

Group Assignment Problem Set

Due Date: Friday 15th October 2021 at 5pm.

Group: This is a group assignment. Your group should contain 5 students. If you have not been registered in a group before Thursday 9th September 2021 at 6pm, you cannot participate in the group assignment and will receive a grade of 1 for this part.

Overview: The objective of this group assignment is to assess students' ability to apply the theoretical knowledge learnt during the lectures to practical cases. Some of the questions might go beyond what we covered during the lectures. Students are required to do additional readings in the reference book, in any other relevant books, or online.

Grade: The group assignment counts for 25% of your final grade for this course. All group members will be assigned the same grade for the group assignment unless the Peer Assessment reveals free-rider issues in the group. The maximum number of points is **100**. There are 30 points per question and 10 additional points for the presentation/writing of the final document. The number of points per sub-question is provided for each question in parenthesis. The grade distribution is as follows:

Grade	Cut Off % Range
1 (Serious Fail)	0 - 29
2 (Fail)	30 - 46
3 (Fail)	47 - 49
4 (Pass)	50 - 64
5 (Credit)	65 - 74
6 (Distinction)	75 - 84
7 (High Distinction)	85+

Layout and presentation:

1. Your document should be typed in **Times New Roman font, size 12**.
2. The assignment should be **1.5 lines-spaced** and have **margins of 2.54 cm** (standard).
3. Include a cover page with the group number and the names of the team members.
4. The answers to the different questions must be written in the document. For calculation questions, you need to show all your workings (including timeline if appropriate) and round your final answers to two decimal places (intermediate answers should keep at least 6 decimals). All results (including tables) from Excel need to be reported in the written document.
5. All your answers must be *typed in*, handwriting/drawing is not acceptable.
6. Your Excel file should include the data and all workings and calculations for questions 2 and 3. You must also include the date of your data collection for Q2 as some of the data are real-time. **Formulas for the calculations should have cell references** wherever possible. If you have computed a number incorrectly and just typed that number into the

spreadsheet (or typed a formula using numbers when cell references could have been used), you will not receive partial credit for any portion of your computation that is correct.

7. If you use any reference (e.g. Journal, Book, website etc.), you must reference it according to UQ Harvard Referencing Style. You must also format your reference list (bibliography) in line with Harvard Referencing Style which can be accessed here: <https://web.library.uq.edu.au/research-tools-techniques/referencing-style-guides>
8. An **additional 10 marks** will be awarded for clear presentation and writing (academic English). Make sure that there are no mistakes and that your tables are well formatted before sending the document!

Submission: Read the document ‘Group Assignment Submission Guidelines’ and follow the instruction. **Only one team member** must submit the documents **at any time** through Blackboard and Turnitin. You must include the solutions of the three questions in ONE single PDF file and save your document as “Groupnumber_FINM1415assign.pdf”. E.g., if your team number is 65, save your assignment as “Group65_FINM1415assign.pdf”. The Excel file must be saved as “Groupnumber_FINM1415assign.xlsx”. On Turnitin, you must only upload the PDF document.

Late Penalties: Late penalties apply! 10% per calendar day (or part thereof)! Don’t submit at the last minute! Penalties start from Friday 15th October 2021 at **5.01pm**.

Question 1: Estimating your pension rent (30pts)

You have just been graduating from UQ and start your first job as Financial Analyst at Westpac Banking Corp. in Brisbane. The company offers you a commencing salary of AUD 60,000 per annum, which is paid at the end of each month in your bank account. In addition, Westpac will contribute an amount equal to 14%¹ of your salary to your Superannuation account² at the end of each month (i.e., this amount is paid to your fund in addition to your salary). As part of the Australian Government plan, you are also allowed to make arrangement with the employer for extra contributions made into your super account from your salary (called ‘concessional contributions’).

Westpac Superannuation Fund gives you the option to choose between several funds and the percentage you want to allocate in each of them. Here are the different funds provided as well as their rates of returns over the past years.

