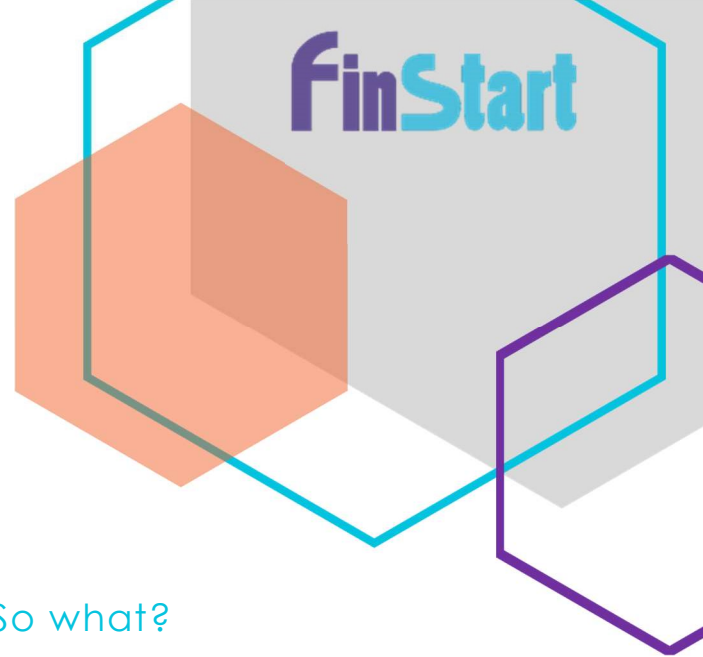


BRINGING FINANCE TO YOUR CLASSROOM



A FinStart Newsletter for Teachers Interest Rates, October 23, 2020

What?

A recent Wall Street Journal article asked “how to think long term with near-zero interest rates”?

Original article
https://www.wsj.com/articles/how-to-think-long-term-with-near-zero-interest-rates-11600507800?mod=markets_major_pos4

How and why?

Interest rates have been falling since the early 1980s.

A big factor is a larger number of aging people (who tend to save more and whose demand for safe investments pushes interest rates lower).

More recently, the shocks of the 2008-09 financial crisis and the COVID-19 pandemic led authorities to lower interest rates to stimulate the economy.

So what?

Are low interest rates good or bad? It depends on whether you are a saver or a borrower.

Borrowers benefit from low interest rates. Low rates reduce their ongoing loan payments. This leaves them with more money to spend.

Savers - those who deposit money into savings accounts or buy GICs - earn less when interest rates are low. This leaves them with less money.

Here’s something to think about. Borrowers tend to be younger and savers tend to be older. So when interest rates are lowered to stimulate the economy, some say that young people benefit at the expense of older people.

Teaching with FinStart

Interest rates appear in three sections of the FinStart website:

1. Savings Accounts.
2. Investment Accounts, where we also address GICs.
3. Loans.

Both case studies in this newsletter can be used when covering these modules. The case studies aim to develop general intuitions about interest rates. No calculations are required. Solutions and additional talking points follow the case studies.

If you haven’t done so, please review our 5-minute video on Teaching with FinStart on the Teacher Portal.



Image: Gerd Altmann from Pixabay.

INTEREST RATES

Let's make sure we're on the same page

Savings accounts pay interest based on your balance.

- They're flexible - you can withdraw / transfer as much money as you please any time, up to your balance.
- Remember, it may take a few days to transfer money between financial institutions - each has its own rules.

GICs are similar - they also pay you interest based on your balance. The differences are:

- You have to purchase GICs from a financial institution.
- You can choose to spend any amount over the minimum pre-set by the institution - usually \$500 or \$1000.
- You won't be able to withdraw or transfer money from the GIC until it matures.
 - GICs mature once a certain amount of time has passed after purchase. This is called the GIC's "term" - for example, a 2-year GIC (with a term of 2 years) matures 2 years after purchase.
- Because you must wait until the deposited money can be accessed, GICs have higher interest rates than savings accounts, which provide access to funds with little delay.
 - Moreover, GICs with longer terms tend to pay more interest than those with shorter terms. GICs can have terms as short as a month and up to 10 years.

