The Perils of Taxation

Investors will be well aware that we are now in a period in which coupons are far higher than yield for almost every fixed income investment available. As discussed in the March, 2010, edition of this newsletter, this can give rise to extremely unpleasant taxation consequences for investors due to the differential taxation of capital gains (losses) and income from dividends and bond coupons.

In this essay, I will first review the nature of the problem.

Marginal rates on income types[1] for an investor resident in British Columbia with a taxable income of $150,000 are shown in Table 1. It should be noted that these are generic rates, which may be materially affected by the taxpayer's personal tax circumstances.

Table T1: Marginal Tax Rates in British Columbia (Taxable Income $150,000)	
Interest Income	43.70%
Capital Gains	21.85%
Eligible Dividends	25.78%
Ineligible Dividends*	33.71%
Data Source: Ernst & Young	
* It is extremely rare for ineligible dividends to be paid on the preferred shares of Canadian corporations listed on the Toronto Stock Exchange. The only example of which I am aware is WN.PR.A, for which less than 2% of the 2011 dividend was ineligible; over 98% was eligible. http://www.weston.ca/en/Dividend-Information.aspx#eligDiv	

Table 1 allows us to compute an equivalency ratio, which describes how may dollars of pre-tax interest income are required to produce the same after-tax value as one dollar of pre-tax dividend income. A calculation based on the figures in Table 1 is shown in Table 2[2]. Those with an algebraic bent will notice that:

$$E = (1 - M_{Div}) / (1 - M_{Int})$$

Where:

E is the equivalency factor (Row G of Table 2)

M_{Div} is the Marginal rate on Dividends (Row B of Table 2)

M_{Int} is the Marginal Rate on Interest (Row E of Table 2)

Calculations have been performed for a variety of provinces and taxable incomes, with the Equivalency Factors thus derived shown in Table 3.

Table T2: Sample Calculation of Equivalency Factor		
A	Pre-Tax Dividend Income	$1.00
B	Marginal Rate of Tax on Dividend Income	25.78%
C	Tax Paid (A * B)	$0.2578
D	After Tax Amount (A – C)	$0.7422
E	Marginal Rate of Tax on Interest Income	43.7%
F	Pre-tax Interest Income Required to Leave Amount D after tax (D/(1-E))	$1.3183
G	Check! Tax Paid on Interest (F * E)	$0.5761
H	Check! After-Tax Amount from Interest (F – G)	$0.7422
I	Check! Are the after-tax amounts equal? (H = D ?)	Yes
G	Equivalency Factor (F/A)	1.32
Data Source: Ernst & Young (marginal rates; see Table 1), author's calculations.		

---

[1]   Ernst & Young, *2012 Personal Tax Calculator*, updated to 2012-6-30, available on-line at http://www.ey.com/CA/en/Services/Tax/Tax-Calculators-2012-Personal-Tax (accessed 2012-8-12)

[2]   A more involved calculation (with different assumptions of taxation rates) is shown in the post *After-Tax Yield Equivalency*, on-line at http://www.prefblog.com/?p=1255

Table T3: Equivalency Factor for Some Provinces and Taxable Income Levels			
Province	$150,000	$75,000	$30,000
British Columbia	1.32	1.33	1.30
Alberta	1.32	1.33	1.33
Manitoba	1.26	1.28	1.30
Ontario	1.31	1.28	1.25
Quebec	1.30	1.31	1.32
Data Source: Ernst & Young (marginal rates), author's calculations			

Means Testing and the OAS Clawback

Those who receive benefits subject to means testing, such as Old Age Security, drug plans and other government programmes should be wary of the indicated equivalency factors shown in Table 2.

According to the accountancy firm KPMG[3]: *For high-income taxpayers these* [Old Age Security] *payments are completely taxed back through a special tax, known informally as the "clawback". The tax reduces benefits for taxpayers whose net income (after most deductions, such as RRSP contributions) is over $66,335. If your net income exceeds about $107,692, the clawback will apply to 100% of your OAS benefits* (precise figures will have changed since this was written).

At first glance, this might seem to be immaterial to our purpose. Clearly, the marginal rate of tax for individuals receiving OAS benefits will be higher – within the stated range of taxable income – but, one might think, this will not affect the calculation of the equivalency factor.

