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**Canadian Bar Association – BC Branch
Submission to the Chief Justice of the BC Supreme Court on Discount Rates**

Dear Ms. Flewelling.

Thank you for your letter of April 11, 2013.

Further to your letter and to our conversations, it is my understanding that you would like me to do the following:

- a. Comment on the 2013 report by George David MacAuley, “Real Discount Rates Prescribed Under the Law and Equity Act” (‘MacAuley’).
- b. Make *preliminary*¹ suggestions concerning the discount rates to be used in British Columbia to convert future incomes and/or costs into their present values.

EXECUTIVE SUMMARY

Comment on MacAuley

It is my opinion that MacAuley provides an excellent background to a discussion of the appropriate real discount rates to use in discounting future costs and incomes. However, I disagree with MacAuley’s methodology and therefore with his conclusions.

My Recommendations

1. The yields on real return Government of Canada bonds (‘RRBs’) should be used as the basis for discounting future plaintiff related cash flows. In other words, the discount rate(s) used should not be fixed, but should be allowed to vary as the yields of RRBs change. These RRB discount rates are available from the Bank of Canada or from certain financial institutions such as Bloomberg.

¹ Please note that any suggestions made in this report are *preliminary* as a result of the limited time and budget allowed for this report.

2. In devising a rule, there are almost always trade-offs between simplicity and accuracy. Cognisant of the fact that in order to be effective the rule must be simple, I make two alternative recommendations:

Recommendation A: Very simple

I recommend that a single discount rate i.e., the Return on Long Term RBBs (V121808) be used as the basis for discounting. This rate is published every Wednesday by the Bank of Canada.²

Recommendation B: Slightly less simple and somewhat more accurate

I recommend the use of two RRB discount rates, depending on the horizon time of specific payments. To calculate the present values of costs/cash payments that are due within 15 years of the date of the award, the yield on RRBs with 15 years to maturity should be used as a basis.³ To calculate the present values of costs/cash payments that are due in more than 15 years, the yield on RRBs with 30 years to maturity should be used as a basis.⁴

3. It is obviously very onerous to change the rates weekly. In view of this, I would recommend that, whether Recommendation A or B is adopted, the discount rate(s) used in any calendar year are based on the observed average yield on real return bonds for the 12 months ending August of the year preceding the date of calculation.
4. The above discount rates should be used to discount future *costs* except for costs that are labour intensive. Future *incomes and labour intensive costs* should be discounted at ½% less than the above rates.

ANALYSIS:

General

MacAuley concludes his report by stating

‘Based on the most recent 10-year average of the real discount rate calculation and supported by the yield on Canada real return bonds, we suggest that the discount rate prescribed under the *Law and Equity Regulation* for s. 56(2)(b) of the *Law and Equity Act* be set at 2%.

Based on the most recent 10-year analysis of real average hourly earnings for BC as well as the 20-year average, we suggest that the discount rate prescribed under the *Law and Equity Regulation* for s. 56(2)(a) of the *Law and Equity Act* be set at 1.5% which is 2% as suggested for s. 56(2)(b) minus 0.5% for labour productivity.’

² See <http://www.bankofcanada.ca/rates/interest-rates/canadian-bonds/>

³ Or closest maturity available.

⁴ Or closest maturity available.

Unfortunately, MacAuley's analysis is restricted to considering the use of a *fixed* real discount rate i.e., one that is independent of the real discount rates prevailing at the time the award is made.

For the reasons stated below, it is my opinion that it is preferable to employ a rule whereby the real discount rate is regularly adjusted based on objective market data. This allows the discount rate(s) used to reflect *current* economic realities rather than *historical* ones.⁵

The essence of my argument is based on the logic of using a present value to commute a series of future incomes or costs.