What if your bank goes out of business? Your money will be fine. A government agency called the Canada Deposit Insurance Corporation (CDIC), or its provincial equivalent, automatically insures savings accounts and GICs with terms up to 5 years, for as much as \$100,000 per account / GIC.

You can learn about savings accounts and GICs on these FinStart webpages:

<https://www.finstart.ca/---savings-accounts.html>

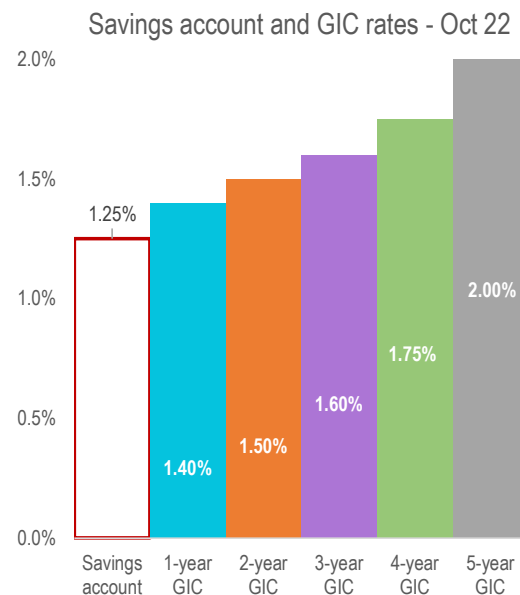
<https://www.finstart.ca/gics.html>

Case Study 1 (no calculations required)

Leon got \$1,000 from his aunt for his 18th birthday. He'd like to buy a new bike. But his old bike is still in decent shape, so he decides to wait and save his money.

Leon is watching biking videos online when a GIC advertisement pops up on his screen. He notices that this provider offers several GICs: 1-year, 2-year, 3-year, 4-year, and 5-year. He quickly writes down the GIC interest rates and draws up the chart to the right, comparing them to his savings account.

- i) How does the provider's rate change as the term of the GIC increases?



Case Study 1 continues on the next page

Case Study 1 continues

Leon is not sure which GIC he wants to buy, he still hasn't decided when he wants to buy his new bike. To compare the GICs, he calculates how much, in dollars, he'd earn from each type if he purchased \$1,000 worth.

- If Leon deposits \$1,000 in a savings account, after 1 year he'd earn \$12.57.
- If he buys a 1-year GIC instead, he'd earn \$14.00.
- If he decides to wait longer and buys a 2-year GIC, he'd earn \$30.22 in interest - more than double. This is partly due to the effects of compound interest acting over a longer period and partly due to the higher interest rate on the two year GIC.

Interest Leon earns on his \$1,000		
Savings account after 1 year		\$12.57
GIC after	1 year	\$14.00
	2 years	\$30.22
	3 years	\$48.77
	4 years	\$71.86
	5 years	\$104.08

Source of interest rates data: www.ratehub.com (Oaken), October 22, 2020

In reality, the rate on Leon's savings account can go up or down during the year, so he may earn more or less than \$12.57.

A GIC's rate never changes its term.

Check your understanding of interest rates and answer the following questions.

- ii) Leon gets paid more interest on the 5-year GIC than on the 2-year GIC because of:
- A. Compounding over a longer period
 - B. Lower interest rates on the 2-year GIC
 - C. Both A and B
 - D. None of the above
- iii) The 1-year GIC pays a higher interest rate than Leon's savings account because:

