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Calculating Present Values in Civil Litigation: A Review of Past, Present & Future Interest Rates

By Cara L. Brown, M.A.*

INTRODUCTION

Alberta, Newfoundland and Yukon Territory are the three regions in Canada in which quantum experts must research and forecast interest rates appropriate for use in the calculation of present value lump sum awards for civil litigation.[1] In addition, there are other provinces where legislation permits variance from the mandated discount rate if persuasive evidence is presented.[2]

It is this author's considered opinion that an appropriate *real* discount/interest rate[3] to use in civil litigation in Canada is **1.00% for 5 years** (as of the date of trial or valuation[4]), increasing to **2.00% <u>after</u> 5 years.**[5] We have decreased our 3.00% rate after 5 years to 2.00% given that real interest rates had begun to decline to never-before-seen levels starting in 2001 (Table 2, Figure 1), continued to decrease until 2019, and analysts expects this pattern to persist.

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* The author would like to express appreciation to Ha Nguyen, MA, one of Brown Economic's consultants, for assistance in gathering interest rate data.

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[1] In some instances, actuaries (and lawyers) refer to the methodology by which streams of future losses are converted to present value lump sum awards as "actuarial calculations". However, the formula used to calculate present value is widely used in many disciplines (banking, accounting, engineering, mathematics, science, economics, etc.), not just actuarial science. With regard to present value calculations, see **Brown's Economic Damages Newsletter** "Choosing a Real Interest Rate for Civil Litigation" February 2016, vol. 13, issue 2, p. 2.

[2] For example, New Brunswick *Regulation 2014-159*, section 1 states: "*In the absence of evidence to the contrary*, the discount rate to be used in determining the amount of an award in respect of future pecuniary damages is 2.5% per year" (emphasis added).

[3] The conversion of a future annual or periodic (every 2, 5, 10 years) income stream or care costs requires a mathematical formula which produces a lump sum, referred to as "present value". This process is also commonly referred to as "discounting" to present value, because the formula removes (discounts) the future income or dollar stream by the projected or assumed interest rate.

[4] If a trial date is scheduled and known to us, we divide the past and future loss calculations as of that date. When there is no scheduled trial date (or we are not made privy to it), the "valuation date" is an assumed date used to divide the past and future loss calculations at the date that counsel expect to settle the sums in the litigation. For instance, when mediation is scheduled, we are often asked by counsel to use the mediation date as the valuation date. (Past loss sums do not require conversion to "present value" lump sums because it is assumed the plaintiff is compensated for years already past and as such there is no need for the plaintiff to invest his/her past loss award). On occasion, some counsel will refer to past loss sums as "present value sums" as of the date of trial or valuation because they include pre-judgment interest. In any event, past sums are not discounted to present value.

[5] The reader can see that these discount/interest rates are used in *every* year of the future calculations, so these rates are *annual* rates, not aggregate rates over a multi-year period.

Some forensic economists express their real discount rate assumption *after* productivity (wage) increases are factored in, i.e., they *restate* their discount rate assumption by <u>reducing</u> it for assumed productivity increases. Although mathematically proper,[6] the productivity assumption is affected by many different economic variables than are interest rates. The former pertains to the income streams of Canadians and are correlated with structural aspects of labour markets, technological change, and regional influences arising from differing natural resources (among others).[7] Interest rates are linked to macroeconomic events and global influences (particularly American interest rate levels) and are governed by monetary policy carried out by the Bank of Canada. What this means is that *before* comparing discount rate assumptions, **productivity must be excluded.**

The change in our real discount rate assumption is due mainly to:

1) The persistence of never-before-seen low (or nil) interest rates (starting in 2001);

2) The opinion of experts, forecasters and analysts that this low-interest rate environment will continue in the future (not only in Canada, but the US and globally);

3) That plaintiffs or widow/widowers must invest in short-term instruments (i.e., 3-month Treasury bills or 1-year GICs) because they need ready access to the lump sum awards in order to be compensated in accordance with when they will forego the income or dependency loss.[8] The same is true for cost of care awards (items and services are needed annually or periodically), tax gross-up awards, loss of housekeeping capacity awards, and a loss of interdependent benefit arising from an inability to "couple up";

4) The shift in 3 provinces in Canada (Ontario, Saskatchewan and British Columbia) to legislate lower mandated real discount rates in recent years, and the 2020 mandated rate in Ontario and Saskatchewan of **0.00% for the next 15 years** (Table 1);

5) Judges do not require plaintiffs or widow/widowers to risk their awards (the principal sums) by chasing returns in the stock market or capital gains markets. This means quantum experts should be using a real discount/interest rate that is lower than prevailing or expected future rates, because the only way to *guarantee* one's principal is to invest it at a lower interest rate (such as in GICs).

We have observed that many quantum experts do *not* review any data or macroeconomic forecasts to corroborate their interest rate assumption (other than perhaps a quick look at "long-term Government of Canada bonds"). We discuss whether this is sufficient to predict the appropriate interest rate for civil litigation purposes, and if not, why not. We also review historical rates in Canada, current rates in Canada, and forecasts of future rates which demonstrate that using a "data-insensitive" rate assumption will result in inaccurate present value sums.

This newsletter edition provides an overview of the research Brown Economic reviews to determine the appropriate interest rate to use if the mandatory one is not relied upon or there is no applicable mandatory discount rate.

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[6] When annual income streams are converted to present value, an equation is used which extrapolates the growth of wages (in the numerator) but then "discounts" using the interest rate (in the denominator). This relationship allows some forensic economists to mathematically restate their discount rate assumption by reducing it for any assumed productivity wage increases.

[7] For more information regarding the productivity rate to apply to wages, see **Brown's Economic Damages Newsletter** "The Productivity Rate: What is it, and how is it determined?" February 2012, vol. 9, issue 1, p. 5.

[8] There is another reason why we assume immediate access to any awards: this is how the lump sum is calculated. If the plaintiff or widow/widower were expected (by the courts) to absorb the entire award immediately after the trial outcome or settlement, there would be no need to "discount" the award to "present value" sums. We would simply add up the losses in each year to arrive at a total for all years (after contingencies and timing adjustments). We have been advised by counsel that it is irrelevant as to how plaintiffs and widow/widowers actually expend their funds after being paid.

Prior issues of **Brown's Economic Damages Newsletter**
related to this month's topic:

- "Real Interest Rates for Civil Litigation: Mandatory Rates & Economic Data"
  January 2018, vol. 15, issue 1

- "Economic Outlook for Canada: Forecasts" March 2017, vol. 14, issue 2

- "Trends in Real Interest Rates: New Research" August 2016, vol. 13, issue 8

- "Choosing a Real Interest Rate for Civil Litigation" Feb. 2016, vol. 13, issue 2

- "Real Discount Rate: what is the best interest rate for civil litigation? UPDATE"
  September 2014, vol. 11, issue 8

- "Economic Outlook for Canada: Long-range Forecasts of Various Indicators"
  May 2013, vol. 10, issue 4

- "The Productivity Rate: What is it, and how is it determined?" February 2012, vol. 9, issue 1

- "Real Discount Rate: Revisiting the forecasts & Interpreting Ontario's mandated discount rate"
  December 2011, vol. 8, issue 10

- "Real Discount Rate: what is the best interest rate for civil litigation?"
  December 2010/January 2011, vol. 7, issue 12

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*Brown Economic offers a **Present Value Damages Calculator** ^{TM} at its website:*
[**www.browneconomic.com**](http://www.browneconomic.com) *> click on "Present Value (free)" on the home page.*

This calculator is free-of-charge. Based on an annual income loss, or annual care costs, this calculator will return a lump-sum present value as of the date it is used online. In addition, it provides 4 unique fields (not found in other present value slide rules or calculators): a mortality adjustment can be elected (or not); a labour market contingency can be selected (or not); the discount rate can be varied; and the user can assume a "growth rate" that is in excess of wage inflation, for productivity or occupation-specific wage increases. This field is ideal for care costs provided by professional nurses, healthcare providers, or LPNs.[9]

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[9] For more information regarding the productivity rate to apply to wages, see **Brown's Economic Damages Newsletter** "The Productivity Rate: What is it, and how is it determined?" February 2012, vol. 9, issue 1, p. 5.

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MANDATED REAL DISCOUNT RATES IN CANADIAN PROVINCES AND TERRITORIES

Most of the provinces and territories in Canada have mandated rules specifying the *real* discount rate for quantum experts to use when calculating the present value of future losses to determine lump sum awards in civil litigation. Table 1 below summarizes the mandated *real* discount rates in each jurisdiction in Canada (except for Quebec).[10]

Table 1
Mandated Real Discount Rates, Canada

Jurisdiction	Real Discount Rate
Manitoba	**3.0%**[a]
New Brunswick	In the absence of evidence to the contrary, **2.5%**[b]
Nova Scotia	**2.5%**[c]
Prince Edward Island	**2.5%**[d]
Northwest Territories	**2.5%**[e]
Nunavut	**2.5%**[f]
British Columbia	**1.5%** for loss of future earnings because of partial or total loss of earning capacity or loss of dependency under the *Family Compensation Act* [g] **2.0%** for all other future damages[h]
Saskatchewan[i]	For 2020, the rates are **0.00%** for the next 15 years, **2.50%** thereafter The rate for the first 15 years that follow trial is the greater of (i) the average real return bond rate,[j] less 0.5%, rounded to the nearest 0.1%, or (ii) zero.
Ontario[k]	For 2020, the rates are **0.00%** for the first 15 years that follow trial, **2.50**% thereafter[l] The rate for the first 15 years that follow trial is the greater of (i) the average real return bond rate,[m] less 0.5%, rounded to the nearest 0.1%, or (ii) zero.