Unfortunately, there is another nuance due to the manner in which dividend income is treated under the Income Tax Act. Again, according to KPMG: *Dividends received by individuals from Canadian corporations are taxed in a rather peculiar manner, designed to reflect the fact that the corporation paying the dividend has already paid tax on its profits. The amount included in the individual's income is "grossed-up" to reflect the total amount of pre-tax income that the corporation is presumed to have earned. The individual then receives a credit to offset the tax the corporation is presumed to have paid.*

This mechanism of dividend taxation has the unfortunate effect of increasing the amount of income calculated for purposes of OAS clawback, while not providing any mitigation of this higher clawback.

I have not been able to find an authoritative source that quantifies this effect in any way; the best I can provide is unattributed or non-authoritative claims on the Internet[4] that indicate that the equivalency factor in the presence of clawback of marginal income declines somewhat[5] – from 1.33 to 1.29 for an investor with taxable income of $75,000.

However, this figure will change, perhaps dramatically, according to the province of residence, the precise amount of taxable income, and the sources of income (or other benefit, such as drug plans) that are subject to clawback. Investors should consult their own personal tax advisor to determine the equivalency factor that should be used when choosing between investments offering different types of income.

Heterogeneous Tax Effects

A much greater problem facing taxable fixed income investors is the heterogeneity of income types. Any fixed income instrument purchased at a price that is different from its maturity value will give rise to a capital gain or loss on maturity, in addition to the periodic income that is paid prior to maturity.

Normal yield calculations net these values and only the net value is quoted – for instance, a five year bond with a coupon of 7.4% and priced at 120.30 will be reported as yielding 3.00%, this being the net result of the coupon income of $7.40 received annually and the total expected capital loss of $20.30 over the five year period, divided by the $120.30 purchase price.

Chart T-1 shows how five-year bonds with different coupons will differ in price if they all yield 3%.

This is all very good and sensible, but we are thrown for a loop when it comes to considering the tax effects. Table T-4 shows two sets of tax calculations for the bond trading at $120.30 with a 7.4% coupon – one in which the investor is able to claim the capital loss to offset other capital gains; the other in which the investor has no offsetting capital gains and is unable to make this claim.

[3]　KPMG, *Tax Planning 2010 For You and Your Family*, ISSN 1207-5957

[4]　Million Dollar Journey, unattributed blog, *TFSA vs RRSP – Clawbacks & Income Tax on Seniors*, post attributed to Ed Rempel, available on-line at http://www.milliondollarjourney.com/tfsa-vs-rrsp-clawbacks-income-tax-on-seniors.htm; PrefBlog, (my own blog, not authoritative on taxation matters), comments to *Marginal Tax Rates: Ontario 2008*, available on-line at http://www.prefblog.com/?p=2372#comment-27986; and Financial Webring Forum, *Tax Bracket Sensitivity of Preferred Shares*, unattributed discussion forum, available on-line at http://www.financialwebring.org/forum/viewtopic.php?f=32&t=111505

[5]　See http://www.milliondollarjourney.com/wp-content/uploads/clawbacks-plus-2010-final2.pdf

