

# PERSPECTIVES

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Humans think in linear terms, an intuitive trait we inherited from our early ancestors. In this issue, I discuss how such a trait can bias us into making bad financial decisions. Michael Chu compares two experts' views on predicting the long-term performance of stocks. Elaine Loo looks at the results of stocks vs. bonds over the past 100 years—and reminds us that we can use the past to inform the future. And from the B.C. government's recently-announced 2019 budget, Sylvia Ellis brings us highlights we should be aware of.

*Stan*



### Behavioral finance

## Careful: You likely suffer from exponential growth bias

By Stan Clark - Senior Investment Advisor

### Let's begin with a fable:

The man who invented the game of chess showed it to the ruler of his country. The ruler was so impressed he allowed the inventor to name his reward.

The inventor, being wise, asked only for this: one grain of wheat on the first square of the chessboard, two grains on the second square, four grains on the third square and so on. Basically he was doubling the number of grains per square until the last square of the chessboard.

Stooping at its seeming meagreness, the ruler granted the request. He ordered his treasurer to hand over the wheat. The treasurer took a whole week to calculate the amount of wheat needed. He finally determined it was impossible to make the payment!

Just how much wheat were they talking about? A lot: 18,446,744,073,709,551,615 grains. Assuming each grain weighed 65 mg, at current world production levels the total amount would take more than 1,600 years to grow.

The above shows the power of compound interest – and of *exponential growth bias*, “the pervasive tendency to linearize exponential functions when assessing them intuitively.”

With *linear growth*, things change by a constant amount. With *exponential growth*, growth becomes bigger and bigger as the number itself gets bigger.

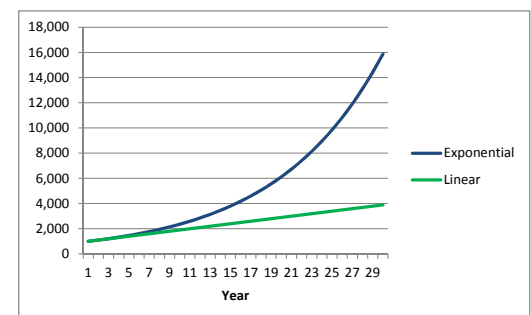
For our ancestors, most things were linear: the amount of food they gathered, the number of children they had, the distances they travelled. The linear perspective worked well for them (though not for the ruler in our fable). Naturally, our minds evolved to think in that same linear fashion. But this doesn't work so well in our modern world. Linear thinking can cause us to make mistakes when making judgements on things that grow exponentially.

To give you a sense of the difference, if one of our ancestors took 30 linear steps (one step equalling a meter) from the entrance to her cave, she ended up 30 meters away. However, if she could take 30

exponential steps – i.e., one, two, four, eight, 16, 32, and so on – she would end up a billion meters away. She'd be lapping the globe 26 times.

Even if we are aware that growth is exponential, our intuition still leads us to think of things linearly. For that reason, it's vital to sit down and crunch numbers.

Exponential vs Linear Growth: 10% per year



One of the best examples of exponential growth is compound interest. Our fable was an extreme example of its exponential effects, with the amount doubling on each square. However, even seemingly small differences in returns can make big differences. And the effect is truly amazing. According to Albert Einstein, “Compound interest is the eighth wonder of the world.”

At lower rates of growth, the effects of compounding don't make much difference over short time periods. For example, the difference of investing \$100,000 at 6% versus 8% over three years is less than \$7,000. What if we look at the same example over 10 years? The difference is more than \$36,000. For 30 years, it's more than \$431,000. The difference is four times greater than the original investment of \$100,000. And that's from a difference in growth of only 2% per year! As you can see in the table below, the longer the time period, the greater the effect. Plus, a bigger differential in returns will produce an even more significant difference in the final results.

## Team Talk:

### Johnny Lyall

Sales Assistant



Johnny & Erin aboard Bienvenue – Curme Islands, Desolation Sound

#### So, What's new?

Lots is new! Erin and I bought an apartment in Fairview and enjoyed fixing it up. I have been boat obsessed since I was a young boy and always dreamed of having my own – last year my dream came true when I found this 1987 20ft Limestone. We have traveled from the Gulf Islands all the way up to Desolation sound. Looking forward to exploring more of our coast this summer.

#### What's new at work?

I recently completed a business development course and learned some valuable best practices. I really enjoyed the program and found it to be one of the better courses I have done. Warning: If you are not a client... you may receive a 'friendly' call from me looking to touch base.