[a] *Court of Queen's Bench Act* , S.M. 1988-89, c.4 (C.C.S.M. c. C280), s. 83(2).

[b] New Brunswick *Rules of Court* , N.B. Reg 82-73, Rule 54.10(2) and New Brunswick *Regulation 2014-159* , section 1.

[c] As per Nova Scotia's *Civil Procedure Rules* , rule 70.06(1): "Subject to the *Insurance Act* , the discount rate to be used in calculating the difference between estimated investment and price inflation rates for capitalizing the value of future pecuniary damages, other than damages for loss of business income, is two and one-half percent per annum." Rule 70.06(2) states that for future loss of business income the discount rate used may be calculated based on the difference between estimated investment and price inflation rates.

[d] Prince Edward Island *Rules of Civil Procedure* , r. 53.09(1).

[e] *Judicature Act* , R.S.N.W.T. 1988, c. J-1, s. 57(1).

[f] *Judicature Act* , S.N.W.T. 1998, c. 34, s. 1, sec. 56(1).

[g] *Law and Equity Act* , R.S.B.C. 1996, c. 253, s. 56(2)(a) and 56(3); BC Reg 74/2014.

[h] *Law and Equity Act* , R.S.B.C. 1996, c. 253, s. 56(2)(b) and 56(4); BC Reg 74/2014.

[i] Saskatchewan *Queen's Bench Rules* , r. 9-21(1)(b).

[j] According to Rule 9-21(1)(b) of the Saskatchewan *Queen's Bench Rules* , the average real return bond rate is "the average of the value for the last Wednesday in each month of the real rate of interest on long-term Government of Canada real return bonds, monthly series, as published in the Bank of Canada's *Weekly Financial Statistics* for the period commencing on March 1 and ending on August 31 of the year before the year in which the trial begins".

[k] Ontario *Rules of Civil Procedure* , r. 53.09(1)(b).

[l] As published at https://www.attorneygeneral.jus.gov.on.ca/english/courts/civil/pecuniary_damages.php.

[m] According to clause 53.09(1)(a) of the *Rules of Civil Procedure* , R.R.O. 1990, Reg. 194, the average real return bond rate is "the average of the value for the last Wednesday in each month of the real rate of interest on long-term Government of Canada real return bonds (Series V121808, formerly Series B113911), as published in the Bank of Canada's *Weekly Financial Statistics* for the period starting on March 1 and ending on August 31 in the year before the year in which the trial begins".

Currently, mandated real discount rates in Canada range from **0.00% per year** (Ontario and Saskatchewan, for the first 15 years following the trial) to **1.50% per year** in British Columbia, to **2.50% per year** (everywhere else except in Manitoba). Again, these are *real* rates, net of inflation.

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[10] Note that the mandated discount/interest rates set by legislation are expressed in "real" terms, that is, net of the inflation component present in "nominal" rates – the latter being the rates posted by banks and investment firms and observed in the marketplace. To compare the (real) mandated rates to (nominal) observed rates, the mandated rates would have to be converted to nominal rates by an assumed rate of inflation. For instance, if we use the Bank of Canada's target rate of inflation of 2.00% per year, this means that BC's mandated rate of 1.50% for loss of future earnings or loss of dependency would be equivalent to 3.53% (when compounded with the target rate of inflation). It is this converted rate that should be compared to, say, the GIC rates in Table 6 below.

THE BASIS FOR THE INTEREST RATE ASSUMPTION IN CIVIL LITIGATION

Both *historical* interest rate data and interest rate *forecasts* provide useful information to quantum economists seeking to predict the behaviour of interest rates for damage estimates. Interest rates are influenced by a number of economic and political factors, some of which are determined domestically and some of which are global. The International Monetary Fund states that "[m]ovements in domestic real interest rates have a major common, global component. Therefore, examining shifts in the global supply and demand for funds is necessary to understand the behavior of interest rates within any region."[11]

Historical interest rate data (see Table 2) provides information about longer-term structural trends in factors affecting interest rates. For example, high interest rates in the 1970s and 1980s were observed to be consistent with inflationary monetary policy; low interest rates since the early 2000s, on the other hand, reflect declining investment-to-GDP ratios in advanced economies, increasing relative preferences for safe assets, and increased savings in rapidly growing market economies[12] To generate interest rate predictions, forecasters are required to make assumptions about these long-term structural trends as well as predict potential shifts in these trends in the future. Combining forecasts is recommended to the extent that forecasters rely on *different yet valid assumptions*: J.S. Armstrong notes that "[compared to the typical component forecast, the combined forecast is never less accurate. Usually it is much more accurate."[13]

The final consideration is that Canadian courts award lump sums to plaintiffs – but these lump sums represent *periodic* losses or costs (i.e., annually, bi-annually, etc.). In other words, any plaintiff who receives a lump sum award is expected to replace his/her income loss each year (as it would have been earned) or spend monies on care items needed each year. This consideration is important because in estimating the accrual of interest on a lump sum award, we have to account for the plaintiff's *annual or periodic withdrawal* from the lump sum either for compensation or for care items, implying that the plaintiff must have ready access to his/her award. The award *cannot* be tied up in a long-term investment instrument which only pays a rate of return *if* the investment is not disturbed. This requirement dictates an emphasis on short-term investment instruments, which accrue a lower rate of interest than long-term investment instruments.

HISTORICAL INTEREST RATES

In this section we provide historical *nominal* and *real* interest rates for a variety of Canadian investment instruments. *Real* interest rates are not commonly published by banks or investment firms. The *real* rates we present below are derived from publications from Statistics Canada, Canadian Institute of Actuaries, and the Government of Canada *Real Return Bond* rate ("RRB").

Statistics Canada data

Statistics Canada provides financial statistics in CANSIM, table 176-0043 as far back as 1934. Table 2 provides historical real interest rates from 1976 to 2019 for five fixed income securities with different maturities (i.e., timespan the investment instrument is invested).[14]

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[11] International Monetary Fund, "Chapter 3: Perspectives on Global Real Interest Rates" (April 2014) in *World Economic Outlook: Recovery Strengthens, Remains Uneven*, p. 97.
[12] International Monetary Fund, "Chapter 3: Perspectives on Global Real Interest Rates" (April 2014) in *World Economic Outlook: Recovery Strengthens, Remains Uneven*, p. 81.
[13] J.S. Armstrong, "Combining Forecasts" (2001) *Marketing Papers*, University of Pennsylvania Scholarly Commons, 6-17-2001, p. 15.
[14] To be published in C.L. Brown, *Damages, Estimating Pecuniary Loss*, loose-leaf (Toronto, Ontario: Canada Law Book, a Thomson Reuters business), 2019 (26th edition, forthcoming), Table 8-1.

Table 2
Average Annual *Real* Interest Rates, Selected Canadian Fixed Income Securities[15]

Year	3-month Treasury bills yields [1]	1-year Treasury bills yields [2]	Gov't of Canada bonds, avg. yield 1-3 year yields [3]	Gov't of Canada bonds Over 10 years yields [5]
1976	1.27%		0.57%	1.56%
1977	-0.62%		-0.62%	0.65%
1978	-0.30%		-0.23%	0.25%
1979	2.37%		1.52%	1.02%
1980	2.35%		2.03%	2.07%
1981	4.73%		3.16%	2.51%
1982	2.49%		2.75%	3.03%
1983	3.42%		4.24%	5.76%
1984	6.38%		6.96%	8.00%
1985	5.32%		5.98%	6.88%
1986	4.58%		4.69%	5.11%
1987	3.59%		4.59%	5.32%
1988	5.26%		5.46%	5.98%
1989	6.72%		5.44%	4.69%
1990	7.64%		6.54%	5.77%
1991	3.12%	3.03%	3.21%	3.94%
1992	5.01%	5.09%	5.45%	7.16%
1993	2.99%	3.63%	4.01%	5.94%
1994	5.33%	6.47%	6.92%	8.41%
1995	4.59%	4.91%	4.95%	5.95%
1996	2.57%	3.14%	3.69%	5.81%
1997	1.58%	5.53%	3.03%	4.75%
1998	3.79%	4.09%	4.15%	4.52%
1999	2.94%	3.39%	3.59%	3.92%
2000	2.68%	3.09%	3.12%	3.10%
2001	1.11%	1.18%	1.61%	3.10%
2002	0.35%	0.84%	1.32%	3.39%
2003	-0.19%	0.27%	0.71%	2.74%
2004	0.31%	0.64%	1.01%	3.12%
2005	0.51%	0.87%	0.96%	2.14%
2006	1.99%	2.14%	2.03%	2.25%
2007	1.91%	2.07%	1.98%	2.09%
2008	0.09%	0.25%	0.35%	1.70%
2009	0.05%	0.31%	0.91%	3.58%
2010	-1.18%	-0.72%	-0.31%	1.82%
2011	-1.92%	-1.70%	-1.48%	0.31%
2012	-0.52%	-0.42%	-0.38%	0.82%
2013	0.07%	0.15%	0.22%	1.80%
2014	-1.07%	-0.99%	-0.93%	0.59%
2015	-0.59%	-0.54%	-0.57%	0.91%
2016	-0.89%	-0.84%	-0.81%	0.40%
2017	-0.88%	-0.59%	-0.49%	0.57%
2018	-0.88%	-0.47%	-0.33%	0.02%
2019	-0.24%	-0.20%	-0.30%	-0.17%
Average (1976-2019)	**2.00%**		**2.29%**	**3.26%**
Average (1990-2019)	**1.34%**		**1.81%**	**3.02%**
Average (2000-2019)	**0.04%**	**0.27%**	**0.43%**	**1.71%**
Average (2010-2019)	**-0.81%**	**-0.63%**	**-0.54%**	**0.71%**
Average (2015-2019)	**-0.69%**	**-0.53%**	**-0.50%**	**0.35%**

[15] Sources: Rates are quoted in nominal terms based on data from the Bank of Canada (Series V122541, V122558, V122545, V122533, and V122487), and are converted to real terms by using the inflation rates (CPI, 12 month rolling average up to November 2019) published by Statistics Canada, Catalogue 62-001-XPB, Table 5.