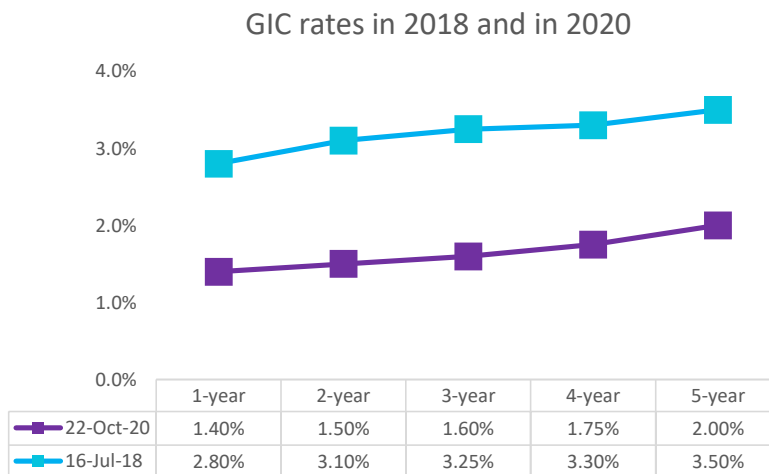
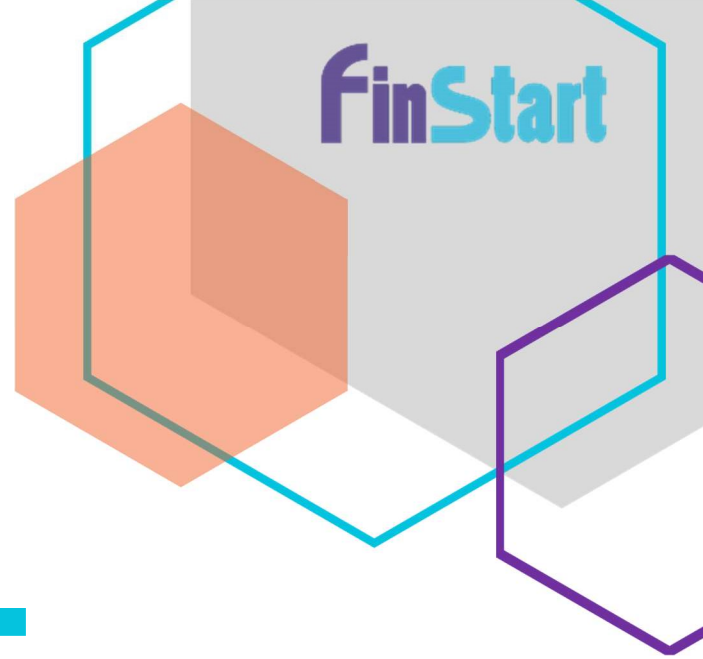
Leon cannot get his money back until the end of the GIC's term. He can withdraw money from his savings account any time.	TRUE	FALSE
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Case Study 1 continues on the next page

Case Study 1 (continued)

A few days later Leon was helping his aunt clean out the attic. He tripped on a pile of old magazines. One, dated July 2018, flipped open to an advertisement by the same GIC provider he ran into while watching bike videos. The numbers seemed quite different than before.

Leon was intrigued. He drew another chart. The purple line represents today's GIC rates for various terms, and the blue line show GICs rates for the same terms from 2018.



Source of interest rate data:
www.ratehub.com (Oaken)

- iv) Looking at Leon's second chart, describe what happened to interest rates in the last two years by completing the following sentences:

GIC rates are (higher / lower) in October 2020 compared to July 2018.

This is the case for (every GIC term / some GIC terms only).

If Leon bought a 1 year GIC in July 2018, he would have earned (more / less) interest than if he bought a 1 year GIC in October 2020.

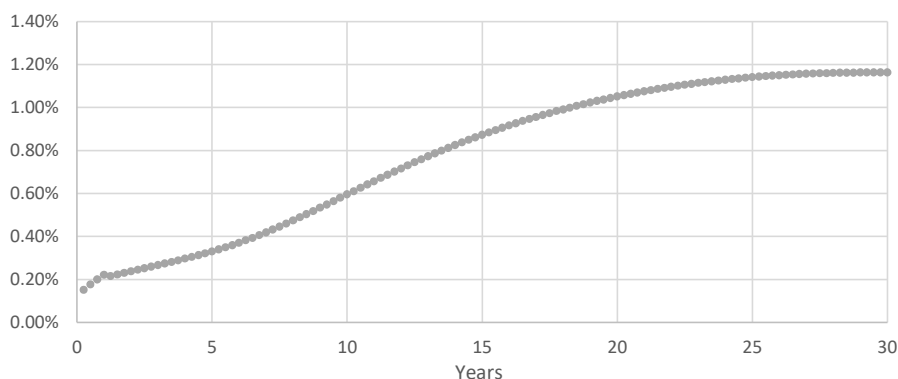
Leon's graph suggests interest rates (change / stay the same) over time. Between 2018 and 2020, interest rates (declined / rose). In fact, the 5-year GIC rate (declined by 1.5% / increased by 1.5% / did not change) between 2018 and 2020.

