(1) $n = 3$

$C = 5\%$

$y_m = 3\%$

$P_0 = 105,657223$

$\Delta y_m = 5\ BP \Rightarrow 0,0005$

$$P^-_{(y+\Delta = 0,0295)} = \frac{5}{1+0,0295} \cdot \frac{\left(\frac{1}{1+0,0295}\right)^3 - 1}{\frac{1}{1+0,0295} - 1} + \frac{100}{(1+0,0295)^3} =$$

$$= 105,804232$$

$$P^+_{(y_m = 0,0305)} = \frac{5}{1+0,0305} \cdot \frac{\left(\frac{1}{1+0,0305}\right)^3 - 1}{\frac{1}{1+0,0305} - 1} + \frac{100}{(1+0,0305)^3} =$$

$$= 105,5510494$$

$$\text{APROX. DURATION} = \frac{P^- - P^+}{2 \cdot P_0 \cdot \Delta \text{YIELD}}$$

$$= \frac{105,804232 - 105,5510494}{2 \cdot 0,0005 \cdot 105,657223} =$$

$$= 2,48\ \%$$

(2)

$$D = \left\{ \frac{1+0,03}{0,03} \cdot \frac{1+0,03 + [3 \times (0,05 - 0,03)}{0,05 \times [(1+0,03)^3 - 1] + 0,03} \right\}$$

$$D = \frac{1,03}{0,03} \cdot \frac{1,09}{0,03463635} = 2,86350 \text{ LET}$$

(3)

$$\text{EFEKTIVNI DURACE} = \frac{PV^- - PV^+}{2 \cdot \Delta \text{ CURVE} \cdot PV_0}$$

$$= \frac{510,1 - 373,6}{2 \cdot 0,01 \cdot 455,4} = \frac{136,5}{910,8} = 0,14987$$

$$\Rightarrow 14,987\%$$

(4) $P_0 = 98,722$

$P_+ = 98,669$

$P^- = 98,782$

$\Delta = 0,1\%$

$$\text{CONVEXIM} = \frac{P^- + P^+ - 2 \cdot P_0}{(\text{YIELD})^2 \cdot P_0}$$

$$= \frac{98,782 + 98,669 - 2 \cdot 98,722}{(0,001)^2 \cdot 98,722} =$$

$$= 70,90\%$$

(5.) MOD. DURACE = 7,020

CONVEXIM = 65,180

Δ YIELD = 0,0025

$$\Delta P = -7,020 \cdot (-0,0025) + \frac{1}{2} \cdot 65,180 \cdot (0,0025)^2$$

$$\Delta P = 0,01755 + 0,00020369 = 0,017754$$

$$\Rightarrow 1,7754\%$$

(6) MOD. MACE = 7,140

KONVEXITA = 66,200

Δ YIELD = 0,005

$$\Delta P = - 7{,}140 \cdot 0{,}05 + \frac{1}{2} \cdot 66{,}200 \cdot (0{,}005)^2$$

$$\Delta P = - 0{,}0357 + 0{,}0008275 = - 0{,}0348725 =$$

$$= - 3{,}49\%$$

(7) hw

ČAP = 12,1582 LET − 8 LET = 4,1582

(8) YTM = 7,44 %

ϵ = 83

T = 360

C = 7,25 %

(A)

$$P_0 = \frac{7{,}25}{1+0{,}07444} \cdot \frac{\left(\frac{1}{1+0{,}07444}\right)^{15} - 1}{\frac{1}{1+0{,}07444} - 1} + \frac{100}{(1+0{,}07444)^{15}} =$$

$$P_0 = 98{,}31658$$

$$P_{0\,fin} = 98{,}31658 \cdot (1+0{,}07444)^{83/360} = 99{,}956780$$

$$P_0^+ = \frac{7{,}25}{1+0{,}07445} \cdot \frac{\left(\frac{1}{1+0{,}07445}\right)^{15} - 1}{\frac{1}{1+0{,}07445} - 1} + \frac{100}{(1+0{,}07445)^{15}}$$

$$P_0^+ = 98{,}22908112$$

$$P_{0\,fin}^+ = 98{,}22908122 \cdot (1+0{,}07445)^{83/360} = 99{,}869964$$

$$P_0^- = \frac{7{,}25}{1+0{,}0743} \cdot \frac{\left(\frac{1}{1+0{,}0743}\right)^{15} - 1}{\frac{1}{1+0{,}0743} - 1} + \frac{100}{(1+0{,}0743)^{15}} =$$

$$= 98{,}404\,18818$$

$$P_{0\,fakt}^- = 98{,}404\,18818 \cdot (1+0{,}0743)^{83/360} - 100{,}043\,7028$$

(B)

$$\text{APROX. DURACE} = \frac{100{,}043\,7028 - 99{,}86\,9964}{2 \cdot 99{,}956\,780 \cdot (0{,}0001)}$$

$$= 8{,}6907\ \%$$

$$\text{APROX. KONVEXITA} = \frac{100{,}043\,7028 + 99{,}86\,9964 - 2 \cdot 99{,}956\,780}{(0{,}0001)^2 \cdot 99{,}956\,780}$$

$$= 106{,}846$$

(C)

Δ výn = 100 BP $\Rightarrow$ 1 %

$$\Delta P = -8{,}6907 \cdot 0{,}01 + \frac{1}{2} \cdot 106{,}846 \cdot (0{,}01)^2$$

$$= -0{,}086907 + 0{,}0053423$$

$$= -0{,}0815647 \Rightarrow -8{,}15647\ \%$$

NOVÁ CENA $= 99{,}956780 \cdot (1 - 0{,}0815647) =$

$$= 91{,}803835\,23$$

(D) $$P_0 = \frac{4{,}25}{1+0{,}0844} \cdot \frac{\left(\frac{1}{1+0{,}0844}\right)^{15} - 1}{\frac{1}{1+0{,}0844} - 1} + \frac{100}{(1+0{,}0844)^{15}}$$

$$P_0 = 90{,}08226064$$

$$P_{0\,\text{plné}} = 90{,}08226064 \cdot (1+0{,}0844)^{\frac{83}{360}} = 91{,}7809214$$

$$\Delta P = \frac{91{,}7809214 - 99{,}956780}{99{,}956780} = -0{,}081794$$

$$\rightarrow -8{,}1794\,\%$$

POROVNEJ VÝSLEDEK (C) – 8,15647 % S VÝSLEDKEM (D) – 8,1794 %.