left( \frac{d(2)}{d(2.25)} - 1 \right) = 0.0228009$$

$$b). f(1.75)_{\text{new}} = 4 \left( \frac{d(1)}{d(1.75)} - 1 \right) = 0.02100016$$

c). P&L of A:

$$d(1, 25) (100m) \left(\frac{1}{4}\right) (2.1\% - 2.25\%) = -\$0.0365764m.$$