Consider costs: the idea behind a lump sum award is that by purchasing an appropriately tailor-made portfolio of government bonds, an individual can match future cash flows to future needs. If the flow of future costs is known and if the present value of these future costs is calculated correctly and awarded to the plaintiff, using this award to purchase an appropriate portfolio of government bonds will generate exactly the correct amount needed to cover the costs as they are incurred. In other words, a portfolio may be chosen to *replicate* the required cash flow.

And similar, though more complex, reasoning applies to replacing a future lost income flow.

The yield on government backed securities rather than on other assets is used because such assets are considered safe, and a portfolio consisting of such assets can therefore replicate a future cash flow without risk.

However, there exists one risk that typical government bonds do not cover, and that is inflation risk. Unless future inflation is known with certainty, even a portfolio of government bonds might not yield the appropriate cash flow required. Inflation that is higher than expected will create shortfalls in the plaintiff's real cash flow, and inflation that is lower than expected will create a surplus cash flow.

In other words, in the presence of uncertain future inflation a portfolio of nominal government bonds yields a risky cash flow. In order to benefit from the safety of government backed assets *and* be immunized against inflation risk, a portfolio of real return government bonds ('RRBs') should be purchased. The yield(s) on such bonds should therefore be used to discount future cash flows.

Indeed, if large number of zero coupon RRBs with different maturity dates were available, any required real future cash flow could be replicated. For example, if zero coupon RRBs were available with maturities of one year, two years, three years etc., up to say one hundred years, these could be purchased to yield (almost) exactly any real cash flow for the next one hundred years. With current longevity rates, no plaintiff would have to face inflation risk.⁶

By using the discount rates associated with each maturity date the correct present value would be calculated exactly.

However, it should be acknowledged that the above described world is an ideal one. The real world differs from that described above in several ways.

⁵ As has been the case in British Columbia where the discount rates used currently were selected more than 30 years ago.

⁶ And defendants would not incur the risk of an award that will generate a greater real cash flow than needed.

- The number of RRBs extant in Canada at any point of time is small, i.e., around 5 or 6 at this time. This implies that it may be difficult to create portfolios for certain intermediate horizons.
- In Canada, RRBs are not available for longer than 30 years, implying that government backed inflation insurance is not generally available beyond 30 years. And yet, many awards require the present values of costs and/or incomes well beyond thirty years.
- Generally, available RRBs are not zero-coupon bonds. This implies that at regular intervals they pay a CPI linked dividend. At the times that these dividends are paid the yields on RRBs, which are determined in the bond market daily, may be different from those prevailing at the time the RRB was purchased, and these discount rates cannot be known in advance. Hence, the real cash flow is uncertain.
- The *thinness* of the market in RRBs may imply that the yields on these bonds reflect considerations other than expected inflation. For example, given a thin market, individuals holding these assets face a liquidity risk – prices may drop sharply and yields may rise if a large number of investors want to reduce their holding of these bonds at the same time.

Nonetheless, it is my view that despite the above cited (and possibly other) issues, given the basic theory behind calculating present values, i.e., the generation of a safe and inflation-risk free (or at least relatively inflation-risk free) cash flow, the yields on RRBs are the best parameter to use as the basis for discounting future costs and incomes.

Below, I consider some possible objections to using current yields on RRBs to discount future incomes and costs.

- It might be argued that, since the 1990s, the yields on RRBs has fallen very dramatically. Indeed, they are currently at historically low levels, and may revert back to their historical average in the longer run. Hence, using the current low yield on RRBs generates excessive present value, which over compensates plaintiffs and penalizes defendants (insurance companies).

Response:

1. It is not clear when or if the yield on RRBs will revert to its historical average. Given the efficiency of financial markets, the current yield at any point of time is the best predictor of the future.
2. More important, whether the yield is likely to rise or fall in the future is not relevant to *today's* plaintiff. **If the role of an award is to allow the plaintiff to purchase *currently* a portfolio that generates a specific real cash flow for the *future*, the only relevant real discount rates are *today's* discount rates.**
3. It may be public policy to reduce car insurance rates by under compensating plaintiffs in car accidents. Obviously, if the real discount rate is to be chosen with this policy in mind, the above recommendations may not apply. However, it should be explicitly recognised that not using the yield on RRBs is unlikely to yield the correct present value.

