

| Given Inputs |          |            |        |       |
|--------------|----------|------------|--------|-------|
|              | Maturity | Face Value | Coupon | Yield |
| Bond A       | 12/31/28 | \$ 400,000 | 4%     | 5%    |
| Bond B       | 12/31/32 | \$ 600,000 | 6%     | 5%    |

(Red Inputs can be changed)

Settlement                      12/31/25                      Change in Rate:                      1.00%

|        | Maturity | Face Value   | Coupon | Yield | Market Value | Price   | Macauly Duration |
|--------|----------|--------------|--------|-------|--------------|---------|------------------|
| Bond A | 12/31/28 | \$ 400,000   | 4%     | 5%    | \$ 389,107   | \$ 0.97 | 2.88             |
| Bond B | 12/31/32 | \$ 600,000   | 6%     | 5%    | \$ 634,718   | \$ 1.06 | 5.95             |
| Total  |          | \$ 1,000,000 |        |       | \$ 1,023,825 |         |                  |

Macaulay Duration is the weighted average time to receipt of (PV) cash flows.

Modified Duration [ $\text{MacD}/(1+r)$ ] indicates how the price of a bond is expected to change in response to a 100bps change in interest rates.

| Sensitivity MX of A&B |        | Est. Portfolio Duration |
|-----------------------|--------|-------------------------|
| Bond A                | Bond B | Wgt. Duration           |
| 15%                   | 85%    | 5.49                    |
| 20%                   | 80%    | 5.34                    |
| 25%                   | 75%    | 5.18                    |
| 30%                   | 70%    | 5.03                    |
| 35%                   | 65%    | 4.88                    |
| 40%                   | 60%    | 4.72                    |
| 45%                   | 55%    | 4.57                    |
| 50%                   | 50%    | 4.42                    |
| 55%                   | 45%    | 4.26                    |
| 60%                   | 40%    | 4.11                    |
| 65%                   | 35%    | 3.96                    |
| 70%                   | 30%    | 3.80                    |
| 31%                   | 69%    | 5.00069                 |

(Closest to 5%)

| Modified Duration | Contribution to Portfolio Duration | Convexity | Immunized Weight |
|-------------------|------------------------------------|-----------|------------------|
| 2.75              | 1.10                               | 10.33     | 31%              |
| 5.67              | 3.69                               | 40.75     | 69%              |
|                   | 4.79                               |           | 100%             |

| DurConvex    |          |            |                 |                   |                     |             |              |
|--------------|----------|------------|-----------------|-------------------|---------------------|-------------|--------------|
|              | Year (t) | Cash Flow  | Discount Factor | PV of CF          | t * PV(CF)          | Weight      | Conv         |
| Bond A       | 1        | \$ 16,000  | 0.9524          | \$ 15,238         | \$ 15,238           | 3.92%       | 0.07         |
|              | 2        | \$ 16,000  | 0.9070          | \$ 14,512         | \$ 29,025           | 3.73%       | 0.20         |
|              | 3        | \$ 416,000 | 0.8638          | \$ 359,356        | \$ 1,078,069        | 92.35%      | 10.05        |
| <b>Total</b> |          |            |                 | <b>\$ 389,107</b> | <b>\$ 1,122,332</b> | <b>100%</b> | <b>10.33</b> |
| Bond B       | 1        | \$ 36,000  | 0.9524          | \$ 34,286         | \$ 34,286           | 5.40%       | 0.10         |
|              | 2        | \$ 36,000  | 0.9070          | \$ 32,653         | \$ 65,306           | 5.14%       | 0.28         |
|              | 3        | \$ 36,000  | 0.8638          | \$ 31,098         | \$ 93,294           | 4.90%       | 0.53         |
|              | 4        | \$ 36,000  | 0.8227          | \$ 29,617         | \$ 118,469          | 4.67%       | 0.85         |
|              | 5        | \$ 36,000  | 0.7835          | \$ 28,207         | \$ 141,035          | 4.44%       | 1.21         |
|              | 6        | \$ 36,000  | 0.7462          | \$ 26,864         | \$ 161,183          | 4.23%       | 1.61         |
|              | 7        | \$ 636,000 | 0.7107          | \$ 451,993        | \$ 3,163,953        | 71.21%      | 36.17        |
| <b>Total</b> |          |            |                 | <b>\$ 634,718</b> | <b>\$ 3,777,526</b> | <b>100%</b> | <b>40.75</b> |

| Verify | Market Value Post Immunization | Face Value Post Immunization | Duration and Convexity Adjustment |
|--------|--------------------------------|------------------------------|-----------------------------------|
| Bond A | \$ 317,386                     | \$ 326,271                   | \$ (8,554.81)                     |
| Bond B | \$ 706,439                     | \$ 667,798                   | \$ (38,602.28)                    |
| Total  | \$ 1,023,825                   | \$ 994,069                   | \$ (47,157)                       |

| FV of Coupon (Reinvestment Risk Change due to $\Delta y$ ) |            |            |
|--|------------|------------|
|  | Pre-Imm    | Post-Imm   |
| Bond A   | \$ 88,410  | \$ 73,569  |
| Bond B   | \$ 198,923 | \$ 225,866 |
| Total  | \$ 287,333 | \$ 299,435 |

|           | Original Port In 5 Years<br>(no rate shock) | Post-Imm Port in 5<br>Years (rate shock) |
|-----------|---|--|
| Bond A    | \$ 400,000                                  | \$ 326,271                               |
| Bond B    | \$ 611,156                                  | \$ 667,798                               |
| Total     | \$ 1,011,156                                | \$ 994,069                               |
| FV Coupon | \$ 287,333                                  | \$ 299,435                               |
| \         | \$ 1,298,489                                | \$ 1,293,504                             |

| Pre-Immunization Portfolio & No Rate Shock |                 |                  |               |
|--|-----------------|------------------|---------------|
| Bond B In 5 Years                          | Time to Receipt | Cash Flow Amount | Present Value |
| 1  | 1               | \$ 60.0          | \$ 57.14      |
| 2  | 2               | \$ 1,060.0       | \$ 961.45     |
|  |                 |                  | \$ 1,018.59   |
|  |                 | Face Value       | \$ 1,000.00   |
|  |                 | Price            | \$ 1.0186     |

| Post-Immunization Portfolio & Rate Shock |                 |                  |               |
|--|-----------------|------------------|---------------|
| Bond B In 5 Years                        | Time to Receipt | Cash Flow Amount | Present Value |
| 1  | 1               | \$ 60.0          | \$ 56.60      |
| 2  | 2               | \$ 1,060.0       | \$ 943.40     |
|  |                 |                  | \$ 1,000.00   |
|  |                 | Face Value       | \$ 1,000.00   |
|  |                 | Price            | \$ 1.0000     |