

Engineering Economics and Problem Solving, 4N4, 2014

Tutorial/Assignment 1

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This tutorial, and also your first assignment, has two goals: to get you started with economic concepts and to illustrate the purpose of self-directed learning (SDL). We will emphasize self-directed learning several times during the term.

Throughout your career you will have to learn new ideas and tools that you were never taught in school or university. We are going to start off this assignment/tutorial learning about one of the most important topics: your financial well-being, which obviously requires some economic understanding. Making good economic decisions for yourself is as important as making economic decisions for your employer.

Ice-breaker questions within your group

- introduce yourself to your other group members; *then*
- tell each other what you like to do in your free time *or*
- tell your group one thing you really want to achieve and learn from the 4N4 course.

You don't need to submit this part in your written solution.

Question 1

What is the average Canadian's debt-to-income ratio? Explain what this means in your own words.

Read [this article](#) either before or after the tutorial, for a different context of this ratio that is more relevant to your current situation.

Question 2

1. What is the median income of a person in Toronto? State your source and date for your data.
2. What is the median income of a person in Calgary? State your source and date for your data.

Question 3

When you start working after graduation you will either be offered:

- no pension plan (usually for contract or part-time work)
- a defined contribution (DC) plan
- a defined benefit (DB) plan

Now answer:

1. What percentage of Canadians have defined benefit plans?
2. For a DB plan: what factors influence how much money you will receive when you retire?
3. For a DC, what happens on the day you retire?
4. If the stock market goes into a prolonged stagnation during the years while you are working (e.g. like Japan has experienced for the past 11 years), which plan has the greater risk of not meeting your retirement needs?

Question 4

Assume you were born in 1992, which should be about right for most of you. Give a rough estimate (based on evidence) that shows how likely

- you will live to age 70, in Ontario, if female
- you will live to age 90, in Ontario, if female
- you will live to age 70, in Ontario, if male
- you will live to age 90, in Ontario, if male

Question 5

List the sources of income that are available to you as a Canadian citizen during your retirement. Assume that you have worked for a company with a DB plan for the first part of your career, and another company with a DC plan for the last part of your career.

Question 6

- What's the average retirement age in Canada?
- What would be a reasonable number of years to aim to save money for, starting from when you retire?
- The year before you retire you will be earning $\$X$ of income. When you retire you require less money, e.g. you don't need to save money anymore for retirement, you probably require fewer clothes, and commuting costs are much lower, *etc.* What fraction of pre-retirement income do pension planners use, as a rule-of-thumb, to estimate your income requirements during retirement; e.g. $0.4X$, $0.5X$.
- Given your answers above, now calculate an estimate of the total amount of money that would be required during the entire retirement duration, if $\$X = \$100,000$.
- Is anything missing in the above estimate? (*Hint*: does the fraction remain constant? *Bonus*: what fraction do retirement planners consider normal for the first year or two of retirement?)

Question 7

What trusted sources of information can you find now to keep reading during your lifetime that inform you about retirement issues, and planning for income during your retirement?

Question 8

Consider the case of using an RRSP as one option to save for retirement. An RRSP allows you to invest in mutual funds, stocks, and other investments. Let's take a look at how an RRSP might help you.

- What does RRSP stand for?
- We hear about people "maxing out their RRSP". What is the maximum amount a person could contribute to their RRSP in 2013?
- Why do you think the government allows RRSP deductions? Do they ever make this lost revenue back?

Question 9

- What does TFSA stand for?
- If you filed a tax return in 2009, 2010, 2011, 2012, and 2013 then you are eligible to put money into your TFSA, even retroactively, for all 5 of the years. In other words, your contribution amount gets carried forward. In this scenario, what is the maximum amount you could have invested in a TFSA?
- What is main distinguishing feature between a TFSA and an RRSP?

Question 10

For the previous questions on RRSPs and TFSAs we said you can buy “investments” and “funds” for these accounts.

- Where do you buy these stocks and investments?
- Where are they held?
- Write a bullet point list of things you need to do to open a stock-market investment account.

There is no need to submit this question in your solution.

Question 11

You need to repay someone \$5000 in 5 years from now. What average rate of interest should you try to find in order to cover that debt if you have \$4000 to invest right now? Show your calculations.

Question 12

If you deposit \$7,000 every year – which is a just under \$600 that you set aside every month – how much money will you have saved in a bank account that gives interest at 3% (annually)? State your assumptions and show your calculations, at least for the first 2 periods.

Question 13

Every year your company needs to buy \$900,000 of a speciality chemical used in a reaction. Historically, it seems that your company has always paid around \$900,000 to the supplier for the same amount of chemical over the past 8 years. It has a stable price.

If you have to set aside a single amount of money today to cover the cost of this chemical for the next 5 years; do you set aside more or less that $\$900,000 \times 5 = \$4,500,000$?

Show the exact amount, and calculations, you should set aside if time value of money is considered to be $i = 8\%$.

Question 14

Each week your group will have a chance to evaluate each other (confidentially) as part of ongoing peer assessment. In your groups decide on 5 criteria to judge each other. Assign a numeric weight to each criterion, so that the sum of the 5 values equals to 20. The weights can be positive *or* negative values.

So your answer should be a matrix of 5 rows and 2 columns, with the second column being a numeric value, and the first column contains the name and description of how that value is judged.

END