- It might be argued that, as mentioned above, RRBs in Canada have a maximum maturity of 30 years. It may not be appropriate to use the yield on RRBs as a basis to discount costs and incomes beyond a 30 year horizon.

Response:

This comment may well be correct. However, we do face future streams of payments that extend well beyond 30 years, and we do have to find some way of calculating their present values. The yield on 30 year RRBs is the best we have for payments beyond 30 years. Until such time as superior discount rates are available, it is my view that the yield on long-term RRBs should be used.

One discount rate or several?

As illustrated in the figure below, the real return on government bonds varies with time to maturity.⁷

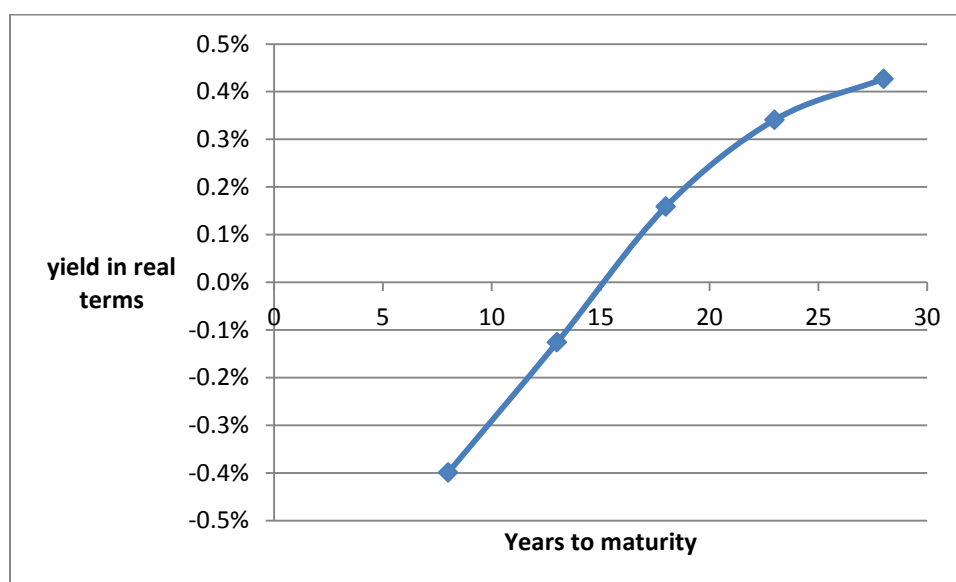


Figure: Yield on Real Return Government of Canada Bonds

A quick look at the above figure might suggest that the current short-term real discount rate is 0% per annum and that the current a long-term discount rate is 0.4% per annum.

Clearly, therefore, using on a single real discount rate will invariably yield somewhat inaccurate present values. At the same time, the rule for discounting has to be simple to apply. Hence, while it may be possible to correctly discount payments due at different times by using different discount rates, if taken to extremes⁸ these calculations would become complex and subject to argument and dissent. The costs of the additional accuracy may be too high.

⁷ Source: Bloomberg, April 19, 2013.

⁸ For example by estimating the term structure for real yields on government RRBs,

In view of this, I offer two alternative recommendations

Recommendation A: Very simple with lower accuracy

Use a single discount rate i.e., the Return on Long Term RBBs (V121808) as the basis for discounting. This rate is published every Wednesday by the Bank of Canada.⁹

Recommendation B: Slightly less simple and somewhat more accurate

Use two RRB discount rates, depending on the horizon time of specific payments. The answer as to what horizon is long and what horizon short is of course arbitrary. Following Ontario, the short horizon might be defined as 15 years or less and the long run could be defined as more than 15 years.

