

0811253 HW4

1. 驗證範例程式

利用講義範例 $n=6, c=8, r=0.08$ 計算後 答案 = 範例答案 = 4.9927

The screenshot shows the Code::Blocks IDE with the file '0811253_HW4.c' open. The code is a C program that calculates the Macaulay Duration for a bond. It prompts the user to input the number of periods (n), the coupon rate (C in percent), and the interest rate (r). The program then calculates the duration using a loop and prints the result. The execution output window shows the following input and output:

```
請輸入期數 n: 6
請輸入債息 C(percent): 8
請輸入利率 r: 0.08
Macaulay Duration = 4.992710
Process returned 0 (0x0)   execution time : 2.954 s
Press any key to continue.
```

2. 假定債息為 0 => C = 0

Answer: 其存續期間應 = n

3. 當債息提高(或下降), 存續期間應提高 or 下降 ?

Answer: 當債息 提高/下降 => 存續期間將 下降/上升

符合程式輸出 存續期間在 (C=8 時) < (C=4 時) < (C=0 時)

⇒ C 愈高, duration 越低, 反之亦然

The three screenshots show the program's output for different coupon rates (C) while keeping n=6 and r=0.08 constant:

- Top-left: C=8, Macaulay Duration = 4.992710
- Top-right: C=0, Macaulay Duration = 6.000000
- Bottom: C=4, Macaulay Duration = 5.382095

The outputs confirm that as the coupon rate C increases, the Macaulay Duration decreases.

4. 當變動 1basic point 時，價格變動百分比為?

```
D:\OneDrive\桌面\財務工程導論\HW4\0811253_HW4.exe
===== Macaulay Duration =====
請輸入期數 n: 6
請輸入償還 C(percent): 8
請輸入利率 r: 0.08
Macaulay Duration = 4.992710
===== Modified Duration =====
Modified Duration = 4.622880
請輸入變動利率 : 0.0001
the approximate percentage price change = -0.046229 (percent)
Process returned 0 (0x0)   execution time : 14.206 s
Press any key to continue.
```