INVESTMENT OPTION	RATES OF INVESTMENT RETURNS		
	6 MTH %	5 YR % P.A.	10 YR % P.A.
Conservative	2.21	4.06	5.80
Conservative Balanced	4.08	5.30	7.15
Sustainable Balanced	7.44	10.23	9.60
Growth	10.01	11.47	10.65
High Growth	12.24	13.48	11.78
Cash	0.04	1.28	2.05
Australian Bond	-1.87	2.65	4.15
Listed Property	13.59	5.35	10.32
Australian Shares	12.91	12.62	10.15

After analysing the risks and benefits of each of the funds, you decide to invest your monthly contributions in four different funds as follows:

INVESTMENT OPTION	ALLOCATION
Conservative	20.00%
Sustainable Balanced	20.00%
Cash	30.00%
Australian Shares	30.00%

¹ This percentage takes into consideration the flat tax rate and fund fees.

² Superannuation is a compulsory system in Australia of placing a percentage of your income into a fund to support your financial needs in retirement. For more information about superannuation, you can read this: <https://www.ato.gov.au/individuals/super/>

You start the job just after your 26th birthday and expect to retire when you turn 66 (i.e., after working 40 full years). You also expect your annual salary to increase by 2% every year up to your retirement. The payment of the new increased salary takes place at the end of the first month of each new year.

Once you will retire, the entire amount in your Superannuation account will be transferred as a lump-sum payment into a savings account paying 1.2% P.A., with interests compounded monthly. You will use this account to generate a constant monthly pension rent for the next 30 years (i.e., the savings account will be empty after 30 years). Your first pension payment will be paid at the end of the first month after you turned 66.

1. Calculate the amount of your first and last monthly salary payment, as well as the first and last monthly contribution to the Superannuation fund. (4pts)
2. You assume that the annual return (APR) over the past ten years (10 YR % P.A.) is a good indicator of the rate of return you will be able to earn on your future monthly Superannuation contributions. Based on the funds and the allocation you have decided above, calculate your expected rate of return on your investment (in % P.A.). Hint: for more information about the expected return of a portfolio, read Ch. 11.1 of Berk & DeMarzo. (2pts)
3. Using the appropriate rate of return based on your estimation above, calculate the amount of the monthly pension rent you will receive after your retirement. (9.5 pts)
4. If you wish to receive a monthly pension rent that is worth 75% of your last salary, is the 14% contribution from your employer large enough? If not, what extra monthly contribution (in percentage of your salary) should you do to reach your target level of pension rent? (9.5 pts)
5. To estimate the pension rent, we used several hypotheses about the future. Comment on five of these hypotheses and how realistic they are. (5pts, max. 250 words)

Question 2: Estimating a stock price (30pts)

As a new financial analyst for Westpac, your first assignment is to analyse the stock of Pfizer Inc., an American pharmaceutical corporation very in demand since the release of its Covid-19 vaccine. Your immediate superior recommends determining prices based on both the dividend-discount model and the method of comparable. He also tells you that some senior analysts from Westpac—that have already followed the entire FINM1415 course at UQ—have estimated the cost of equity of Pfizer Inc. to be 5.53%.

You are a little concerned because your finance professor had indicated that using several methods can result in widely differing estimates when applied to real data. You are really hoping that the two methods will result in similar prices and that you will be able to give a good recommendation to your superior. Good luck with that!

To start your analysis, go to Morningstar (www.morningstar.com) and search for Pfizer Inc. at the top-left of the page. From the main page for Pfizer Inc. (PFE), gather the following information and enter it onto the spreadsheet named “Q2”:

- The date you collected the data
- The current stock price (last trade – highlighted in red).
- The number of shares outstanding (found by clicking on “Short Interest” tab), **in thousands**.

