Sample problem #7: interest rate hedging

The Bogus bank has the following market value asset/liability structure:

<table>
<thead>
<tr>
<th>Assets</th>
<th>$10,000,000</th>
<th>Asset duration (modified)</th>
<th>8.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liabilities</td>
<td>9,000,000</td>
<td>Liability duration (modified)</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The bank considers short-selling a T-bond with a modified duration of 10.0 and a price of $125,000.

What is the bank's interest rate exposure?

a) what is the bank equity Price Value of a basis point (PVBP)?

Define PVBP:

\[ PVBP = \text{Value} \times \text{modified duration} \times 0.0001 \]

\[ = \text{dollar change in value for 1 basis point increase in yield-to-maturity} \]

\[ \text{Asset PVBP} = 10,000,000 \times 8.0 \times 0.0001 = 8,000. \]

\[ \text{Liability PVBP} = 9,000,000 \times 2.0 \times 0.0001 = 1,800. \]

therefore, equity PVBP = Asset PVBP – Liability PVBP = $6,200

How many (dollar value) T-Bonds should the Bogus bank trade in order to minimize interest rate risk? (Ignoring all other considerations).

\[ \text{The Bond PVBP} = 125,000 \times 10.0 \times 0.0001 = 125. \]

Bank should sell \[ 6,200/125 = 49.6 \] bonds.

Sell roughly 49 bonds at 125,000 each.