Table 2 shows that fixed income securities with longer maturities have had higher <u>real</u> rates of return than those with shorter maturities – but plaintiffs must invest in shorter-term instruments if they are to replace their losses periodically (annually), which is the basis for calculating the plaintiff's future income loss. Table 2 shows that 3-month T-bills have not posted real returns above 3.00% *since 1999,* and in the past 10 years, since 2009, rates earned on these short-term instruments have <u>not</u> generated a positive return (the average annual loss from 2010 to 2019 was **-0.81%**). Returns on long-term Government of Canada bonds (over 10 years) dipped below 2.00% in 2008 (except for 2009), averaging only **0.71%** per year from 2010 to 2019, and only **0.35%** in the past 5 years (2015 to 2019).

Canadian Institute of Actuaries ("CIA") data

Table 3 provides average nominal and real rates for 91-day Treasury bills and 10+year Canada bonds from the Canadian Institute of Actuaries' *Report on Canadian Economic Statistics 1924-2018 Final Release* (October 2019) for various time periods.

Table 3
Average Annual Yields to Maturity, Canadian Institute of Actuaries[16]

Time period	Nominal Yield to Maturity		Real Yield to Maturity*	
	91-day Treasury bills	10+ year Canada bonds	91-day Treasury bills	10+ year Canada bonds
1942-2018	4.71%	6.09%	1.01%	2.34%
1969-2018	6.01%	7.21%	1.93%	3.08%
1989-2018	3.84%	5.35%	1.74%	3.22%
1999-2018	2.17%	3.86%	0.24%	1.91%
2009-2018	0.79%	2.67%	-0.85%	1.01%
2014-2018	0.81%	2.19%	-0.86%	0.49%

* Nominal yield to maturity adjusted for CPI.

Table 3 shows that for the period of 2014 to 2018, 91-day Treasury bills and 10+year Canada bonds had average annual <u>real</u> rates of **-0.86%** and **0.49%**, respectively. Table 3 shows the same pattern as in Table 2: real rates have steadily declined in the past 20 years, particularly for short-term instruments (91-day Treasury bills). The CIA's *Report on Canadian Economic Statistics 1924-2018* also shows the real rates of return for "Canada Long Bonds" (see Table 4 below).

Table 4
***Real* interest rates for selected time periods, 91-Day T-Bills and Canada Long Bonds[17]**

Time period	91-Day T-Bills	Canada Long Bonds
All years	0.80%	3.09%
1944-2018	1.16%	2.51%
1969-2018	2.02%	4.23%

[16] Source: Canadian Institute of Actuaries' *Report on Canadian Economic Statistics 1924-2018 Final Release,* Tables 4a and 4b.
[17] Reproduced from Table 2B, p. 10 from the Canadian Institute of Actuaries report, entitled *Report on Canadian Economic Statistics 1924-2018 Final Release*, October 2019.

Table 4 shows the real rates of return for "Canada Long Bonds" have ranged from **2.51%** to **4.23%** (Table 4). Note that "Canada Long Bonds" are difficult for individual litigants to hold because they must cash in a portion of their investment to replace their losses each year rather than hold them in long-term investments. The 91-day T-Bills have ranged from a real rate of **0.80%** to **2.02%**. Recall, however, these averages from Table 4 from the CIA span *very* long time horizons: 1944 – 2018 (75 years) and 1969 – 2018 (50 years). As such, they obscure the significant divergence in real rates that has occurred in the last 10 to 15 years: to *never-before-seen* historically low rates of return or *losses* per year (see Table 3, last two rows).

Canada's Real Return Bond ("RRB")

The Bank of Canada introduced the *Real Return Bond* in December 1991. There are currently eight RRB issues with maturities ranging from 4 years (due December 1, 2021) to 33 years (due December 1, 2050). Figure 1 shows the monthly RRB rate from December 2007 to November 2019.

Figure 1
Real Return Bond Rates (%), Monthly[18]
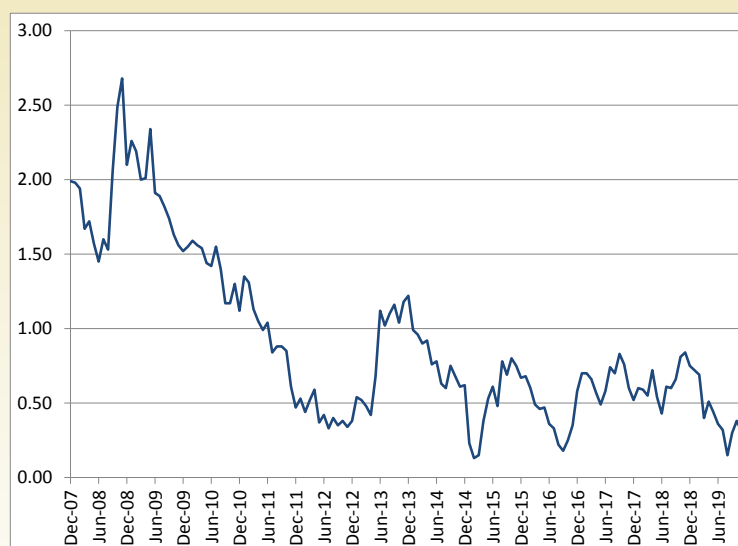
Over this period, the RRB rate ranged from a high of **2.68%** (November 2008) to a low of **0.13%** (February 2015), with an average of **0.92%**. It presently hovers around **0.42%**. Over the longer term, the RRB rate series has reflected a declining trend in real interest rates since its inception in December 1991, which is vividly depicted in Figure 1 above. From 1992 to 1995 the average RRB rate was **4.50%**. The rate fell to **4.10%** between 1996 and 2000, fell again to **2.90%** from 2001 to 2005, and again to **1.80%** between 2006 and 2010. During the past five years (2015 to 2019) the RRB rate has averaged only **0.53%**.

The Bank of Canada notes that "[t]he Real Return Bond market…provides direct information about real interest rates that are determined by financial market participants".[19] The Canadian Institute of Actuaries recommends reliance on the real return bond indicator as the long-term projection of the real interest rate when computing transfer values for

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[18] Source: Statistics Canada CANSIM Table 176-0043 – Financial market statistics, Bank of Canada, monthly (percent).
[19] Agathe Côté, Jocelyn Jacob, John Nelmes, and Miles Whittingham, "Inflation Expectations and Real Return Bonds" (Summer 1996) *Bank of Canada Review*, at p. 42.

pension entitlements. Ontario's *Rules of Civil Procedure* rule 53.09(1) and Saskatchewan's *Queen's Bench Rules* r. 9-21 (1)(b) also rely on the real return bond rate when mandating a real discount rate for civil litigation (see Table 1 above).

Since the real return bond is, at this time, the only inflation-indexed instrument that provides information about the expected *real* interest rate in Canada, it is our opinion that it is one of the investment instruments to consider in selecting a real interest rate for litigation. We do not rely solely on this return, however, since the RRB is a medium- to long-term asset. While the investor will earn the rate of current yield on an RRB bond if s/he holds the bond until maturity, the investor risks a loss if s/he sells the bond before the bond matures.

CURRENT INTEREST RATES

In this section we provide an overview of current and short-term (1 to 5-year) *nominal* interest rates in Canada, including the Bank of Canada's target for the overnight rate and Guaranteed Investment Certificate ("GIC") rates from major Canadian banks. These are *nominal* rates as they are the ones we observe and are posted by the financial institutions. (To obtain *real* rates of return from these figures we would have to deflate them by the rate of inflation. This means that the rates shown below cannot be directly compared to the mandated *real* rates set by legislation in Table 1 above – the nominal rates below are higher than the mandated *real* rates by the implied rate of inflation).

Bank of Canada's Target Overnight Rate

The Bank of Canada carries out monetary policy by influencing short-term interest rates. It does this by raising and lowering the target for the *overnight rate*, which is the interest rate at which major financial institutions borrow and lend one-day (or "overnight") funds among themselves. Changes in the target for the overnight rate influence other interest rates, such as those for consumer loans and mortgages. We can see from Table 5 below that the Bank of Canada rate has ranged within a narrow band (0.25% in 2009 to 1.75% in 2019) but has been lower than all rates announced by the Bank of Canada from 1978 to 2008.[20]

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[20] Bank of Canada, Public Information Service (1-800-303-1282). CANSIM tables: 176-0043, 176-0064,176-0067 and 387-0006.