Next, click on “Dividends”, and find the current annual dividend amount (Dividend Per Share). Report it onto your spreadsheet.

Come back to the main page for Pfizer Inc. by clicking on “Quote”, then click on “Key Ratios” tab and click on “Full Key Ratios Data” tab. This opens a new webpage (financials.morningstar.com/...) with more detailed data. Click on the *Export* button at the top-right of the headline “Financials”. Copy-past all this information onto the spreadsheet named “DataForQ2” in your Excel file. You can delete the column TTM as you will not use it for your analysis. You can also delete all the data below the headline “Key Ratios -> Growth”.

Return to the webpage (financials.morningstar.com/...) and click now on “Valuation” tab, then on “Wall Street Estimates”, and report in your initial spreadsheet the *Five-Year Growth Forecast*, which is found just below the headline “Analyst Ratings”. This is an annual growth rate. It shows the consensus among analysts concerning the company’s long-term growth rate.

You have now all the data necessary to determine the stock value based on the dividend-discount model. You can now follow the different steps:

1. You believe that the *Five-Year Growth Forecast* is a good indicator of the annual growth rate of the dividend for the next 5 years. Use the current dividend found in Morningstar to forecast the next five annual dividends based on the five-year growth rate. Draw a timeline showing the amount of the next 5 dividends (rounded to 4 decimals). (2pts)

2. You are however convinced that this growth rate has been inflated thanks to exceptional circumstances of the Covid-19 vaccine, and that afterwards, the dividend growth will return to a more normal level. To estimate the long-term growth rate, you use the average Payout Ratio and Return on Invested Capital over the prior ten years. These numbers are found in your Spreadsheet “DataForQ2”. You then apply a similar formula that you saw in your finance course:

$$g = (\text{Retention Ratio} * \text{Return on Invested Capital})$$

with: Retention Ratio = (1 - Payout Ratio)

Provide your long-term growth rate. (2pts)

3. Now that you have estimated the long-term growth rate of the dividends, you can determine the terminal price of the stock price at the beginning of year 5 (i.e., at the end of year 4). (1.5pts)
4. Finalize your estimation by determining the current stock price from the dividend-discount model (i.e., at time 0). (2pts)

Congrats! You are halfway through! Now you still need to estimate the stock price using the second method: the comparable method.

To calculate the stock price based on the comparable method, you collect additional data on Yahoo! Finance (www.finance.yahoo.com). You first start collecting data for Pfizer Inc., and then repeat the task for each of your comparable companies.

Search for Pfizer Inc. at the top. Then click on “Statistics” tab. Report in your spreadsheet “Q2” the Market Capitalization (= Market Value of Equity) and the Enterprise Value (both **in thousands**), as well as the Book Value per Share. Report also the following five multiples: EV/Revenue, EV/EBITDA, Trailing P/E, Forward P/E, and P/B.

To value Pfizer Inc., you have chosen the following seven companies: Merck & Co (MRK), Abbott Laboratories (ABT), Amgen (AMGN), Thermo Fisher Scientific (TMO), Abbvie (ABBV), Eli Lilly and Company (LLY), and Gilead Sciences (GILD). Collect the same data as you did for Pfizer Inc..

You now have all the information necessary to estimate the stock price of Pfizer Inc. based on the method of the comparable. You can follow the different steps:

5. Briefly explain to your superior why you have selected these seven companies. (3pts; max. 150 words)

6. For each of the five multiples, calculate the median over the seven comparable companies (i.e., do not include Pfizer Inc.). (3pts)
7. Using each of the five multiples individually, estimate the share prices of Pfizer Inc. (5.5pts)
Note that:
 - i. for ratios involving EV, you need to convert to Market Cap by subtracting off the difference between Pfizer's EV and Market Cap (i.e., the difference between EV and Market Cap is equal to Debt minus Cash);
 - ii. for the P/B multiple, you can use directly the Book Value per Share without calculating EV or Market Cap.
8. Provide a final (unique) price estimate. Justify how you calculated it. (2pts)