Case Study 2 (no calculations required)

Next afternoon Leon stopped by his aunt Martha's home. She was wrapping up her day's work as a manager at the Finance Department of the Provincial government. Since the COVID-19 lock-down, she has been working from home. Leon couldn't help noticing that one of her papers had a chart that looked a bit like his chart with GIC rates from 2018 and 2020.

Martha explained that this chart came from the Bank of Canada's website and shows the 'yield curve'.

- It also shows interest rates for various terms.
- But they are not the rates that banks pay their customers on GICs.
- Instead, these are interest rates the Government of Canada pays investors on its own bonds.



What's a Government of Canada bond?

It's an IOU (I owe you) from the Government. It promises to pay you interest each year, until your bond matures.

Bonds are complicated financial instruments. To truly understand them, you have to read more.

Source: <https://www.bankofcanada.ca/rates/interest-rates/bond-yield-curves/>. As of September 17, 2020.

What can you say about the shape of the yield curve in Martha's chart?

- Is it a straight line or a curve?
- Is it rising or falling?
- Is the slope (how steep or flat it is) the same across all years (from 0 to 30)? Estimate in which five year period the slope is steepest and flattest.

Case Study 2 continues on the next page

What's the Bank of Canada?

- It's NOT a commercial bank.
- It's a federal Crown corporation. It's owned by the federal government and provides services to the public that a private corporation wouldn't be able to.
- The Bank of Canada sets Canada's monetary policy (the level of interest rates), issues banknotes, provides banking services for the government, and loans money to Canadian commercial banks and other financial institutions.
- Interest rates we earn on savings accounts and GICs, as well as those we pay on loans, are related to the interest rate the Bank of Canada charges commercial banks when it lends them money.

Case Study 2 (continued)

Leon found another interesting chart in his aunt's pack. She explained that this chart plots the 5-year interest rate over time, all the way back to 2007.



Source: <https://www.bankofcanada.ca/rates/interest-rates/bond-yield-curves/>

Help Leon describe what happened to interest rates since 2007.

- iv) Compare the 5-year interest rate in 2007 to the one in 2020. Is the 5-year rate in October 2020 higher or lower than in January 2007? Describe the transition between these two dates.
- v) Put yourself in the shoes of a borrower (someone who takes out a loan) and a saver (someone who buys GICs). Complete the activity below.

In 2007 borrowers were better off than they are in 2020.	TRUE	FALSE
In 2007 savers were better off than they are in 2020.	TRUE	FALSE

INTEREST RATES

Talking points

Interest rates are often discussed in the context of borrowing, as the ‘cost’ of a loan. But most high school students don’t have first-hand experience with loans. Many have savings accounts - from there it’s easy to understand GICs. Moreover, in the context of saving money, interest rates are a ‘reward’ for delaying the use of your money. Thinking of rewards rather than costs is a positive financial literacy message.

If you’re teaching math, this is also an opportunity to discuss simple and compound interest.

- A 1-year GIC is an example of simple interest calculation.
- Longer GICs (but only those that have interest reinvestment features) compound interest annually.
- Savings accounts are more complicated. Interest is calculated daily (using annual quoted interest rate divided by 365) and paid monthly to the account (as a sum of these daily amounts). Once paid to the account, this interest earns interest the following month - effectively it compounds monthly going forward. If the account owner makes no withdrawals from or deposits to the account and there are no charges / penalties to the account (as in our Case Study 1), the process can be approximated by the formula provided in the table below.

Solution 1

- i) “This provider pays a HIGHER (lower / higher) interest rate on its GICs as the term of the GIC increases.”