Specifically, within the context of Recommendation B, I suggest that to calculate the present values of costs/cash payments that are due within 15 years of the date of the award, the yield on RRBs with 15 years to maturity should be used as a basis.¹⁰ To calculate the present values of costs/cash payments that are due in more than 15 years, the yield on RRBs with 30 years to maturity should be used as a basis.¹¹

Recommendation B, while more accurate, might be significantly more complex to apply. There are two issues: First, the two rates might be more difficult to apply mathematically, though this can easily be resolved using commonly available software. Second, and more important, at this time the short term rates are not easily accessible; as mentioned above, the long term rate is published every Wednesday by the bank of Canada, but I found it difficult to obtain yields for other RRBs, and was only able to obtain the above Figure by using Bloomberg's. The lack of easy availability of the rates might be a serious obstacle to applying Recommendation B.

Using the RRB data

It is obviously very onerous to change the rates weekly. In view of this, I would recommend adopting a system similar to that used in Ontario where the discount rate used in any calendar year is based on the observed yield(s) on real return bonds for the 12 months ending August of the year preceding the date of calculation.

For perspective, I present the average long term RBB in the 12 months ending August of the year preceding the relevant year below.

⁹ See <http://www.bankofcanada.ca/rates/interest-rates/canadian-bonds/>

¹⁰ Or closest maturity available.

¹¹ Or closest maturity available.

Year	Average real rate for this year
2004	2.90%
2005	2.62%
2006	2.04%
2007	1.65%
2008	1.84%
2009	1.82%
2010	2.09%
2011	1.57%
2012	1.13%
2013	0.52%

Discounting incomes versus costs

The above discount rates are an attempt to allow for average increases in prices. These suggested discount rates should be used to ensure that the plaintiff's ability to purchase a basket of goods and services is maintained.

However, over time, incomes tend to increase faster than prices. In view of this it has been suggested that the real discount rate for incomes should allow for typical long term economy wide increases in productivity. I agree that this should be done and accept MacAuley's suggestion that at this time the adjustment should be 0.5% per annum, though this figure may be somewhat on the high side.

It is important to remember that, even if *average* economy wide incomes rise faster than prices, this may not be true for the future income of a *specific* plaintiff.¹² Average incomes may rise because the educational levels of the population change or because people joining the workforce are employed in more productive activities.

Nonetheless, an increase in the income/ productivity of a proportion of the work force will typically increase the demand for the services of other individuals, i.e., even those whose productivity has not changed. Hence, the real incomes of most people will rise. In view of this, a small adjustment for productivity should be made in calculating the appropriate real discount rates for the future income of all individuals.

To reiterate, for the purpose of discounting future costs, I recommend that costs that are labour intensive, such as, for example, attendant care, be discounted at the same discount rate as income losses. I recommend that other costs be discounted by the base discount rates as defined above.

¹² In my view the correct way of incorporating seniority and experience related increases in the income of a specific individual is via the stream of incomes being assigned to that individual.

For perspective, I compare the rates at which costs and incomes/labour intensive costs, would have been discounted in British Columbia had the above single rate recommendation been in place.

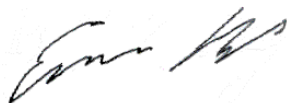
Year	Discount Rate For Costs (Except Labour Intensive Costs)	Discount Rate For Income And Labour Intensive Costs
2004	2.90%	2.40%
2005	2.62%	2.12%
2006	2.04%	1.54%
2007	1.65%	1.15%
2008	1.84%	1.34%
2009	1.82%	1.32%
2010	2.09%	1.59%
2011	1.57%	1.07%
2012	1.13%	0.63%
2013	0.52%	0.02%

REVISITING THE RULES

It is my view that all rules should be revisited in light of experience obtained after working with them. I would recommend that any rule adopted be re-examined with 10 years of being adopted.

Please feel free to contact me if you have any question or require any more information.

Sincerely



Eli Katz PhD
Per JK Economics Inc.