T-1

Coupon vs. Price
5-Year Bond, 3.00% YTM
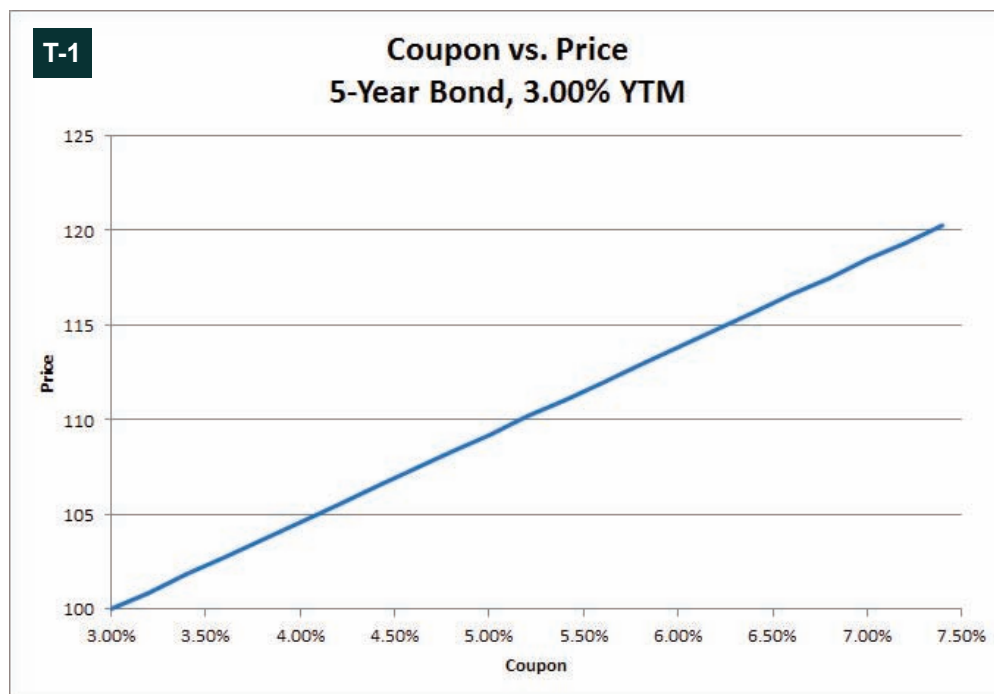
Table T-4: Precise Calculation of Tax Effects for Five-Year Bond, Coupon 7.4%, Trading to Yield 3.0%					
	Cash	Tax (without claim for capital loss)	Tax (with claim for capital loss)	Net(without)	Net(with)
8/10/2012	-120.3			-120.3	-120.3
2/10/2013	3.7			3.7	3.7
8/10/2013	3.7			3.7	3.7
2/10/2014	3.7	-3.404	-3.404	0.296	0.296
8/10/2014	3.7			3.7	3.7
2/10/2015	3.7	-3.404	-3.404	0.296	0.296
8/10/2015	3.7			3.7	3.7
2/10/2016	3.7	-3.404	-3.404	0.296	0.296
8/10/2016	3.7			3.7	3.7
2/10/2017	3.7	-3.404	-3.404	0.296	0.296
8/10/2017	103.7			103.7	103.7
2/10/2018	0	-3.404	1.265	-3.404	1.265
XIRR	3.02%			-0.06%	0.78%
Effective Tax Rate				102%	74.2%

A few explanations of Table 4 are in order:

• A tax rate of 46% is assumed for income, so annual tax on the $7.40 annual interest is $3.404

• A capital gains inclusion rate of 50% is assumed, so the claim of a $20.30 capital loss results in a reduction of tax by $4.669

• Tax is assumed to be settled on February 10 of each year (chosen to reduce the number of dates in the calculation!)

• We are not surprised that the Internal Rate of Return (the MS-Excel XIRR() function) returns a rate of 3.02% when we chose numbers such that the pre-tax yield would be 3.00. As bond investors, we are familiar with conventions regarding bond yields and know that bond yields are calculated using periods equal to the coupon period and annualized by addition. Therefore, when we say a bond with a semi-annual coupon yields 3.00%, we really mean that it yields 1.50% every six months. The Internal Rate of Return calculation annualizes this figure by multiplication: 1.015 * 1.015 – 1 = 3.02%

• The 'without claim' is the worst case scenario of never being able to claim the loss. In fact, the loss may be carried forward and used to offset subsequent capital gains.

20

This calculation is awkward and extremely difficult to automate, so an approximation was developed as shown in Table T-5.

With Table T-5:
- Income is calculated as the Current Yield of the bond at purchase
- Tax on the income is applied immediately at a rate of 46%
- The capital loss is calculated as the yield-to-maturity of the bond less the Current Yield
- Tax is (potentially) claimed on the capital loss at an inclusion rate of 50% for a net recovery of 23%
- No allowance is made for the fact that the claim of the capital loss is deferred until the year following maturity.
- The net after tax yield is calculated as the sum of the yield-to-maturity, the tax on the current yield and (potentially) the tax recovery on the capital loss.

Table T-5: Calculation of Effective Tax Rates for Two Five-Year Bonds with Different Coupons and the Same Yield

Item	5-Year Bond, 3% Coupon	5-Year Bond, 7.4% Coupon
Price to Yield 3%	100.00	120.30
Current Yield (Coupon/Price)	3%	6.15%
Tax on Income at 46%	-1.38%	-2.83%
Possible Tax Recovery on Capital Loss (=-(3% – Current Yield) * 46%/2)	0%	+0.73%
Net After-Tax Yield if Capital Loss is Claimed	1.62%	0.89%
Net After-Tax Yield if Capital Loss is Not Claimed	1.62%	0.17%
Effective Tax Rate on Total Return if Capital Loss is Claimed	46%	70.2%
Effective Tax Rate on Total Return if Capital Loss is Not Claimed	46%	97.3%

As may be seen, these approximations result in differences from the more precise calculation of Table T-4, but they're pretty close and allow for quick computation of other figures of interest, such as Chart T-2, which shows the effect of coupon on after-yield, assuming that pre-tax yield is held constant, and Chart T-3, which shows the effective tax rate for bonds with different coupons, using the data of Chart T-2.