Table 5
Bank of Canada's Target Overnight Rate[21]
(January 2009 to December 2019)

Bank of Canada's Announcement Date	Overnight Rate (%)	Bank of Canada's Announcement Date	Overnight Rate (%)
4-Dec-2019	1.75	4-Jun-2014	1.00
30-Oct-2019	1.75	16-Apr-2014	1.00
4-Sep-2019	1.75	5-Mar-2014	1.00
10-Jul-2019	1.75	22-Jan-2014	1.00
29-May-2019	1.75	4-Dec-2013	1.00
24-Apr-2019	1.75	23-Oct-2013	1.00
6-Mar-2019	1.75	4-Sep-2013	1.00
9-Jan-2019	1.75	17-Jul-2013	1.00
5-Dec-2018	1.75	29-May-2013	1.00
24-Oct-2018	1.75	17-Apr-2013	1.00
5-Sep-2018	1.50	6-Mar-2013	1.00
11-Jul-2018	1.50	23-Jan-2013	1.00
30-May-2018	1.25	4-Dec-2012	1.00
18-Apr-2018	1.25	23-Oct-2012	1.00
7-Mar-2018	1.25	5-Sep-2012	1.00
17-Jan-2018	1.25	17-Jul-2012	1.00
6-Dec-2017	1.00	5-Jun-2012	1.00
25-Oct-2017	1.00	17-Apr-2012	1.00
6-Sep-2017	1.00	8-Mar-2012	1.00
12-Jul-2017	0.75	17-Jan-2012	1.00
24-May-2017	0.50	6-Dec-2011	1.00
12-Apr-2017	0.50	25-Oct-2011	1.00
1-Mar-2017	0.50	7-Sep-2011	1.00
18-Jan-2017	0.50	19-Jul-2011	1.00
7-Dec-2016	0.50	31-May-2011	1.00
19-Oct-2016	0.50	12-Apr-2011	1.00
7-Sep-2016	0.50	1-Mar-2011	1.00
13-Jul-2016	0.50	18-Jan-2011	1.00
25-May-2016	0.50	7-Dec-2010	1.00
13-Apr-2016	0.50	19-Oct-2010	1.00
9-Mar-2016	0.50	8-Sep-2010	1.00
20-Jan-2016	0.50	20-Jul-2010	0.75
2-Dec-2015	0.50	1-Jun-2010	0.50
21-Oct-2015	0.50	20-Apr-2010	0.25
9-Sep-2015	0.50	2-Mar-2010	0.25
15-Jul-2015	0.50	19-Jan-2010	0.25
27-May-2015	0.75	8-Dec-2009	0.25
15-Apr-2015	0.75	20-Oct-2009	0.25
4-Mar-2015	0.75	10-Sep-2009	0.25
21-Jan-2015	0.75	21-Jul-2009	0.25
3-Dec-2014	1.00	4-Jun-2009	0.25
22-Oct-2014	1.00	21-Apr-2009	0.25
3-Sep-2014	1.00	3-Mar-2009	1.00
16-Jul-2014	1.00	20-Jan-2009	1.00

Sources: Bank of Canada, *Monetary Policy, Key interest rate: target for the overnight rate*, www.bankofcanada.ca/monetary-policy-introduction/key-interest-rate/. There are 8 scheduled announcements per year by the Bank of Canada.

The Bank of Canada increased the overnight rate to **1.50%** on July 11, 2018 (source: "Bank of Canada increases overnight rate target to 1 ½ per cent" Bank of Canada press release, July 11, 2018). On October 24, 2018 the Bank of Canada further increased the overnight rate to **1.75%** (where it currently remains), stating:[22]

> The Canadian economy continues to operate close to its potential and the composition of growth is more balanced. Despite some quarterly fluctuations, growth is expected to average about 2 per cent over the second half of 2018. Real GDP is projected to grow by 2.1 per cent this year and next before slowing to 1.9 per cent in 2020
>
> ....

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[21] Sources: Bank of Canada, *Monetary Policy, Key interest rate: target for the overnight rate*, www.bankofcanada.ca/monetary-policy-introduction/key-interest-rate/. There are 8 scheduled announcements per year by the Bank of Canada.
[22] Source: Bank of Canada. *Bank of Canada increases overnight rate target to 1 ¾ per cent*. Press release, October 24, 2018.

Given all of these factors, Governing Council agrees that the policy interest rate will need to rise to a neutral stance to achieve the inflation target. In determining the appropriate pace of rate increases, Governing Council will continue to take into account how the economy is adjusting to higher interest rates, given the elevated level of household debt. In addition, we will pay close attention to global trade policy developments and their implications for the inflation outlook.

Bank experts anticipate that the overnight rate will range from **1.25%** to **1.75%** in 2020.[23] Economic experts similarly anticipate that Bank of Canada will keep its benchmark unchanged at **1.75%** through end-2019 but will cut its rates to 1.50% in 2020 due to sluggish growth and global trade tensions.[24] In its November 12, 2019 report, Bennett Jones predicts that "[i]n the short term – e.g., the next two to three years - the best baseline projection is one founded on global growth below potential, **with low inflation and interest rates**, and only gradual convergence to potential. However, the risks to this projection – for the global economy as well as for Canada – are decidedly tilted to the downside" (emphasis added).[25]

Guaranteed Investment Certificate ("GIC") Rates from Canada's Chartered Banks

Current *nominal* rates for GICs range from **0.35%** for a 1-year term to **1.85%** for a 5-year term. Table 6 provides rates for redeemable GICs currently offered by the major chartered banks in Canada:

Table 6
Nominal rates for 1-year, 3-year and 5-year redeemable GICs,
5 major banks (Canada) as at January 2, 2020 (Chartered bank websites)

	1-Year GICs	3-Year GICs	5-Year GICs
RBC Royal Bank[1]	1.200%	1.550%	1.750%
BMO Bank of Montreal[2]	0.600%	0.900%	1.250%
Scotiabank[3]	0.350%	1.400%	1.750%
TD Canada Trust[4]	1.500%	1.100%	1.846%
CIBC[5]	0.750%	0.867%	1.149%

[1] *Redeemable GIC* - Interest Paid Annually. Minimum $1,000. Features: redeemable prior to maturity at reduced rate

[2] *Cashable Term Deposit* - For investments $1,000 to $999,999. Features: redeemable in full or in part at anytime at pre-determined rates set at the time of purchase; minimum withdrawal of $1,000 while maintaining at least the minimum investment of $1,000,

[3] *ScotiaBank ® Cashable GICs* for 1-year rates. Minimum $500. *Ultimate Laddered GIC* for 3-year and 5-year rates. Minimum $5,000; allows 20% of the remaining balance to be cashed, without penalty, on the purchase date anniversary.

[4] *TD 1 Year Cashable GIC* for 1-year rate, *TD 3 Year Premium Rate Cashable GIC* for 3-year rate and Effective Annual Yield on *5-Year Stepper GIC* for 5-year rate. Minimum $1,000

[5] *CIBC Cashable Escalating Rate GIC* . Minimum $500. Approximate effective yield after 1 and 3 years (3 year GIC) and 5 years (5 year GIC*).* Features: Cashable in full or in part on each anniversary date with a minimum withdrawal of $500 and a remaining balance requirement of $500

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[23] TD Economics' *Long-Term Economic Forecast,* June 17, 2019; RBC Economics' *Economics and Financial Market Outlook,* September 2019; BMO Capital Market Economics' *Canadian Economic Outlook,* July 17, 2019; Scotiabank Global Economics' *Scotiabank's Forecast Tables,* April 12, 2019; and CIBC World Markets Inc.'s *Economic Insights,* April 18, 2019.

[24] The Reuters poll conducted in August 2019 revealed that a majority of economists, 22 of 39, predicted no change to Bank of Canada rates in the fourth quarter of 2019. The poll showed that the Bank of Canada will cut its rates to 1.50% in the first quarter of 2020 and maintain the rates at this level at least through end-2020. There is an 80% chance for a Bank of Canada rate cut by the end of 2020, according to the median probability of a smaller sample of the poll. (Source: Ghosh, I. *To hold or cut: Bank of Canada's dilemma also splits economists – Reuters poll*. Thomson Reuters , August 29, 2019. Accessed at www.ca.reuters.com/article/businessNews/idCAKCN1VK00A-OCABS on September 23, 2019.

[25] D. A. Dodge *et al. Bennett Jones Fall 2019 Economic Outlook*. Bennett Jones, November 12, 2019.

If we adjust the *nominal* rates of return on 5-year GICs shown in Table 6 for inflation (assuming 2.00% per year inflation, which is the Bank of Canada's target for inflation), 5-year GICs are earning <u>real</u> returns between **-0.74%** and **-0.15%** per year. <u>Real</u> interest rates for 1-year and 3-year GICs are even lower, producing negative returns, from **-1.62%** to **-0.49%** for 1-year GICs and from **-1.08%** and **-0.44%** for 3-year GICs.