Great Job! You are now done with the analysis. However, your superior still wants some additional information and explanation:

9. Compare the stock prices from the two methods to the actual stock price. What recommendations can you make as to whether clients should buy or sell Pfizer Inc. stock based on your price estimates? (2pts; max. 150 words)
10. Explain to your superior why the estimates from the two valuation methods differ. Specifically, address the assumptions implicit in the models themselves as well as those you made in preparing your analysis. Why do these estimates differ from the actual stock price of Pfizer Inc.? (2pts; max. 250 words)
11. If you believe that markets are efficient and that the five-year growth forecast used in the dividend-discount model is probably true, what level of long-term growth of the dividends would justify the observable price? Discuss your result. (5pts; max. 150 words for the discussion)

Question 3: Estimating a project value

Your superior was very happy with your first assignment and now needs your help to assess the value of a new project. Westpac is considering expanding its business to the cryptocurrency market. For this purpose, the company will have to make a considerable investment in equipment, plants, and human capital to build a new trading platform and maintain it. However, as this type of alternative investment is very much in demand these days, Westpac hopes to strongly increase its revenues and also attract a new kind of customers.

Westpac has already performed an AUD 1,000,000 feasibility study to analyse the decision to enter this new market, resulting in the following estimates for the next six years:

- Development of the new system will initially require a capital expenditure (CapEx) equal to 2% of Westpac's Net Property, Plant, and Equipment (PPE) at the end of the latest fiscal year (09/2020). It will then require an additional investment equal to 30% of the initial investment during the first year of the project.
- The new trading platform will be launched during the third quarter of the first year, but will be fully operational only after the second half of the following year. Therefore, first year revenue from the trading platform is only expected to be 1.25% of Westpac's total revenue for the latest fiscal year (09/2020). However, the new system's revenue is then expected to grow at 15% for the second year, at 20% for the third and fourth year, and then at 10% annually for the fifth and sixth year, as some other Australian banks will probably have also entered this highly profitable market at that time.
- First year general expenses from the system are expected to be 2% of Westpac's Sales, General and Administrative expenses for the latest fiscal year (09/2020) and will increase at a similar growth rate as the system's revenue.
- One hundred employees would need to be allocated to the creation and maintenance of the new trading platform. Twenty of them would be transferred internally during the first year, whereas eighty of them would be newly hired. This recruitment will take place in two stages: 50% during the first year, and 50% during the second year. Each employee will be paid AUD 125'000 per year. This is equivalent to a 25% salary increase for the twenty employees transferred internally. The transfer does not impact the revenue from the other bank's divisions.
- As some of the current customers of Westpac might transfer part of their wealth to the new trading platform, we expect revenues from previous traditional affairs (e.g., savings account, share trading account, etc.) to reduce by 0.2% of Westpac's total revenue for the latest fiscal year (09/2020). However, we also expect to attract a new clientele that might also use the more traditional affairs of the bank. This increase is estimated to be 0.1% of Westpac's total revenue for the latest fiscal year (09/2020). This is expected to happen during the first year, and to stay constant over time.
- Some of the work developed for the new trading platform will be transferable to some other divisions of the bank. Therefore, Westpac will be able to reduce the number of

employees working in the development and maintenance of the more traditional share trading platform, decreasing the personal costs in this division by AUD 5 millions per year, starting in the third year.

Your superior asks you to determine the incremental free cash flows, the NPV and the IRR of the new trading system. In addition, he gives you the following information:

- The net working capital requirements should stay similar to the rest of the company, i.e., at a constant percentage of the project's revenue. Furthermore, Westpac uses only Cash and Cash Equivalents, Receivables, and Accounts Payable to measure its Net Working Capital.
- Depreciation of the PPE's investments (CapEx) is straight-line for capital budgeting purposes over a five-year life. Therefore, the first CapEx expense (at Year 0) is depreciated over Years 1 to 5 and the second CapEx expense (at Year 1) is depreciated over Years 2 to 6.
- Westpac uses a cost of capital of 10%.
- As a very large Australian company, Westpac is not subject to the reduced tax rate and pays the entire Australian federal tax on their taxable income.
- Finally, after the sixth year, you should expect the incremental free cash flows to decline by 1% for ever.