T-2 Effect of Coupon on After-Tax Yield 5-Year Bond, 3% YTM, 46% Tax Rate
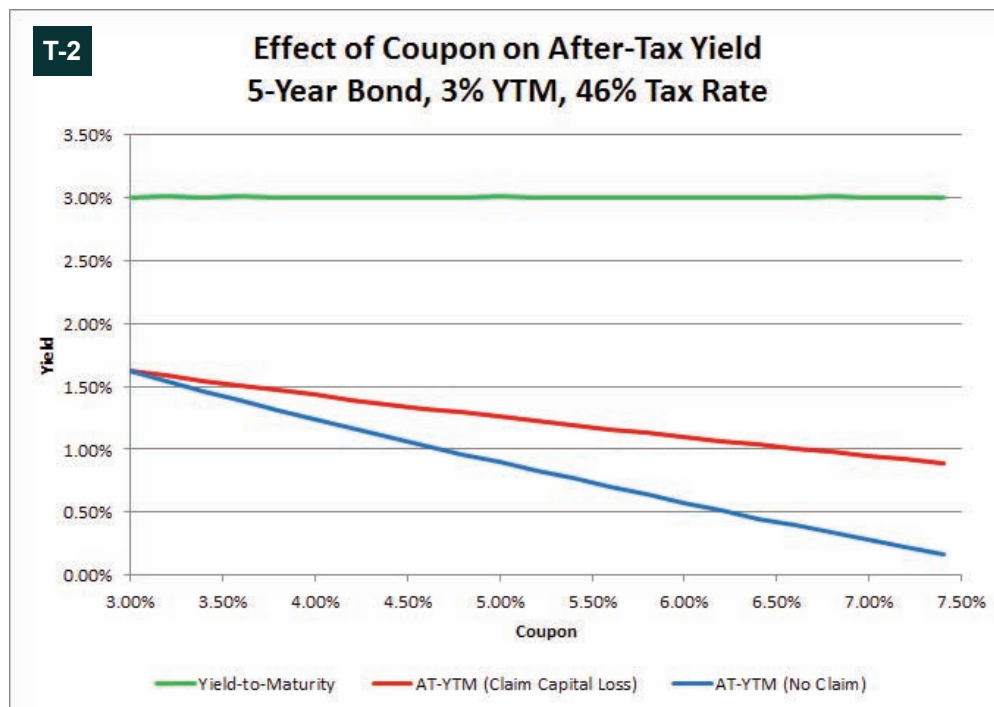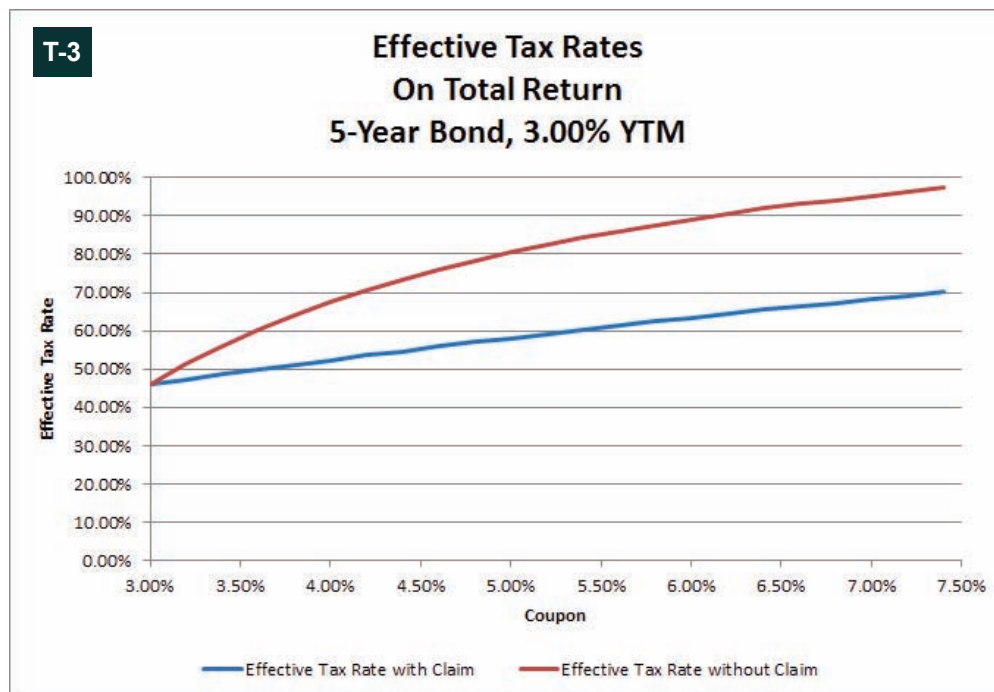
Bond Funds