#### Are you still snowboarding often?

Yes, I snowboard as much as I can. In recent years I've gotten a pass to Mount Seymour. I enjoy going up on weekdays for a few hours after work.

Time Period	Compound Growth From \$100,000			
	6% Return	8% Return	10% Return	12% Return
10 Years	\$179,085	\$215,892	\$259,374	\$310,585
20 Years	\$320,714	\$466,096	\$672,750	\$964,629
30 Years	\$574,349	\$1,006,266	\$1,744,940	\$2,995,992

Source: Stan Clark Financial Team

What does this mean for you? When thinking longer term, *calculate* the effect of anything likely to change at an exponential rate. This includes your expected investment returns and, very importantly, inflation. Inflation can escalate your costs at an exponential rate, which can make a huge difference in what your money buys down the road. A calculator or computer is helpful. Or, as a quick check, try the **Rule of 72**. Your intuition will often be surprised at the results. ■

<sup>1</sup> Exponential Growth Bias and Household Finance, The Journal of Finance December 2009.

*The above examples are for demonstrative purposes only. Rates are not guaranteed and depend on investment choices and circumstances.*

## Asset Allocation

### Shiller vs. Siegel: Is the stock market overvalued?

By Michael Chu, Investment Advisor

**The big question for investors is often: Where is the stock market going next – up or down? At a conference in late 2018, Wharton finance Professor Jeremy Siegel and Yale economics Professor and Nobel Laureate Robert Shiller made their respective cases, which we'll review in this article.**

We've often discussed the work of Siegel and Shiller. Siegel, author of *Stocks for the Long Run*, is usually seen as the perpetual bull and Shiller, author of *Irrational Exuberance*, as the perma-bear. (They both dispute these characterizations, noting that in 2000 they were both bears.) No matter what side you lean toward, it's important to be open-minded and consider both views. Interestingly, despite opposing outlooks, the two have been close personal friends since they met in the 1960s as grad students at the Massachusetts Institute of Technology.

Since the 1800s, stock returns have far outpaced any other asset class. That's good to know, but what about future returns – can they be predicted? Shiller summed it up well: "If you want to predict tomorrow's price change, it's very hard. But if you want to predict what's going to happen in 10 years, you have a better chance. It's the reverse of weather forecasting."

Both Shiller and Siegel believe longer-term future returns are somewhat predictable. They also agree that valuations – in particular, share price vs. earnings – matter. Lower valuations (lower price vs. earnings) tend to result in higher future returns, and higher valuations tend to result in lower future returns. However, Siegel and Shiller differ on the valuation method and interpretation, and as a result, have different conclusions.

Let's first examine Shiller's rather negative case.

#### The Rule of 72

72 divided by the compound interest rate will give you the number of years something will take to double. Conversely, 72 divided by the number of years something took to double will give you the interest rate.

Example: if something is growing at 6%, it will take 12 years to double. If something took 10 years to double, the compound interest rate was 7.2%

Shiller is famous for coming up with the CAPE (Cyclically Adjusted Price Earnings) ratio. This is calculated by taking the index price divided by the past 10-year average of inflation adjusted earnings. The 10-year average is used to smooth out business cycle fluctuations. Shiller uses data going back to 1871. For earnings he uses what is called *reported earnings*, as calculated using Generally Accepted Accounting Principles (GAAP). At the time of the conference, the CAPE ratio was near historic highs, indicating low future long-term returns. Shiller also looked at a variety of other measurements of valuation. All appear to have been somewhat correlated with future returns, but he views his original construction as being superior to all he tested.

Siegel felt Shiller's numbers are flawed, because of changes over time to a variety of things, such as accounting rules. Siegel also feels that valuations of stocks should be evaluated in comparison to their main competitor – longer-term bonds.

Siegel states that "CAPE methodology forecasts forward 10-year real returns on stocks of only 2.6%, about 40% of long-run average (but still more than bonds)." He thinks this is too low. Adjusting for these shows a different, and more positive, picture.

First, Siegel uses S&P operating earnings to calculate the *E* in P/E, that is, price-to-earnings ratio. He uses these earnings because they exclude many non-recurring items such as write-downs, which can significantly, and in his view artificially, depress GAAP earnings. He points out that billionaire Warren Buffett said the new mark-to-market rules make GAAP earnings, for analytical purposes, "useless."

Siegel notes that for the last 140 years, the P/E ratio of the S&P 500 averaged around 15, which

corresponds to a 1/15 or 6.7% earnings yield. He further notes that this is exactly equal to the long-term real return on stocks of 6.7%. This is no accident, he says: "Earnings Yield (E/P) is a good predictor of long-term real returns."

