**BEFORE YOU BEGIN: MAKE SURE THAT YOUR FILE FOR PART 2 (Retirement problem) is saved as MACRO ENABLED FILE (xlsm file ending).**

**Learning Objectives: Part 1: Understand and develop the Weighted Average Cost of Capital (WACC) for Procter & Gamble. Use that WACC in a discounted cash flow (DCF) analysis. Perform sensitivity analysis on a DCF analysis. Part 2: Write VBA code to develop a “real world” retirement analysis.**

**Excel objectives: Use of XLOOKUP, Max in an Array function, sensitivity analysis, regression analysis, VBA, analyze output.**

**Instructions for completion:**

It is assumed that you have watched the WACC videos prior to beginning this case. This homework will not explain in details any theoretical knowledge or models. That is the purpose of watching the videos. **Your starting file should be what you submitted for Case 3, but corrections from Case 2 SHOULD be made prior to beginning your work!**

**Please do the work in the “Pre-Work” instructions FIRST.**

If you want to see where I got the book value data in the tab named “MV Debt and Weighted YTM,” you will need to examine firm 10-Ks..

How to access 10-K’s:

Go to [www.sec.gov](http://www.sec.gov)

Go to “Search Filings” and select “Full Text Search”

Type Procter & Gamble or PG

Under Browse filing types, select the box with 10-k.

Select the 10-K **filed** on 8/5/2024 (for the year ending June 30, 2024).

Once you open the 10-K, go to “Sections” and go to “Notes to Financial Statements” and under this, select “SHORT-TERM AND LONG-TERM DEBT.”

**WACC:**

In the videos: I show you how to compute WACC using 2016 as “your time 0”.

**A few differences exist for P&G, and these are outlined below.**

Your case should be completed with 2024 fiscal year end as your “time 0”. “Time 0” will be the date of the 10-K (June 30, 2024). The filing date is usually 45 or so days later and is when P&G uploaded the file to the Securities and Exchange Website. The “date” of the 10-K is June 30, 2024. You can see this on page 1 of the 10-K (viewable under the document format). Therefore, the data you use for this analysis should be as of this date (or the closest PRIOR date).

The “basics” of case #4 are *similar* to what is in the video, but you will need to complete this analysis for a different year, a different firm, and a few minor other differences!

**Instructions continued on next page**

**I provide “numbers only” files for both. They are listed here in this assignment tab as:**

1. **“Three\_Statement\_Model\_Valuation\_Goes\_With\_Videos\_WACC\_numbers\_only.xlsx”**

**B) “Case\_4\_Numbers Only\_Spring\_2025.xlsx” (Check values for DCF Analysis sheet and WACC\_Growth Sheet)**

**Worksheets that you will need for Part 1 of this case.**

WACC and Growth

MV Debt & YTM

Debt Details

Required Return Equity, Re,

Beta Computation

DCF Analysis

Part 1: Compute WACC, use this WACC in the DCF analysis and perform some sensitivity analysis

**Details of work necessary; Any cell in grey needs a formula**

**Please watch the videos for week ; this will help you greatly!**

1. “MV Debt and YTM” and “Debt Details” Worksheets

**Different from videos (and much cleaner!):**

Debt details worksheet: In Cells A1 through F31, I provide the % price and the Yield (YTM) for ***each piece of debt that P&G has issued which is still outstanding***. **Nothing is required for you in this tab.**  You will “pull” data **from** this tab **into** MV Debt and Weighted YTM tab.

**This data was obtained from Bloomberg. These are prices as of the data of the 10K (or closest to that date).**

**MV Debt and Weighted YTM (Rd)**

In this worksheet, you will be computing a weighted average YTM to use as “Rd” in the WACC equation. You will compute a weighted average YTM for long term debt, short term debt, and then you will combine that into a single YTM, which will serve as “Rd” in the WACC equation.

**Instructions continued on next page**

**MV Debt and Weighted YTM (Rd), continued**

In A6 through 40 you will find the various pieces of P&G debt. In column A is the name; in column D is the year of maturity, followed by the Coupon rate and Book value in Columns E and F, respectively. These data have been pulled from the company 10-K.

Using the XLOOKUP function, pull the **YTM** (column J) from the “Debt Details” sheet. You can follow what I did or Column G where I pulled in the Price. Note: In the videos Index/Match were used, but XLOOKUP had not been developed yet! Your match criteria will be Year of Maturity and Coupon Rate. **I have provided a primer video on XLOOKUP in the module named “Module Week 10: Weighted Average Cost of Capital.”**

In Column F are the book values of each piece of debt. You need to compute market values of debt. The easiest way to do this is to take the book value and multiply that by the price. Example: if the book value of the debt is $300 million, and the price of one bond is 103.50, the market value will simply be $300 x 103.50/100 = $310.50 (recall that the prices are stated as percentages; this is why we divide by 100). Once you have the market values, you can compute the weight that each piece of debt comprises in the totals. Take the weight and multiply it by that bond’s YTM, and sum that column (Column K). For “all other long-term debt” (row 39 of this worksheet), assume the price is 100% (already in your template) and assume the YTM is 3.2% (please put 3.2 in cell J39.).