The technique used to estimate the after-tax yield of a single bond in Table T-5 may be generalized to examine the overall effect of taxation rates on bond funds held in a taxable portfolio.

First, we will check if we can use average yields and terms with any confidence – a test calculation is performed in Table T-6. This table performs calculations on three portfolios, each of which will be reported by a fund company as having an average term of three years and an average coupon of 5%:

- Portfolio "A" has equal dollar amounts invested in a two-year bond with a 4% coupon and a four-year 6% bond
- Portfolio "B" has equal dollar amounts invested in a two-year 6% bond and a four-year 4% bond
- The "Notional Average" is fully invested in a three year 5% bond
- All bonds are priced to yield 3% to maturity

Clearly, there are inaccuracies introduced into the estimates due to the use of a single notional bond to represent the entire portfolio. However, the use of this notional bond appears to be a good estimate of the median expected value that would arise from a sample in which the relationship between the coupon of each bond and its remaining term is randomized. In the absence of any detailed tax information from the funds, the methodology chosen appears acceptable.

Table T-6: Checking of Effect of Averaging Yields, etc.			
Item	Portfolio A	Portfolio B	Notional Average
Bond 1	4%, 2014-8-10, YTM 3%	6%, 2014-8-10, YTM 3%	5%, 2015-8-10, YTM 3%
Bond 2	6%, 2016-8-10, YTM 3%	4%, 2016-8-10, YTM 3%	
Price of Bond 1	101.92	105.79	105.70
Price of Bond 2	111.22	103.75	
p.v. Bond 1 in $1MM portfolio	491M	474M	946M
p.v. Bond 2 in $1MM portfolio	450M	482M	
Coupon Income Bond 1	$19,640	$28,440	$47,300
Coupon Income Bond 2	$27,000	$19,280	
Total Coupon Income	$46,640	$47,270	$47,300
Amortization, Bond 1*	$4,603	$13,439	$17,299
Amortization, Bond 2*	$11,961	$4,301	
Total Amortization	$16,564	$17,740	$17,299
Total Expected Pre-Tax Return	$30,076	$29,530	$30,001
Tax Payable on Income	$21,454	$21,744	$21,758
Tax Recovery if Capital Loss Claimed	$3,810	$4,080	$3,979
Total Return (with Claim)	$12,432	$11,866	$12,222
Total Return (without Claim)	$8,622	$7,786	$8,243
The calculation for the notional bond as performed for the funds indicates a yield of 1.22% (with claim) or 0.82% (without claim)			
Amortization is calculated as the YTM less the Current Yield on the full value of the investment.			

Table T-7 shows calculations for a selection of bond funds. Clearly, taxable investors should shy away from bond funds in the current environment, particularly if there is any doubt regarding the ability to claim ultimate capital losses!

Those who wish to repeat the calculations for other funds will note that the fund is approximated by a single notional bond, with a coupon equal to the average coupon reported by the fund and a term equal to the fund's average term. The price of this notional bond can be determined by trial and error, until the results of the MS-Excel Yield() function agree with the average Yield-to-Maturity reported by the fund. Having derived this data, a tax calculation can be performed according to the method illustrated by Table T-5.

Obviously, this will be an approximation of the actual effect – but it will be a fairly good approximation, as illustrated by the calculations of Table T-6 and until the fund companies start reporting the expected after-tax return for investors with standard characteristics, I suggest that this methodology is a very good quick method of determining the appropriateness of bond funds in the current environment for taxable accounts.

Other Problems with Canadian Short-Term Bond Funds

For many clients, I recommend one or more of the BMO Corporate Bond ETFs – BMO Short Corporate Bond ETF (ZCS),[6] BMO Mid Corporate Bond Index ETF (ZCM),[7] or BMO Long Corporate Bond Index ETF (ZLC);[8] these are very good products for achieving targeted exposure to the corporate bond market – but in the current environment are deprecated for taxable accounts. In addition, the short-term fund is particularly deprecated as a complement for a preferred share portfolio for more complicated reasons of composition.