FORECASTS OF INTEREST RATES

This section provides national real interest rate forecasts from the Bank of Canada, Canada's Department of Finance, the University of Toronto's *Policy and Economic Analysis Program* (PEAP), Willis Towers Watson, as well as international real interest rate forecasts from the International Monetary Fund, the U.S. Federal Reserve Bank, and the U.S. Congressional Budget Office.

Bank of Canada

The Bank of Canada's ***neutral rate of interest***[26] represents the Bank's expectation of the trend for interest rates over the long run when the Canadian economy is producing its full-employment level of output and the inflation rate is 2.00% (the Bank's inflation target). In 2019, Bank of Canada staff estimated that the real neutral rate in Canada had slightly decreased from a range of 2.50% to 3.50% in 2018[27] to a range of **2.25%** to **3.25%** in 2019.[28]

In the short run, the Bank lowers interest rates below the neutral rate when the Canadian economy is producing below potential (such as during a recession) or raises interest rates above the neutral rate to slow the pace of economic activity in Canada during periods of rapid growth and/or high inflation. *The current low interest rate environment in Canada reflects the Bank's view that the Canadian economy is presently operating below potential*. Importantly, even once the Canadian economy returns to full potential, interest rates are not likely to rise above the neutral rate unless the Canadian economy unexpectedly begins to expand rapidly and/or the price level rises faster than 2.00% per year. Barring these types of shocks to the economy, Canadian real interest rates are likely to remain at or below the neutral rate range of **2.25%** to **3.25%** in the coming years.[29]

Department of Finance, Government of Canada

The federal government's Department of Finance performs a *Survey of Private Sector Economic Forecasters* regularly that surveys approximately 15 private sector forecasters for their views on the main economic variables. The average of private sector forecasts forms the basis for the economic assumptions used for fiscal planning purposes in the budget and the fall update. In the table below, we show the *nominal* interest rate forecasts for 3-month Treasury bills (short-term instruments) and 10-year Canada bond rates (long-term instruments) gathered in the February 2019 surveys.[30] This table is similar to the table above from the Canadian Institute of Actuaries, except that instead of *historical* data, we show short-term *forecasts* (as of September 2019) until 2023.

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[26] Also referred to as the *natural rate of interest* or the *equilibrium rate of interest*. For more information about the neutral rate of interest, see **Brown's Economic Damages Newsletter** "Trends in Real Interest Rates: New Research" August 2016, vol. 13, issue 8, pp. 3-7.
[27] Chen, Xin Scott, and Dorich, José, *The Neutral Rate in Canada: 2018 Estimates*. Bank of Canada's Staff Analytical Note, 2018, p. 1.
[28] Carter, Thomas J., Xin Scott Chen and José Dorich, "The Neutral Rate in Canada: 2019 Update" (2019) *Bank of Canada Staff Analytical Note*, p. 2.
[29] Dungan and Murphy (2019) anticipate that "real short-term interest rates are expected to stabilize at roughly 1.5% over the longer term, while long-term real rates are seen to stabilize at 2.7%" (Source: P. Dungan and S. Murphy, *Long Term Outlook for the Canadian Economy: NATIONAL PROJECTION THROUGH 2050 Policy and Economic Analysis Program,* PEAP Policy Study 2019-1, University of Toronto, February 2019).
[30] Available at: http://www.fin.gc.ca/pub/psf-psp/index-eng.asp.

Table 7
<u>Nominal</u> **Interest Rate Forecasts to 2023, Department of Finance Canada, September 2019**

Year	3-month Treasury bill	10-year benchmark Canada bond
2019	1.6%	1.5%
2020	1.5%	1.6%
2021	1.6%	2.0%
2022	1.9%	2.4%
2023	2.2%	2.7%

Table 7 shows that the Department of Finance's <u>nominal</u> interest rate forecasts for 3-month Treasury bills and 10-year benchmark Canada bonds from 2019 to 2023 range from **1.50%** to **2.20%** and **1.50%** to **2.70%**, respectively. The forecasts in Table 7 show that using a **3.50%** assumption for the real discount rate in civil litigation (which is equal to a nominal rate of approximately 5.50%) is unduly optimistic and has the effect of lowering the lump sum values substantially. If we convert the most recent *nominal* forecasts in Table 7 to <u>real</u> rates using the Bank of Canada's inflation target (2.00%),[31] this implies that the Department of Finance forecasts *real* rates of approximately **0.20%** for 3 -month Treasury bills and **0.69%** for 10-year Canada bonds by the year 2023. The 0.20% rate is closer to Ontario and Saskatchewan's 0.00% mandated rate for the next 15 years; the 0.69% rate is more similar to Brown Economic's assumption for real interest rate of **1.00% per annum** for the first five years (if there is no mandated rate or it is being challenged). Brown Economic's 1.00% rate is lower than the 10-year bond forecast because we assume the plaintiff must invest the award(s) in shorter term instruments, since they need to withdraw compensation every year (which is not possible with 10-year bonds).

Policy and Economic Analysis Program ("PEAP") @ the University of Toronto

The University of Toronto's Policy and Economic Analysis Program [PEAP] issues periodic policy studies in which they use macroeconomic forecasting models to generate long-term forecasts of key economic variables in Canada. *The Long Term Outlook for the Canadian Economy: NATIONAL PROJECTION THROUGH 2050,*[32] released February 2019 reports:

> "The U.S. nominal 3-month T-bill rate which hovered near zero for a number of years has finally begun to increase, albeit somewhat modestly. The US Fed, which has maintained its accommodative monetary policy to backstop a return to solid economic growth, is expected to continue to increase its benchmark rate very cautiously. The speed of adjustment will largely be data dependent, including how expansionary U.S. fiscal policy is. By 2021 the t-bill rate is projected to reach its long-run sustainable level of 3.5% (translating to 1.4% real, using the GDP deflator). We also expect real long-term government bond rates in the U.S. (represented in the model by the 10-year bond rate) to increase over the next few years before stabilizing at 2.6% in 2020 and through the rest of the projection period (with a nominal rate of 4.7%). These real rates - especially the real long-term rate - of course will dominate the Canadian interest-rate projection. The long-term real rate for the U.S. is, if

[31] Since Canada adopted inflation targets in 1991, total CPI inflation has averaged very close to 2 per cent, and the variability of inflation has been significantly lower than was the case in the 15 years before inflation targeting. Success in reducing inflation, coupled with an explicit commitment to keep inflation low, stable, and predictable through time, has helped to anchor inflation expectations to the 2 per cent target. On October 24, 2016, the Government of Canada and the Bank of Canada renewed Canada's inflation-control target for a further five-year period, ending 31 December 2021. Under this agreement, the Bank will continue to conduct monetary policy aimed at keeping inflation, as measured by the total consumer price index (CPI), at 2 per cent, with a control range of 1 to 3 per cent around this target. (Source: Bank of Canada, *Renewal of the Inflation-Control Target Background Information – October 2016* (Ottawa, Ontario: Bank of Canada), 2016).
[32] P. Dungan and S. Murphy, *Long Term Outlook for the Canadian Economy: NATIONAL PROJECTION THROUGH 2050 Policy and Economic Analysis Program,* PEAP Policy Study 2019-1, University of Toronto, February 2019.

anything, low by longer-term historical standards, but is somewhat above the levels of the last half-decade, when world net savings may have been unusually plentiful. A key risk overhanging the long-term financial projection is whether this recent excess of world saving will indeed persist into the long term with a resulting greater reduction in world real interest rates (p. 9 emphasis added).

Given the recent strength in the Canadian economy, the Bank of Canada has begun increasing rates, following a number of Fed quarterly rate increases. With recent oil price weakness and much uncertainty surrounding U.S. trade policy, it is now not until late 2021, however, until we expect that short rates in both Canada and the U.S. will be roughly equal. *By 2021 and beyond the 3-month t-bill rate is expected to average 3.5%, the same as its American counterpart, while the 10-year Canadian government bond rate is expected to hit 4.7%* …

After an increase over the next two years as a result of the rise in energy prices from their very low levels (as well as the introduction of the federal carbon tax in four provinces), we expect that *Canadian CPI inflation will average at the 2% inflation target over the longer term*, which should keep it below that seen in the U.S. over this period … (p. 21, emphasis added).

Real short-term interest rates (as measured using the 3-month t-bill rate and the GDP deflator) *are expected to stabilize at roughly 1.5%* over the longer term, while long-term real rates are seen to stabilize at 2.7%" (p. 22, emphasis added).

Table 8 summarizes PEAP's short-term forecasts for Canadian real and nominal interest rates (to the year 2023).

Table 8
Interest Rate Forecasts to 2023, Policy and Economic Analysis Program
(PEAP Long Term Outlook, 2019-1 Policy Study)

Year	Nominal Interest Rate		Real Interest Rate	
	3-month Treasury bill	10-year benchmark Canada bond	3-month Treasury bill	10-year benchmark Canada bond
2019	1.8%	2.2%	0.2%	0.6%
2020	2.6%	3.1%	0.7%	1.1%
2021	3.4%	4.2%	1.4%	2.3%
2022	3.5%	4.7%	1.5%	2.7%
2023	3.5%	4.7%	1.5%	2.7%

Table 8 shows that *nominal* forecasts of 3.50% and 4.70% translate into real rates of **1.50%** and **2.70%**, assuming 2.00% inflation as per the Bank of Canada's inflation target (and consistent with the current rate of inflation in Canada).[33] PEAP's forecast for short-term real rates in 2023 (**1.50%**) is significantly higher than Ontario and Saskatchewan's 0.00% mandated rate for the first 15 years while PEAP's forecast for longer-term real rates by 2023 (**2.70%,** slight decline to **2.60%** by 2050) is closer to other provinces' mandated rates of **2.50%** to **3.00%** (see Table 1) and falls within the range of the Bank of Canada's real neutral rate. The higher real rate for long-term instruments (**2.70%**) is consistent with our long-term forecast for the real interest rate (**2.50%** **after** **the first five years**). The lower real rate for short-term instruments (**1.50%**) is more optimistic than our short-term assumed rate of **1.00%** *until* the 5th year mark.