For short term, debt, you will work in cells A44 – K48. I’ve put the YTMs in this section for short term debt. Assume that the market value of short-term debt is equal to its book value; therefore, assume the “price” for each piece of short-term debt is 100 (See Column G).

Finally, make sure the area from A51 – E55 calculates the weighted YTM correctly. Note: Yields should appear just as a regular number, not a decimal. We will later divide by 100.

1. Required Return Equity, Re and Beta computation Worksheets

In the Required return equity, Re worksheet, you will see “pieces” of the Capital asset pricing model equation. In addition, in Cells B4 and B5 you will find a “drop down menu” for the period of time over which beta needs to be computed, and a selection of the market index you should use. Please select 60 months and S&P.

In cell B8, you should see a hardcode value of the 30-year treasury rate of 4.51%. This is the rate as of 6/28/2024, obtained from [www.treasury.gov](http://www.treasury.gov).

**Instructions continued on next page**

**In Cell B9, you need to write a nested if statement or Xlookup that will pull the correct beta (from the beta worksheet) based on any combination of the drop-down menus in B4 and B5. Even if Cell B9 is not gray in your file, this needs a formula!**

Those beta choices include a 60- or 120- month beta, and a market return which is either an equally weighted (EW) return for all stocks, a value weighted (VW) return for all stocks, and the S&P 500 return. So B9 should populate the betas computed in the beta computation worksheet that corresponds to these possibilities. More on the beta computation below.

The market risk premium should be 5.5% according to Pablo Fernandez 2024 study.

1. Beta computation worksheet

**Note: This worksheet has a few extra columns as compared to the one in the videos. But your “check numbers” file for Case 4 matches your template for Case 4. The numbers only file that goes with the videos is also provided in this assignment!**

You will be computing a 60- month beta and a 120- month beta which will be “fed” into the Required return of equity, Re worksheet).  **In the videos, we computed 36- and 120- month.**  Before you begin, carefully examine the formulas in N2 through U145. Notice the formulas are currently returning #VALUE for some cells. Once you complete the formulas in this sheet, the returns that you will need will populate, and the ones you do not need will remain blank.

**Make sure all cells have a formula or a hardcoded value!**

**Cells W5, W13 W16 and should have a hardcoded date of 12/31/2023 (the last return that you need for each of your betas is the one from December of 2023).**

**Note: We are using data from CRSP (Center for Research and Security Prices; the last month of data they have is as December 2023). In the “real world” we could use Bloomberg data, but CRSP has very reliable time series data for stock returns (back to 1925!) and multiple “market” measures.**

Please use the “EDATE” function in Cell W12 as follows: =EDATE(W13,-W7+1). This should return 1/31/2019 as the first return in the 60-month series. Series 1 (which will be associated with the 60-month betas) use data from January 2019 through December of 2023.

Use the “EDATE” function in Cell W15 as follows: =EDATE(W16,-W8+1). This should return 1/31/2014 as the first return in the 120-month series. Series 2 (which will be associated with he 120-month betas) use data from January of 2014 through December of 2023.

**In Cell AB5, I have hardcode the per share price of Procter & Gamble (From Finance.Yahoo.com) on 6/28/2024.**

**Instructions continued on next page**

Now using the slope function and the data in columns N through U, compute betas in W19 through X24. Make sure you reference ALL rows (**2 through 145**) in the slope function so that your betas will work if you change the # of months. You may want to test this! Go back to Required return, equity Re worksheet and make sure it is all working! That is, your nested if formula in Cell B9 (Required return equity worksheet) is “pulling” the correct beta from “Beta computation” worksheet.

1. WACC and Growth Worksheet

See the WACC and Growth tab; looks like this:

Table

Description automatically generated

**Since P&G has preferred stock, we have a WACC formula as follows:**

**WACC = D/V x Rd (1-T) + E/V x Re + P/V x Rp**

**Where V = (D + P + E)**

**D = market value of debt, P = Book value of preferred stock, and E = market value of common equity**

**Instructions continued on next page**

We are therefore weighting the required returns of common equity, preferred equity, and debt.

Read the following carefully:

Pull the data necessary (listed in the labels) so you can compute WACC. Make sure everything you “pull” is as of your time 0 (data of 10-K or the latest date prior to this date).

Write formulas in B6 through B17; hardcode 2.75% as your growth rate (cell B20); all other items are referencing (pulling) data from other sheets.

Market value of debt should “pull” from MV Debt and Weighted YTM. You want the market value of ALL interest-bearing debt.

Market value of equity = Price (from Row 17) x Shares outstanding (Row 16)

In Rows 16 and 17, you will “pull” shares outstanding from multiple valuation sheet and per share price from beta computation sheet.

Preferred equity: “Pull” the book value of preferred stock from the 2024 balance sheet. That is, NOT a forecasted balance sheet, but a “time 0” balance sheet! Should be 798.