From 1954 to 2018, the average P/E ratio was 17 times. At the time of the conference, according to Siegel, the P/E ratio was "not that high. We're in the low 20s," based on the last 12 months of earnings. Moreover, when using forecasted earnings, the ratio drops to 18 and further drops to 16 when using 2019 estimates.

According to Siegel, "the P/E ratio of 18 forecasts a real return of 5.5% for stocks (or about 7.5% nominal return with 2% inflation)."

Comparing to bonds, he adds, "This is more than 4.5% over Treasury bonds. This premium is also above the historical average of 3% to 3.5%."

So, who's right? Both cases make sense on the surface. On the other hand, there are also many criticisms when you get into the details. As examples: definitions of earnings data are different between the two methods; accounting standards have

changed recently; and different assumptions about mean reversion.

The Shiller-Siegel debate has been going on for years and will likely continue for many more. At The Stan Clark Financial Team, rather than commit to one or the other, our approach is to diversify and use both. More on this soon! ■



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## Financial Planning

# 2019 BC Budget Highlights

*By Sylvia Ellis, Senior Estate Planning Advisor*

**On February 19, 2019, the BC NDP government's second budget, delivered by Finance Minister Carole James, focused on: tax breaks and benefits for people with children, students and businesses; and investments in clean energy and climate initiatives.**

The following are some of Budget 2019's highlights.

- 1. BC Child Opportunity Benefit** – This benefit replaces the Early Childhood Tax Benefit and offers families with children under 18 a substantial increase, both in monthly benefits and eligibility. Starting in October 2020, families with one child will receive up to \$1,600 per year; those with two children, up to \$2,600; and those with three, up to \$3,400.
- 2. Interest-Free Student Loans** – The provincial portion of student loans will now be interest-free, effective immediately. The announcement covers both new and existing student loans. The government estimates borrowers will save an average of about \$2,300 over 10-year repayment periods.
- 3. Elimination of Medical Services Plan (MSP) Premiums** – Still in the works, our MSP premiums are about to be eliminated – from a personal standpoint, anyway. The budget will eliminate the premiums on January 1, 2020, saving families as much as \$1,800 per year.
- 4. First Nations** – First Nations will now have a stable, long-term source of funding to invest in housing, infrastructure, training, environmental protection, economic development and other uses as their local governments choose. This first-time revenue-sharing agreement will provide First Nations with approximately \$3 billion over 25 years from provincial gaming revenue, with every Aboriginal government

eligible for between \$250,000 and \$2 million annually.

- 5. Adoptive and Foster Parents** – Support payments are being increased for the first time in a decade. Foster parents, adoptive parents and relatives caring for children in care will see an increase in their monthly benefit.
- 6. Rental Housing and Affordable Homes** – Community organizations will be provided with funding for operating rent banks to provide short-term loans with little or no interest to low-income tenants who can't pay their rent because of a financial crisis. And the province has stated that progress continues to be made on the existing housing plan, indicating that of the 114,000 new affordable homes over 10 years promised in last year's budget, 17,000 are built or underway.
- 7. Disability Income Assistance Rates** – People receiving income assistance or disability assistance will see a nominal increase each month starting in April.
- 8. BC Wildfire Management** – Budget 2018 began with an investment to support wildfire resilience and recovery efforts from communities. Budget 2019 provides additional funding over three years to strengthen BC's efforts to prevent and respond to wildfires, and for restoration in areas damaged by disease and wildfires.
- 9. Transit Expansion** – The government is investing \$21 million in transit expansion in 30 communities across the province; and \$39 million over three years for bridges and roads.
- 10. CleanBC** – Budget 2019 moves forward with CleanBC, which aims to put our province on the path to a low-carbon economy. The plan will see funds spent to cut greenhouse gas emissions; and offer incentives to help people retrofit their homes and purchase electric vehicles.

These are just some of the highlights. More information can be obtained from the BC Government's website:

[www.bcbudget.gov.bc.ca/2019/pdf/2019\\_Highlights.pdf](http://www.bcbudget.gov.bc.ca/2019/pdf/2019_Highlights.pdf)



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# Stocks vs. bonds over the past 100 years: An update with Cdn\$ returns

By Elaine Loo, Associate Investment Advisor

**In Aesop's fable The Tortoise and the Hare, slow and steady wins the race. But is that really how it works in life? When it comes to investing, slow and steady can be a recipe for near-certain losses.**