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[33] As noted in the IMF publication, "in the absence of inflation-protected securities, real rates can be approximated by the difference between the nominal interest rate and inflation expectations over the relevant time horizon" (p. 84). (See International Monetary Fund, *World Economic Outlook: Recovery Strengthens, Remains Uneven,* April 2014, chapter 3: "Perspectives on Global Real Interest Rates").

Willis Towers Watson

The majority of respondents to Willis Towers Watson's 2016 *Survey of Investment Perspectives* expected the <u>nominal</u> overnight rate to increase to **1.50% per year** over the period 2017 to 2020,[34] while predictions for the <u>real</u> target overnight rate ranged between **-1.50%** and **1.00% per year** over the same period. The median predicted <u>real</u> rate for the 10-year Canada bond over the period 2017 to 2020 was **0.60%**, falling in a range of **-0.50%** and **2.50% per year**.[35]

Towers Watson's *Economic Expectations 2014 - 33rd Annual Canadian Survey* respondents expected the present low-interest yield environment to continue for the longer-term (to 2028). According to this forecast, the <u>real</u> rate for 91-day Treasury bills is expected to rise to **0.98% per year** between 2019 and 2028, considerably lower than the most recent Department of Finance forecast (2.20**%** by 2023, see Table 7). <u>Real</u> returns on Government of Canada 5-year bonds are predicted to rise to **1.96% per year** from 2019 to 2028, while both 10-year and 30-year Canada bonds are expected to have <u>real</u> returns of **2.94% per year** from 2019 to 2028.

The authors of Towers Watson's 2014 survey state that:

> There continues to be no sign of a ramp up in inflation and the velocity of money continues to be at abnormally low levels despite significant stimulus over the past five years.

> Last year, participants predicted that the long-term median forecast yield for the 10 year government of Canada bond (on a nominal basis) would remain below 4%. Respondents to this year's survey have predicted a more optimistic forecast of 5% over the long term. The survey results, however, do point to an inconsistency between nominal and real expectations with *real yields expected to remain at around 1% for the 10 year bond* compared to an inflation forecast of 2% over the long term" (p. 5, emphasis added).

The 128 organizations which comprised the Towers Watson 2014 consensus forecast confirmed that the present low-interest yield environment is expected to continue for the mid-term (to 2018) and longer-term (to 2028). Our use of a lower rate for the <u>next 5 years</u> (1**.00%**) is in concert with this consensus.

U.S. Federal Reserve Bank

Similar to the Bank of Canada's neutral rate of interest discussed above, the U.S. Federal Reserve's natural rate of interest (also referred to as the equilibrium real interest rate) represents "the real federal funds rate consistent with the economy operating at its full potential once transitory shocks to aggregate supply or demand have abated".[36]

The natural rate of interest in the United States has been exhibiting a downward trend since the 1980s. Based on estimates from five different Federal Reserve Bank research studies, the average real natural rate of interest fluctuated between **2.00%** and **2.50%** in the 1990s through the mid-2000s and then dropped to about **0.50%** around 2009, where it remained through 2019.[37]

[34] "Experts predict modest near-term change in Canadian economic indicators, according to Willis Towers Watson survey" (January 26, 2016) Willis Towers Watson's website (www.willistowerswatson.com/en-CA/press/2016/01/experts-predict-modest-near-term-change-in-canadian-economic-indicators).
[35] Willis Towers Watson's *2016 Canadian Investment Perspectives: Summary Table* (kindly provided to Brown Economic by Willis Towers Watson).
[36] John C. Williams, "The Decline in the Natural Rate of Interest" (March 2, 2015), article for the presentation for the NABE panel *The Outlook for the U.S. and Global Economy: Headwinds, Tailwinds and Whirlwinds*, at p. 1.
[37] John C. Williams, "Three Questions on R-star" (February 21, 2017) *FRBSF Economic Letter*, p. 1; and Holston, K., Laubach, T., and Williams J. C. (2017). *Measuring the natural rate of interest: International trends and determinants.* Journal of International Economics, Vol. 108, pp. S59–S75. doi: 10.1016/j.jinteco.2017.01.004; and Federal Reserve Bank of New York. *Measuring the Natural Rate of Interest*. Accessed at www.newyorkfed.org/research/policy/rstar on September 23, 2019.

The decline in the natural rate of interest "implies that *real short term interest rates will be lower on average in the future than was typical in the postwar period*"(emphasis added) and "by implication, **longer-term interest rates will also be corresponding lower on average**."[38] Federal Reserve Bank of San Francisco President John C. Williams addressed the issue of how long lower long-run equilibrium real interest rates (which he calls "r-star") can be expected to persist in the United States:

> There are number of reasons why the decline in the natural rate of interest will not reverse anytime soon. First, over eight years after the onset of the global financial crisis, there are no signs of a return to more historically normal levels of r-star….This suggests that these low estimates of r-star are not overly influenced by country-specific factors, but instead that longer-term global influences are at work. For example, the U.S. economy has fully recovered from the recession following the financial crisis, and the most recent estimates of r-star there have shown no signs of rebounding.

> Second, many possible factors depressing r-star across countries reflect highly persistent forces affecting the global supply and demand for savings….For example, one potential explanation for the decline in r-star is a dramatic slowdown in trend real GDP growth in many advanced economies….The decline in the trend rate of growth reflects shifts in demographics of the workforce and a slowdown in productivity growth….These underlying trends are unlikely to swing back upward in the near future, suggesting continued downward pressure on r-star.[39]

In its July 30-31, 2019 meeting, U.S. Federal Reserve Bank lowered its key interest rate from a range of **2.25%** to **2.50%** as of December, 2018 to a range of **1.75%** and **2.00%** as of September 2019.[40] This was the first rate cut in a decade, since 2008. Explaining its decision on the rate cut, Federal Reserve Chairman Jerome Powell said that "uncertainties around trade tensions and concerns about the strength of the global economy continue to weigh on the U.S. economic outlook", and thus, "have strengthened the case for looser interest-rate policies".[41] The Chairman further states "*if the economy does turn down, then a more extensive sequence of rate cuts will be appropriate*" (emphasis added)[42]

[38] John C. Williams, "The Decline in the Natural Rate of Interest" (March 2, 2015), article for the presentation for the NABE panel *The Outlook for the U.S. and Global Economy: Headwinds, Tailwinds and Whirlwinds*, at p. 5.
[39] John C. Williams, "Three Questions on R-star" (February 21, 2017) *FRBSF Economic Letter*, pp. 2-3.
[40] Board of Governors of the Federal Reserve System. (n.d.). *Policy Tools – Open Market Operations*. Retrieved from www.federalreserve.gov/monetarypolicy/openmarket.htm.
[41] CBC. *Fed starting to see a case for rate cuts, Powell hints* (July 10, 2019). Retrieved from www.cbc.ca/news/business/fed-powell-rate-cuts-1.5206515.
[42] CNBC. *Powel says a "sequence of rate cuts could be needed if economy turns, but doesn't see that now."* Retrieved from www.cnbc.com/2019/09/18/powell-press-conference.html.

U.S. Congressional Budget Office

Table 9 shows the U.S. Congressional Budget Office's most recently published economic projections for 2019 to 2023.

Table 9
Interest Rate Forecasts, U.S. Congressional Budget Office, August 2019[43]

Year	Nominal Interest Rate		Real Interest Rate*	
	3-month Treasury bill	10-year Treasury note	3-month Treasury bill	10-year Treasury note
2019	2.2%	2.3%	0.5%	0.6%
2020	2.1%	2.2%	0.2%	0.3%
2021	2.3%	2.5%	0.3%	0.5%
2022	2.3%	2.9%	0.3%	0.9%
2023	2.3%	3.0%	0.3%	1.0%

* Deflated using the GDP Price Index

Table 9 shows that the U.S. Congressional Budget Office's August 2019 economic forecast predicts interest rates on 3-month U.S. Treasury bills will rise to only **2.30% per year** (in nominal terms, equivalent to **0.30% in real terms**) by 2021 and remain at this level through 2023. Likewise, interest rates on 10-year U.S. Treasury notes are predicted to rise to **2.50% per year** (in nominal terms, equivalent to **0.50% in real terms**) by 2021 and to **3.00%** (in nominal terms, equivalent to **1.00% in real terms**) by the end of 2023. US forecast for *real* interest rates is lower than the Department of Finance Canada forecast for *real* interest rate (0.49% for 3-month Treasury bills and 1.27% for 10-year Canada bonds by the year 2023). Note how this US forecast in *real* terms (0.30% to 1.00%) is considerably less optimistic than our forecast (1.00% for 5 years, 2.00% thereafter).