Table T-7: Current Calculations on Actual Bond Funds						
Fund Name	BMO Short Corporate Bond ETF[9]	Guggenheim Bulletshares 2017 Corporate Bond ETF[10]	Vanguard Short-Term Corporate Bond ETF[11]	iShares Barclays 1-3 Year Credit Bond Fund[12]	BMO Aggregate Bond Index ETF[13]	BMO Mid Corporate Bond Index ETF[14]
Currency	CAD	USD	USD	USD	CAD	CAD
Ticker	ZCS	BSCH	VCSH	CSJ	ZAG	ZCM
Average YTM	2.15%	2.45%[15]	2.0%	1.24%	2.15%	3.13%
Average Coupon	4.06%	5.26%	4.2%	3.87%	4.13%	5.35%
Average Term (years)	3.17	4.50[16]	3.0	1.95	9.67	7.07
Notional Bond	4.06% 2015-9-26 @$105.82	5.26% 2017-1-23 @$111.88	4.20% 2015-7-26 @$106.37	3.87% 2014-7-7 @$105.05	4.13% 2022-3-25 @$117.20	5.35% 2019-8-19 @$114.00
After-Tax Yield (with claim)	0.77%	0.81%	0.63%	0.11%	0.84%	1.33%
After-tax Yield (without claim)	0.38%	0.29%	0.18%	-0.46%	0.53%	0.97%
Effective Tax Rate (with Claim)	64%	67%	68%	91%	61%	58%
Effective Tax Rate (without Claim)	90%	94%	95%	112%	85%	79%

No allowance has been made for fund MERs in the above calculation; the calculations reflect only the characteristics of the underlying portfolio. Incorporation of fund expenses in the calculations will, of course, simply make things worse.

The "notional bond" has been constructed with a calculation date of 2012-7-26, which is the date on which the data was recovered.

---

[6]　See http://etfs.bmo.com/bmo-etfs/glance?fundId=74665

[7]　See http://etfs.bmo.com/bmo-etfs/glance?fundId=75744

[8]　See http://etfs.bmo.com/bmo-etfs/glance?fundId=75747

[9]　Data from http://etfs.bmo.com/bmo-etfs/glance?fundId=74665

[10]　Data from http://www.guggenheimfunds.com/Libraries/Literature_en/Guggenheim_BulletShares_2017_Corporate_Bond_ETF_Fact_Card.sflb.ashx

[11]　Data from https://personal.vanguard.com/us/funds/snapshot?FundId=3145&FundIntExt=INT#hist=tab%3A2

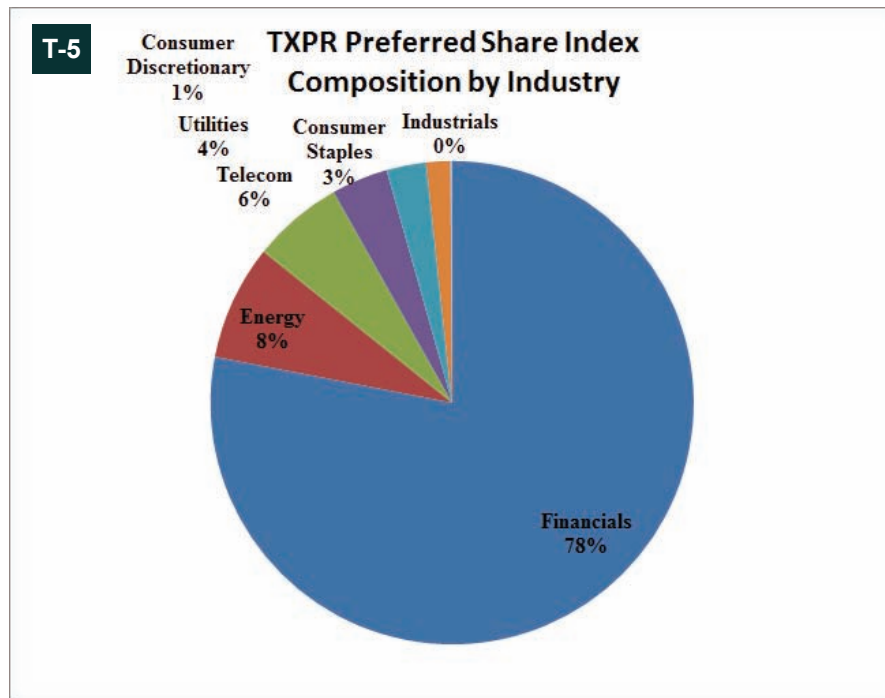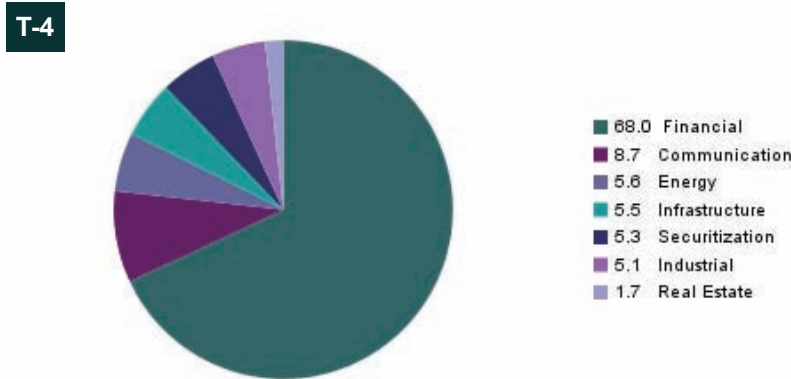[12]　Data from http://us.ishares.com/product_info/fund/overview/CSJ.htm

