The objective of this assignment is to confirm some of the results presented to you in week 07, on slides 40–42. We proceed as follows.

In a spreadsheet, create three separate sheets, labelled 'Part a', 'Part b', and 'Part c'. Then answer the following questions.

1. [*3 marks*] On your sheet labelled 'Part a' do the following.

   Firstly, you are required to price a number of bonds (30 in all). We start by considering a 2% Treasury bond, maturing in 7 years. Price this bond at yields to maturity of

   - 47 basis points under CY_{20}.
   - 153 basis points over CY_{20}.
   - 353 basis points over CY_{20}.

     $\vdots$

   - 1 753 basis points over CY_{20}.

   where CY_{20} is the Australian 10-year government bond yield for calendar year 2020 (i.e., the 10-year government bond yield on 31 December 2020).*

   Next, consider a 10% Treasury bond, maturing in 7 years. Also price this bond at yields to maturity of

   - 47 basis points under CY_{20}.
   - 153 basis points over CY_{20}.
   - 353 basis points over CY_{20}.

     $\vdots$

   - 1 753 basis points over CY_{20}.

   Finally, consider a 20% Treasury bond, maturing in 7 years. Also price this bond at yields to maturity of

   - 47 basis points under CY_{20}.
   - 153 basis points over CY_{20}.
   - 353 basis points over CY_{20}.

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*You will need to use `FactSet` to find this value.

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$\vdots$

- 1 753 basis points over CY_{20}.

2. [*3 marks*] On your sheet labelled 'Part b' do the following.

   Produce one graph of the prices (against yields) you calculated above for the three different bonds—that is, all three bond results should be plotted in the one graph. Price should be the vertical axis of your graph. Label the three curves you have plotted as '2% coupon', '10% coupon', and '20% coupon'.

3. [*4 marks*] On your sheet labelled 'Part c' do the following.

   Consider the move in yield from $i_0 = 7\%$ to $i_1 = 5\%$. By adjusting our approximate formula for modified duration, calculate the (approximate) duration of each of the three Treasury bonds maturing in 7 years we worked with above (one with 2% coupon, one with 10% coupon, and one with 20% coupon).

   Next, consider the move in yield from $i_0 = 15\%$ to $i_1 = 17\%$. Using your formula above, calculate the approximate duration of each of the three Treasury bonds maturing in 7 years we worked with above (one with 2% coupon, one with 10% coupon, and one with 20% coupon).

$\boxed{\text{End of task}}$

The submission deadline for the spreadsheet project is 9.00 a.m. on 4 May 2021. You will need to submit your solutions (in one functional `.xlsx` or `.xls` file) to the link on `iLearn` prior to this time. Your spreadsheet should be clearly labelled and easy to understand. Make sure you identify what the "inputs" and "outputs" are. Include necessary information (e.g., title, axis titles, etc.) in your plot. Document and describe the steps in the development of each tab of your spreadsheet.

   Please note that uploading a file can take up to 15 minutes. You need to submit your file at least 20 minutes before the deadline to ensure a successful submission.