Since your boss hasn't been much help (welcome to the "real world"!), here are some tips to guide your analysis:

1. Obtain Westpac Banking Corp financial statements. You can download the annual income statements and balance sheets for the last five fiscal years from Morningstar (www.morningstar.com). Search for Westpac Banking Corp.³ at the top-left of the page. Click on "Key Ratios" tab and then on "Full Key Ratios Data" tab. This opens a new webpage ([financials.morningstar.com/...](http://financials.morningstar.com/)) with more detailed data. Click on "Financials" tab. From there, click on the *Export* button at the top-right of the table. This will export in an Excel file the Income Statement of Westpac. Repeat the process by clicking on "Balance Sheet" tab. Copy-past the two tables onto the spreadsheet named "DataForQ3" in your Excel file. (1pt)
2. Report in the Spreadsheet "Q3", the different figures from the financial statements needed for our analysis, as well as the different assumptions we obtained from the feasibility study (i.e., fill all the green cells). For readability, use in this spreadsheet only

³ The Australian ticker of Westpac Banking Corp. is WBC, however, as Morningstar is a US company, it suggests first the ADR of Westpac Banking Corp. (ticker: WBK), which is the quotation on the NYSE. The financial statements are still similar.

numbers **in thousands AUD**. Numbers from Morningstar are in millions AUD, you need to multiply them by 1,000. (2pts)

3. Draw the timeline and set up the computation of incremental free cash flow in separate, contiguous columns for each year of the project life. Be sure to make outflows negative and inflows positive. (1pt)
4. Compute the incremental EBITDA by taking into consideration all operating revenues and costs of the project, as well as its indirect effects. Note: you might have more lines in the provided table than needed. (6pts)
5. Complete the Depreciation Schedule table for the six years and report the yearly depreciation in your incremental free cash flow statement. Calculate the incremental EBIT. (3pts)
6. Find the Australian federal tax rate for large corporations (give your source). Calculate the incremental Unlevered Net Income. (2pts)
7. To calculate the change in net working capital, complete the NWC Requirements table. Calculate the net working capital required each year by assuming that the level of NWC will be a constant percentage of the project's revenues. Use Westpac's NWC/Revenue for the latest fiscal year (09/2020) to estimate this required percentage. Use only Cash and Cash Equivalents, Receivables, and Accounts Payable to measure NWC. (3pts)
8. To determine the incremental free cash flow (without the terminal value), add back Depreciation, deduct the Change in Net Working Capital and the additional capital investment (CapEx) for each year. (2pts)
9. Use the incremental free cash flow at year 6, the future growth rate of FCF, and the cost of capital to calculate the Terminal Value of the project at the end of year 6. Add the Terminal Value in the Free Cash Flow Statement and calculate the incremental free cash flow with the terminal value. (2pts)
10. Determine the NPV of the project by discounting the incremental free cash flows (with the terminal value) at the appropriate discount rate. Also, calculate the IRR of the project using Excel's IRR function. (3pts)

You now need to present your results to your superior.

11. What recommendation can you give him concerning the investment in the new trading platform based on the different assumptions made? (5pts; max. 150 words for the argumentation)

To strengthen your argument, perform a sensitivity analysis by varying the project forecasts (one at a time) as follows:

- a. Suppose first year revenue will equal 1%–1.5% of Westpac's revenues.
- b. Suppose the cost of capital is 5%–15%.
- c. Suppose the growth rate of the FCF after the 6th year will be (+5%)–(–5%).