[13]　Data from http://etfs.bmo.com/bmo-etfs/glance?fundId=75742

[14]　Data from http://etfs.bmo.com/bmo-etfs/glance?fundId=75744

[15]　Calculated from coupon, price and average term data

[16]　The fund reports an average maturity of 2.69 years and an average duration of 4.37 years, which is very difficult to reconcile. Considering the fund objectives and the average duration, I have set the average term to 4.50 years

ZCS is weighted over two-thirds in financial issues, as shown in Chart T-4:[17]

T-4

68.0	Financial
8.7	Communication
5.6	Energy
5.5	Infrastructure
5.3	Securitization
5.1	Industrial
1.7	Real Estate

T-5

TXPR Preferred Share Index Composition by Industry

Consumer Discretionary 1%
Utilities 4%
Telecom 6%
Consumer Staples 3%
Industrials 0%
Energy 8%
Financials 78%

This is of particular concern to preferred share investors, since the composition of the preferred share universe is so overwhelmingly financial, as shown in Chart T-5 which uses data from the iShares S&P/TSX Canadian Preferred Share Index Fund (CPD)[18] as of 2012-3-31. Preferred share investors will by necessity be getting quite a lot exposure to financials through the preferred-share portion of their portfolios – holding financial bonds in the bond portion of their fixed income should be deprecated.

To make matters worse, many of the financial holdings in ZCS aren't even proper bonds! If we examine the top ten holdings in the ZCS portfolio, we find the data shown in Table T-8.

---

[17] See http://etfs.bmo.com/bmo-etfs/holdings?fundId=74665

[18] See http://ca.ishares.com/content/stream.jsp?url=/content/en_ca/repository/resource/fact_sheet/cpd_en.pdf (accessed 2012-8-12)

Table T-8: Top Ten Holdings of BMO Short Corporate Bond ETF (ZCS)		
Securities	% of Assets	Comments
Bk Nova Scot 3.61 22Feb16	3.49%	
CIBC 3.10 02Mar15	3.25%	
RYB Fx/Flr 3.18 02Nov20	3.22%	Sub-Debt
TD Bk Fx/Fl 3.367 02Nov20	3.14%	Sub-Debt
TransCda P 5.65 15Jan14	2.88%	
Royal Bank 3.18 16Mar15	2.74%	
BNS Fx/Flr 4.94 15Apr19	2.61%	Sub-Debt
RBC Cap Tst 5.812 Perp	2.14%	Tier 1 Capital – and yes, you read that right, folks! There's a perpetual issue in the Short Term Corporate Bond index and the corresponding fund!
BMO Fx/Flr 3.979 08Jul21	2.01%	Sub-Debt
Rogers Comm 5.80 26May16	2.01%	
Top Holdings (% of Portfolio)	**27.49%**	

Of the ten top holdings, four are subordinated debt and one is Innovative Tier 1 Capital. These are deemed eligible for inclusion in the fund by the portfolio manager (and in the index by the index compiler) due to the happy assumption that the issues will be called within five years, although this is not a contractual obligation. I have complained about the composition of bond ETFs in the past[19] and even more plaintively about regulatory interference in index composition[20] – but, alas, without attracting much heavyweight support. Until such time as short-term bond funds make a point of including only short term bonds, I deprecate the use of these instruments for portfolio management purposes.