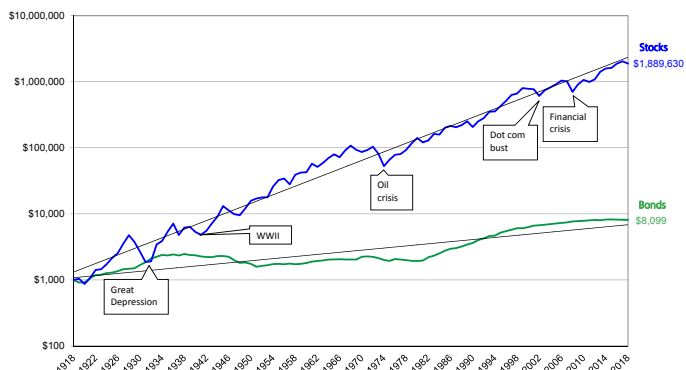
Let's look at stocks-vs.-bonds returns over the past 100 years. Think of The Tortoise and the Hare as a story about asset allocation: of fixed-income investments, which appreciate slowly and appear reliable; and of stocks, which can appreciate strongly and quickly, but appear risky. Which is your best bet? The answer depends on what kind of race you're running.

The past 100 years have been wildly volatile: inflation, deflation, a deep depression, two global financial crises, explosive growth, two World Wars, embargoes, assassinations and worldwide pandemics. We often forget how frightening things seemed at the time. Although the world may seem scary now, it's likely that the period ahead won't be all that different from some of the periods we've experienced in the past. History repeats itself; you just don't know which part of the past you're going to get! But the past informs the future. By studying history, you can get a good feel of the range of possible outcomes going forward.

Data shows that, over the past 100 years, if you owned equal amounts of Canadian and U.S. stocks you would have enjoyed average annual growth of 10.8% (in Cdn\$) for an inflation-adjusted (real) return of 8.1%. Over the same period, Canadian fixed-income investments averaged 4.9%, or real returns of just 2.2% per year.

Here's a graph showing 100 years of growth in stocks vs. bonds. If you started with \$1,000 in each, you would now have over \$1.8 million with stocks, but only about \$8,000 with bonds. Remember that these

Real Growth from \$1,000 1919 to 2018



Source: Siegel, Cdn Institute of Actuaries, TSX, Bank of Canada.

are in "real" dollars, after adjusting for inflation.

Here's a table showing the average percentage growth in stocks vs. bonds over the past 100 years. It also compares the differences in median total dollar growth over various time horizons.

Growth in stocks vs bonds 1919 to 2018

	Average Nominal Returns	Average Real* Returns	Real growth from \$100,000**				
			1 Year	5 Years	10 Years	15 Years	20 Years
Stocks	10.8%	8.1%	\$8,052	\$51,256	\$117,037	\$223,031	\$381,180
Bonds	4.9%	2.2%	\$2,172	\$10,283	\$19,749	\$30,459	\$43,642
Inflation	2.8%						
Difference in growth (\$)			+\$5,880	+\$40,973	+\$97,289	+\$192,573	+\$337,538
Difference in growth	2.2x	3.7x	3.7x	5.0x	5.9x	7.3x	8.7x

Source: Siegel, Cdn Institute of Actuaries, TSX, Bank of Canada.

\* "Real" returns are nominal returns after subtracting inflation

\*\* "Real growth from \$100,000" is the median real growth over different time periods, showing the effect of compounding.

The Average Real Returns from equities were 3.7 times higher than those of bonds. If you started with \$100,000 in bonds, this would have grown by about \$43,642 after 20 years. The same amount invested in stocks would have grown by \$381,180 – 8.7 times as much!

You may be asking: But aren't stocks much riskier than bonds? Yes and no. The stock market is volatile in the short term, making stocks seem risky. But if you invest for the long term, that is, more than 10 years, history shows that down markets have almost always been more than offset by up markets, giving reliable returns for stocks after inflation.

Inflation actually makes bonds riskier than stocks over the long term. The return during the worst 10-year period for bonds was 20% lower than the worst 10-year period for stocks. The chance of losing money over any 10-year period was nearly seven times greater for bonds than it was for stocks. Over any 10-year period, stocks did better than bonds 89% of the time. And, over 15 and 20-year periods, stocks beat bonds every time and never failed to beat inflation. The worst return for stocks over 20 years was a profit of \$100,708 above inflation! So, based on history, it seems that the longer your investment horizon, the less risky stocks are, and the riskier bonds become.

The key takeaway here is that one type of asset isn't always better than another. How long you can invest for is critical in determining the right mix for you. If you only have a few years to invest, then your money should be mostly in fixed income. If you have savings earmarked for needs five to 10 years or more from now, consider investing more of those savings in stocks. ■



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