International Monetary Fund

In the April 2014 *World Economic Outlook*, the International Monetary Fund ("IMF") predicted that continued low investment-to-GDP ratios in advanced economies and increased preferences for safe assets over risky assets would keep global real interest rates relatively low in the medium term (2008 to 2012). However, they also identified factors promoting a rising shift in interest rates: high and rising debt levels in advanced economies; population aging; and lower growth in energy markets (lowering savings rates). Overall, they estimated that risk-free global *real* interest rates would remain **below 2.10%** for 5 years as of 2014.[44]

In the October 2017 *World Economic Outlook*, the IMF reported that:

> …the global recovery may not be sustainable – not all countries are participating, inflation often remains below target with weak wage growth, and the medium-term outlook still disappoints in many parts of the world. The recovery is also vulnerable to serious risks….Even as negative output gaps close across the advanced economies,

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[43] "An Update to the Budget and Economic Outlook: 2019 to 2029" (August 2019) U.S. Congressional Budget Office (www.cbo.gov/publication/55551), p. 77.
[44] International Monetary Fund, "Recovery Strengthens, Remains Uneven" (April 2014) *World Economic Outlook*, chapter 3, Table 3.2, p. 96.

growth in nominal and real wages remains weak compared with past recoveries. ***Weak wage growth is one source of the surprisingly weak inflation that itself is a source of concern, as it leaves nominal interest rates low***…

(p. xiii, emphasis added).

More recent, in the April 2018 *World Economic Outlook,* the IMF reported that:

> …The upswing in global investment and trade continued in the second half of 2017… Global growth is projected to soften beyond the next couple of years. Once their output gaps close, most advanced economies are poised to return to potential growth rates well below precrisis averages, held back by aging populations and lackluster productivity. Growth is projected to remain subpar in several emerging market and developing economies, including in some commodity exporters that continue to face substantial fiscal consolidation needs (p. xvi).

> …Wage growth also remains tepid in most advanced economies, moving broadly in line with labor productivity when measured in real terms (hence implying a limited increase in unit labor costs). With strengthening economic activity and expectations of more rapid increases in the policy rate in the United States, nominal yields on 10-year US Treasury bonds have risen by over 50 basis points since August (as of end March 2018). ***This increase reflects primarily a steeper expected path for short-term interest rates*** (p. 5, emphasis added).

As part of its April 2018 medium-term baseline scenario,[45] the IMF projected that the *real* six-month LIBOR[46] will be **0.90%** in 2019 and average **1.50%** from 2020 to 2023. The world *real* long-term interest rate[47] was projected to be **0.50%** in 2019 and average **0.90%** from 2020 to 2023. Our short-term forecast of 1.00% for the next 5 years is consistent with these forecasts.

CHOOSING AN APPROPRIATE REAL INTEREST RATE FOR CIVIL LITIGATION IN CANADA

Summary of interest rate data/forecasts[48]

1) Provinces that have recently amended their real discount rate or mandate that the *Real Return Bond* (RRB) rate be used as its basis each year show that mandatory discount rates for these 3 provinces range from **0.00% for the next 15 years** (Ontario and Saskatchewan) to **1.50% for all years** (British Columbia)[49] - see Table 1. British Columbia's mandated rate was *reduced* in 2014 from 2.50% to 1.50%, presumably in part to reflect the shift to a low-interest rate environment.[50]

2) **3-month Treasury bill** rates have posted real returns ranging from **-1.92%** (2011) to *less than* **0.1%** from 2008 until 2019 (Table 2). The last time 3-month T-bill rates were in excess of 3.00% per year was in 1998 (Table 2).

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[45] International Monetary Fund, "Cyclical Upswing, Structural Change" (April 2018) *World Economic Outlook*, Table A15, p. 269.
[46] London interbank offered rate on US dollar deposits minus percent change in US GDP deflator.
[47] GDP-weighted average of 10-year (or nearest-maturity) government bond rates for Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.
[48] All interest rates are expressed in "real" terms, given that the mandated discount rates are also expressed in "real" terms and forensic economists calculate loss awards in "real" terms (except the Bank of Canada's Target Overnight Rate and the U.S. Federal Reserve Bank rates, which are posted in nominal terms). Additionally, rates are given on a *per year* basis.
[49] We only cite British Columbia's mandated rate for "loss of earning capacity" in this discussion, because the 2.00% mandated rate for "all other future damages" reflects the omission of a productivity factor relating to wages, a topic beyond this issue. For information on productivity increases related to wages, see **Brown's Economic Damages Newsletter** "The Productivity Rate: What is it, and How is it determined?" February 2012, vol. 9, issue 1, p. 5.
[50] *Riding-Brown v. Jenkins,* 2015 BCSC 1751, para [4].

3) **Long-term (10-year) Government of Canada real bond** rates averaged only **1.71%** from 2000 to 2019; **0.71% from** 2010 to 2019; and from 2015 to 2019, equaled only **0.35%** (Table 2). The Canadian Institute of Actuaries computed the same averages over these time periods (Table 3).

4) *Real Return Bond* **(RRB)** rates, which are relied upon both by Ontario and Saskatchewan as the basis for their mandated discount rates (Table 1), have steadily declined from 2007 until 2019 (Figure 1). Just like the 3-month T-bill and Government of Canada bond rates, the RRB declined to **1.80%** (average per year) from 2006 to 2010, and **since 2011** have <u>not</u> exceeded 1.00% per year as of 2019 (Figure 1).

5) The **Bank of Canada's Target Overnight Rate** has fluctuated from **0.25% (in 2009 and 2010) to 1.00% (2010 to 2017),** having only recently rebounded slightly as of October 2018 and during 2019 to 1.75% (Table 5). From 1978 to 2008, the Bank of Canada rate exceeded the level of rates in every year compared to the 2009-2019 time period. Many bank analysts expect the Bank of Canada to reduce the target overnight rate in 2020.

6) **GIC rates** have long boasted a flat yield curve,[51] paying 0.35% to 1.50% (for 1-year GICs) to 1.846% (for 5-year GICs) (Table 6). When we convert these observed (nominal) rates at the 5 major chartered banks to *real* rates of return, we see they are negative: net of inflation, there has been *no* real return on money invested in GICs for many years.

7) Forecasts by the **Dept. of Finance** and University of Toronto's *Policy and Economic Analysis Program* **(PEAP)** suggest that *short*-term instruments[52] will earn **0.20% to 1.50%,** and *long*-term instruments[53] will earn **0.70% to 2.70%** (Tables 7 & 8) until 2023.

8) **Willis Towers Watson's** 2016 *Survey of Investment Perspectives* suggests expectations until 2028 of **1.00%** to **2.00%** for shorter-term instruments (T-bills to 5-year bonds) to **3.00%** for longer-term instruments (10 & 30-year Government of Canada bonds).

9) Just like the declining trend in the Bank of Canada's *Target Overnight Rate* since 2009, the natural rate of interest in the United States has been exhibiting a downward trend since the 1980s. The **U.S. Federal Reserve Bank** lowered the range of its key interest rate to a range of **1.75% to 2.00%** in 2019 – the first rate cut in a decade.

10) The **U.S. Federal Reserve Bank** rates are nominal rates. The **U.S. Congressional Budget Office** predicts *real* interest rates of **0.30%** for 3-month T-bills and **1.00%** for 10-year Treasury notes.

11) The **International Monetary Fund (IMF)** projected in 2018 that the "world" *real* long-term interest rate is projected to be 0.90% from 2020 to 2023.

The datasets and forecasts reviewed in this article indicate that since 2001, *real* interest rates have steadily fallen, resulting in a *never-before-seen* low-interest rate environment and this is a shift downward from interest rate levels before 2009 – more than 10 years ago. Most of the studies we have reviewed expect the low-interest rate environment to persist in the coming years (as of the date of this newsletter issue).

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[51] In layperson's terms, this refers to the observation that a 1-year GIC investment holder can earn a rate of return (1.50%) almost as high as a 5-year GIC investment holder (1.846%). This translates into a line graph that is almost horizontal ("flat").
[52] 3-month Treasury bills.
[53] Long-term Government of Canada bonds (10+ years).

Brown Economic's Real Discount Rate Assumption

In all cases where there is <u>no</u> mandated discount rate for the jurisdiction, we assume *real* rates of **1.00%** per year for the **next 5 years, rising to 2.00%** per year thereafter. This range is consistent with the trend in Canada's *Real Return Bond* (RRB) rate which averaged 1.80% per year from 2006 to 2010, and since 2011 has <u>not</u> exceeded 1.00% per year (Figure 1).

This assumption is considerably higher than the level of 3-month Treasury bill rates since 2008, which have posted *negative* real rates of return from 2008 until 2019. Our shift to 2.00% per year after the next 5 years is consistent with long-term (10-year) Government of Canada bond rates since 2000 (1.71% per year on average from 2000 to 2019) – see Table 2.

To place our *real* discount rate assumption in context with posted or observed rates at the chartered banks, we must adjust for the inflation component embodied in *nominal* rates. Using the Bank of Canada's target for inflation of 2.00% per year, this translates to *nominal* rates of **3.00%** for 5 years, **4.00%** thereafter.[54] Brown Economic's discount rate assumption is in fact *optimistic* given the posted GIC rates ranging from 0.35% (1-year GICs) to 1.846% (5-year GICs) – see Table 6.