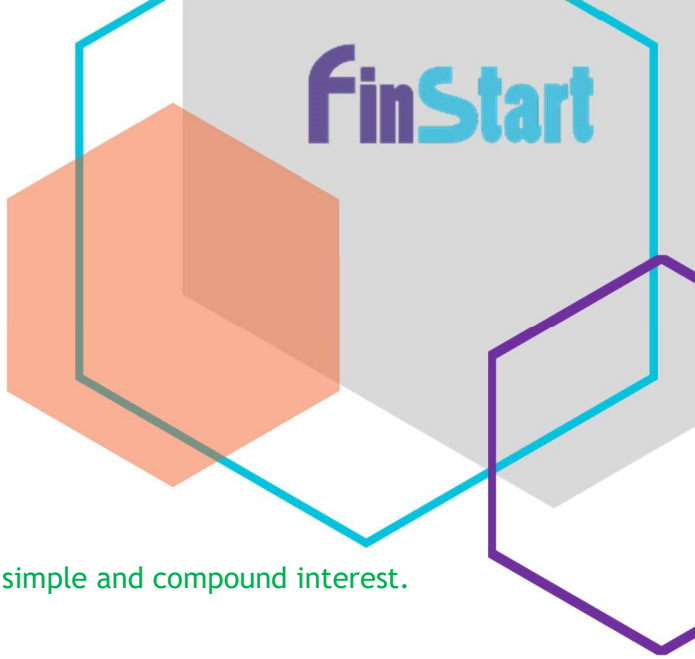
When you buy a GIC, you allow the provider to use your money for the stated term, 1, 2, 3, 4 or 5 years. The longer the time period, the more you should be compensated for postponing the use of your money.

Leon calculated the dollar amounts of interest paid as follows:

Interest Leon earns on his \$1,000			
Savings account after	1 year	\$12.57	$(-1+(1.25\%/12+1)^{12})*1000$
GIC after	1 year	\$14.00	$(-1+(1.4\%+1)^1)*1000$
	2 years	\$30.22	$(-1+(1.5\%+1)^2)*1000$
	3 years	\$48.77	Etc. ^3
	4 years	\$71.86	Etc. ^4
	5 years	\$104.08	Etc. ^5

- ii) Leon gets paid more interest on the 5-year GIC than on the 2-year GIC as a result of C (both compounding and higher interest rate).
- iii) The 1-year GIC pays a higher interest rate than the savings account because:

With the GIC, he cannot get his money back until the end of term while with the savings account he can withdraw his money any time	TRUE	
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Solutions continue on the next page

- v) GIC rates are LOWER (higher / lower) in October 2020 compared to July 2018.
 This is the case for EVERY GIC TERM (every GIC term / some GIC terms only).
 Two years ago, if Leon delayed buying a new bicycle and bought a 1-year GIC, he would have earned MORE (more / less) in interest for the same time period.
 Leon's example suggests interest rates CHANGE (change / stay the same) over time, and that in the last two years interest rates DECLINED (declined / rose). In fact, in the last two years, the 5-year GIC rate DECLINED BY 1.5% (declined by 1.5% / increased by 1.5% / did not change) between 2018 and 2020.

Solution 2

- i) In most times, it's a curve with a slightly humped shape.
- ii) A normal yield curve rises from left to right, like the one in the chart. The longer the maturity, the higher the interest rate.
- iii) No, the slope changes. In the 5-10 years range the slope is steepest. Afterwards, it begins to flatten. It's flattest in years 25-30.
- iv) The 5-year interest rate in October 2020 is lower than in January 2007. In the last 13 years interest rates have fallen. Interest rates do not necessarily change in a smooth, regular way. Over short periods of time, they can go up and down. Over this period of time, we had a few big legs down - in 2008-09 and in 2019-20. After the 2008-09 move down, interest rates rose again in 2010, but fell back in 2011. There was another move up in 2013, followed by a move down in 2014 and again in 2017-18.
- v) Borrowers are better off when interest rates are low because the cost of borrowing is lower. Savers are better off when rates are higher because they earn more on their savings.

In 2007 borrowers were better off than they are in 2020.		FALSE
In 2007 savers were better off than they are in 2020.	TRUE	



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