For Rd: Pull the weighted YTM from MV Debt and Weighted YTM worksheet

For Re: Pull from the Required Return Equity worksheet

For Rp: Write formula: =Preferred dividends / book value of Preferred equity (Cell B8)

Preferred dividends can be “pulled” from Multiple valuation tab. It should be $284.

The shares outstanding you need are those from the balance sheet, **not weighted shares outstanding!** You could pull these from either WACC\_Growth Hardcode sheet OR your multiple valuation sheet! **Tax rate should be the tax rate used in your forecast. Make sure you are pulling 20%, not a historical tax rate!**

**Instructions continued on next page**

1. DCF Analysis Worksheet

Change your terminal value formula (Cell F15) to reference the **WACC that is now computed in the WACC and growth sheet.** Also reference the growth rate in the WACC and Growth sheet. Change your formula for value of the firm (Cell D19) to reference the new WACC that you just computed.

**Recall for case #2: You hardcoded the growth and WACC (for terminal value, Cell F16 and value of the firm, Cell D19). You also used book value of debt less cash as proxy for market value. We are updating this now to include market values of debt AND the preferred stock value!**

**Change cell D20 to the following:**

**Market value of all interest-bearing debt (pull from WACC and Growth)**

**PLUS book value of preferred (pull from WACC and Growth)**

**LESS the 2024 cash balance (from the balance sheet)!**

**This value (in Cell D20) is now subtracted from the value of the firm to obtain the value of equity.**

1. WACC and Growth

Using What if analysis, do a sensitivity analysis on the stock price if you were to change the growth rate and the WACC. This should be done in WACC and Growth Worksheet (Not WACC\_Growth Hardcode). The placement of the table is already in this worksheet, so use the WACCs and growth rates already there.

1. Analysis Write-up

Please write a page (approximately 2 – 3 paragraphs) analysis of the sensitivity analysis on WACC and growth. What does this analysis tell you? How sensitive is your analysis to changes in these inputs? If you were an analyst for Procter & Gamble, would you issue a BUY, SELL or HOLD recommendation? Explain your rationale.

**Instructions continued on next page**

**Part 2**

Use the file named “VBA\_Macros\_Examples\_Student\_Version.xlsm

**Worksheets that you will need for Part 2 of this case:**

Retirement

Instructions: Replicate the VBA code shown in the videos regarding VBA. In order to do this, you must also replicate the worksheet named “Retirement.” You need to test your code as shown in the videos with TEST MODE = 1 (Cell B17). When TESTMODE = 1, your values in the excel sheet should match the videos.

**Once you change the value of TEST MODE (Cell B17) to 0, your values will not match the numbers in the videos because now the values are variable, based on the Monte Carlo simulation!**

**When you turn your file in, make sure that your Excel file has TESTMODE =0 in the worksheet (Cell B17).**

**Also, have your VBA code have the line Z =0 is commented out. Example:**

**‘Z = 0**

**If your VBA code runs properly, the average savings (Cell F3) should be around $1.6 million.**

**Your final excel file should have:**

1. **Cell B17 with a value of 0**
2. **VBA code with Z=0 commented out**

**Note: these are consistent. Testmode = 0 is the same as having Z=0 commented out in the VBA code.**

**Instructions continued on next page**

**Submission information:**

**IMPORTANT: YOUR RETIREMENT FILE MUST BE MACRO ENABLED. That is, the FILE ENDING will be .xlsm**

**You will submit 3 files (an Excel file and a Word file for part 1 and an Excel file for part 2)**

**EXCEL FILES:**

**The two excel files will be submitted to the Assignment named “Case #4A Wacc + Sensitivity analysis +VBA Retirement EXCEL”**

**Part 1 Excel**: **For cases, only one person per group will submit!**

On the information sheet, for “GROUP\_Number” please put your group number (Group   
numbers are posted on Canvas). Please use digits for the group number: Examples: 1, 9,   
23, etc. For the GT Login, write the GT Login of the submitter. This IS not the GTID,   
but your login. Mine, for example, is jgarner47.

**For cases, only one person per group will submit! Please name the file upon completion: Case\_4\_Group\_number.xlsx**

**If you are group 3, your file would be named:**

**Case\_4\_Group\_3.xlsx**

As with other assignments, anything in gray needs a formula unless otherwise stated above. Given the current corporate tax rate, use 33% for the corporate tax rate (an estimate of federal plus state).

**Part 2 Excel:**

For the retirement VBA code, name your file as follows:

**Retirement\_Case\_4\_Group\_number.xlsm**

**YOU MUST SAVE AS MACRO ENABLED FILE!!!**

**WORD FILE:**

**The word file will be submitted to the Assignment named “Case #4B Wacc + Sensitivity analysis +VBA Retirement Conceptual Portion”**

For the analysis file: Name your file as follows:

**Case\_4\_Group\_number.docx**

**REMINDERS:**

Remember to name your files as indicated above!

Don’t forget to save the retirement file as macro enabled!

**END OF INSTRUCTIONS**