Our discount rate assumption of 1.00% per year (<u>for 5 years</u>) is higher than the existing 0.00% per year rate mandated in both Ontario and Saskatchewan for the next <u>15 years</u>, but our 2.00% per year rate <u>after *5* years</u> is lower than both provinces' mandated rate of 2.50% after 15 years. However, the fact that we use a higher rate than Ontario and Saskatchewan for 10 years offsets this slight difference. We also have access to more recent forecasts of interest rates in Canada than when Ontario and Saskatchewan established their 2.50% rate after 15 years.

The other factor inherent in our real discount rate assumption is that the plaintiff or widow/widower requires his or her compensation or care costs each year in the future, which means they *require ready access to the funds for such annual withdrawals.* This feature restricts the lump sum recipient to shorter-term instruments, which pay lower rates of return than do long-term Government of Canada bonds. Using long-term bonds as the benchmark for a real discount rate in civil litigation is <u>not</u> appropriate for this reason.

Using a real discount/interest rate which <u>conflicts</u> with historical interest rates and future forecasts

Many forensic economists working for defense counsel assume a **3.00% or 3.50%** annual *real* discount rate <u>immediately and for all future years</u>, which results in a smaller lump sum value (because the award is "discounted" by a greater accrual of interest at a higher assumed rate than those in all mandated provinces and territories in Canada).[55] **Assumption of a 3.00% or 3.50% *real* rate of return is <u>not</u> supported by any of the interest rate data shown in Tables 2 through 9 and Figure 1 in this article.**

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[54] The decimal-place conversion from real to nominal rates using a 2.00% inflation rate results in exact rates of 3.02% for 5 years, then 4.04% after 5 years, given the compounding effect of interest.
[55] Only Manitoba has a mandated real rate of 3.00%; all other mandated rates are less than 3.00%.

In order to generate this rate of return, plaintiffs must either forego annual compensation to invest in longer-term investment instruments; or invest in riskier (or long-term) instruments which, *if successful,* can earn higher rates of return than interest accruing from GICs, where the investor's principal is guaranteed. Yet we already know that the plaintiff or widow/widower requires annual or periodic access to his/her lump sum to be compensated. We also know from *Palmquist v. Ziegler* (2010) that most judges refuse to require plaintiffs to chase rates of return to maintain their lump sum award.[56]

These same forensic economists make this assumption despite:

1) Data and research to the contrary;
2) A permanent shift to a low-interest rate environment cited by most analysts; and
3) Experts' and analysts' opinions that the low-interest rate environment is expected to persist.

The most frequent impetus for ignoring interest rate data is to *reduce* the lump sum values by using too-high discount rates (because a higher discount/interest rate assumes a greater accrual of interest will occur over the discounting period compared to a lower interest rate). But using an assumption of a 3.00% or 3.50% real discount rate *will lead to a systematic under-estimation of the plaintiff's or widow/widower's lump sum loss, because s/he will not be able to generate this level of interest income upon investing the lump sum award.*

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[56] For more information regarding the use of safe and liquid assets, see **Brown's Economic Damages Newsletter** "Choosing a Real Interest Rate for Civil Litigation" February 2016, vol. 13, issue 2, p. 5. Justice Read echoed this sentiment in *Palmquist v. Ziegler* (2010), stating that plaintiffs should not have to incur risk to chase returns. (This author testified for the plaintiff estate in this matter).

Consumer Price Index $ Unemployment Rate

From November 2018 to November 2019* (rates of inflation)		For the month of November 2019	
Canada**	2.2%	Canada:	5.9%
Vancouver:	2.3%	Vancouver:	4.9%
Toronto:	1.8%	Toronto:	5.7%
Ottawa:	2.5%	Ottawa:	4.3%
Montréal:	2.9%	Montréal:	5.8%
Edmonton:	2.1%	Edmonton:	7.7%
Calgary:	2.0%	Calgary:	6.9%
Halifax:	1.9%	Halifax:	5.9%
St. John's, NF:	1.5%	St. John's, NF:	6.7%
Saint John, NB:	2.2%	Saint John, NB:	8.2%
Charlottetown (PEI):	2.1%	Charlottetown (PEI):	8.0%
* Using month-over-month indices. Source: Statistics Canada			
** 12 month rolling average up to November 2019 is 1.9% (see table above).			

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UPDATING NON-PECUNIARY AWARDS FOR INFLATION (NOV. 2019, CANADA)

Year of Accident/ Year of Settlement or Trial	"Inflationary" Factors*	Non-Pecuniary Damages - Sample Awards				
		$10,000	$25,000	$50,000	$75,000	$100,000
November 2018-November 2019	1.019	$10,192	$25,481	$50,961	$76,442	$101,922
Avg. 2017-November 2019	1.041	$10,406	$26,016	$52,032	$78,048	$104,063
Avg. 2016-November 2019	1.057	$10,573	$26,431	$52,863	$79,294	$105,725
Avg. 2015-November 2019	1.072	$10,724	$26,809	$53,619	$80,428	$107,237
Avg. 2014-November 2019	1.084	$10,845	$27,111	$54,223	$81,334	$108,445
Avg. 2013-November 2019	1.105	$11,051	$27,628	$55,256	$82,883	$110,511
Avg. 2012-November 2019	1.115	$11,155	$27,887	$55,773	$83,660	$111,547
Avg. 2011-November 2019	1.132	$11,324	$28,310	$56,620	$84,930	$113,240
Avg. 2010-November 2019	1.165	$11,654	$29,134	$58,268	$87,402	$116,536
Avg. 2009-November 2019	1.186	$11,861	$29,653	$59,307	$88,960	$118,614
Avg. 2008-November 2019	1.192	$11,918	$29,794	$59,588	$89,382	$119,176
Avg. 2007-November 2019	1.218	$12,179	$30,446	$60,893	$91,339	$121,786
Avg. 2006-November 2019	1.244	$12,439	$31,096	$62,193	$93,289	$124,386
Avg. 2005-November 2019	1.269	$12,687	$31,719	$63,437	$95,156	$126,874
Avg. 2004-November 2019	1.297	$12,969	$32,422	$64,843	$97,265	$129,687
Avg. 2003-November 2019	1.321	$13,210	$33,024	$66,049	$99,073	$132,097
Avg. 2002-November 2019	1.357	$13,574	$33,936	$67,872	$101,808	$135,744
Avg. 2001-November 2019	1.388	$13,881	$34,703	$69,406	$104,109	$138,812
Avg. 2000-November 2019	1.423	$14,230	$35,576	$71,152	$106,728	$142,304
Avg. 1999-November 2019	1.462	$14,618	$36,546	$73,091	$109,637	$146,182
Avg. 1998-November 2019	1.487	$14,871	$37,178	$74,356	$111,534	$148,713
Avg. 1997-November 2019	1.502	$15,019	$37,548	$75,097	$112,645	$150,194
Avg. 1996-November 2019	1.526	$15,263	$38,156	$76,313	$114,469	$152,626
Avg. 1995-November 2019	1.550	$15,503	$38,758	$77,516	$116,274	$155,031
Avg. 1994-November 2019	1.584	$15,836	$39,590	$79,180	$118,770	$158,360
Avg. 1993-November 2019	1.586	$15,862	$39,655	$79,309	$118,964	$158,619
Avg. 1992-November 2019	1.616	$16,158	$40,396	$80,792	$121,188	$161,583
Avg. 1991-November 2019	1.640	$16,398	$40,996	$81,992	$122,988	$163,985
Avg. 1990-November 2019	1.732	$17,321	$43,303	$86,607	$129,910	$173,213
Avg. 1989-November 2019	1.815	$18,151	$45,376	$90,753	$136,129	$181,506
Avg. 1988-November 2019	1.906	$19,055	$47,638	$95,276	$142,914	$190,552
Avg. 1987-November 2019	**1.982**	$19,820	$49,551	**$99,102**	$148,653	$198,204
Avg. 1986-November 2019	2.068	$20,684	$51,711	$103,421	$155,132	$206,842
Avg. 1985-November 2019	2.155	$21,551	$53,878	$107,756	$161,635	$215,513
Avg. 1984-November 2019	2.241	$22,405	$56,013	$112,025	$168,038	$224,051
Avg. 1983-November 2019	2.337	$23,369	$58,424	$116,847	$175,271	$233,695
Avg. 1982-November 2019	2.474	$24,741	$61,853	$123,706	$185,559	$247,412
Avg. 1981-November 2019	2.740	$27,404	$68,509	$137,018	$205,527	$274,036
Avg. 1980-November 2019	3.083	$30,827	$77,067	$154,134	$231,200	$308,267
Avg. 1979-November 2019	3.395	$33,949	$84,874	$169,747	$254,621	$339,495
Jan. 1978-November 2019	**3.867**	$38,670	$96,674	$193,348	$290,021	**$386,695**

$99,102= $50,000 x 1.982 represents the dollar equivalent in November 2019 of $50,000 based on inflation increases since 1987. Similarly, $386,695 (=$100,000 x 3.867) represents the dollar equivalent in November 2019 of $100,000 in 1978 based on inflationary increases since the month of January 1978.

* Source: Statistics Canada, Consumer Price Index, monthly CPI release, rolling average (except for Jan. 1978).