Other Alternatives: GICs?

In general, I deprecate the use of Government of Canada bonds and GICs for retail bond portfolios.

The former are too liquid[21]: investors pay a huge amount of money (in terms of coupon income foregone[22]) in exchange for the ability to transact $50-million worth of bonds in one phone call without moving the market; and the ability to pledge these holdings to the Bank of Canada in exchange for an overnight loan. Needless to say, neither of the benefits is likely to be realized by most investors and only the cost will remain. Liquidity is an important consideration in any fixed income portfolio, but one can pay too much to have too much of a good thing!

Classifying GICs as Canada-equivalents implies a certain amount of moral hazard: the government of Canada is not obliged to cover any losses in excess of $100,000, but I suggest that it would almost certainly provide this coverage in the event it was needed, if for no other reason than to maintain the regulatory bragging rights that have followed Canada's lucky escape from the global Panic of 2007. It will be noted that the OSFI Capital Adequacy Requirements with respect to inter-bank loans states:[23] *The risk weight applied to a claim on a bank is dependant on the credit assessment of the sovereign in the bank's country of incorporation. The bank risk weight is one notch less favourable than that which applies to its sovereign of incorporation* – in other words, our regulators assume that bail-outs will be forthcoming in any future crisis, despite the experience of "burden-sharing" in the current European crisis.[24]

---

[19]　See http://www.himivest.com/media/advisor_1003.pdf

[20]　See http://www.himivest.com/media/advisor_1104.pdf

[21]　For a discussion of liquidity in the context of the generic bond market, see http://www.prefblog.com/?p=6062. See also my article *Credit Spreads and Default Risk*, available on-line at http://www.himivest.com/media/moneysaver_0907.pdf

[22]　Estimates of the value of this liquidity, in terms of yields for Sterling bonds are provided in the BoE figure 3.16 reproduced at http://www.prefblog.com/?p=11512. Somewhat suspicious estimates by the BoC for Canadian corporates are reported at http://www.prefblog.com/?p=8767

[23]　See http://www.osfi-bsif.gc.ca/app/DocRepository/1/eng/guidelines/capital/guidelines/CAR_chpt3_e.pdf

[24]　See http://www.bloomberg.com/news/2012-07-17/draghi-says-senior-bondholder-burden-sharing-question-evolving.html

Additionally, it is observed that FDIC protection of deposits has been unofficially extended to uninsured depositors throughout the crisis;[25] I do not believe there are any examples of uninsured depositors losing any money due to the failure of an American bank in recent history. However, it will be noted that an additional source of effective moral hazard in the States is the fact that the FDIC collects its insurance premia on uninsured deposits.[26] This is not the case in Canada, where the CDIC collects premia only on insured deposits.[27]

However, my primary rational for including the GIC position in the "Canada" credit quality bin is due to pricing: GICs are priced with the Canada guarantee embedded in the investment assumptions, regardless of whether those assumptions are justified (as they are in the case of a single investor with a single investment of $100,000 at a single bank) or more dubious (as with deposits at single banks greatly in excess of $100,000).

There is also the question of the strength of the guarantee itself. The CDIC is merely an agency of the Federal government, it is not the Federal government itself. Despite this, the insurance fund is grossly inadequate for its purpose: the ex ante fund is valued at $1.8-billion, while total insured deposits are in excess of $500-billion[28]. While it is granted that not all insured institutions are likely to fail at the same time, and that even a failed large institution will have sufficient assets that loss given default will be far from 100% of insured value, it will be noted that the American FDIC's deposit insurance fund had a balance in excess of 1.2% in September 2007, which has now declined to about negative 0.4%[29] while its Canadian counterpart targets a mere 40bp–50bp and has been unable to reach even this modest goal.

All this should not be taken as an alarmist call for immediate action, but should be kept in mind when considering the actual, as opposed to the perceived, credit worthiness of GICs issued by major Canadian banks. In the event of an actual problem, it is entirely possible that uninsured depositors will be forced to bear a loss, probably after a lengthy delay.

So, with respect to the guarantee, it appears that in purchasing GICs you are paying for a benefit (federal insurance) that has, at the very least, a degree of moral hazard and uncertainty.
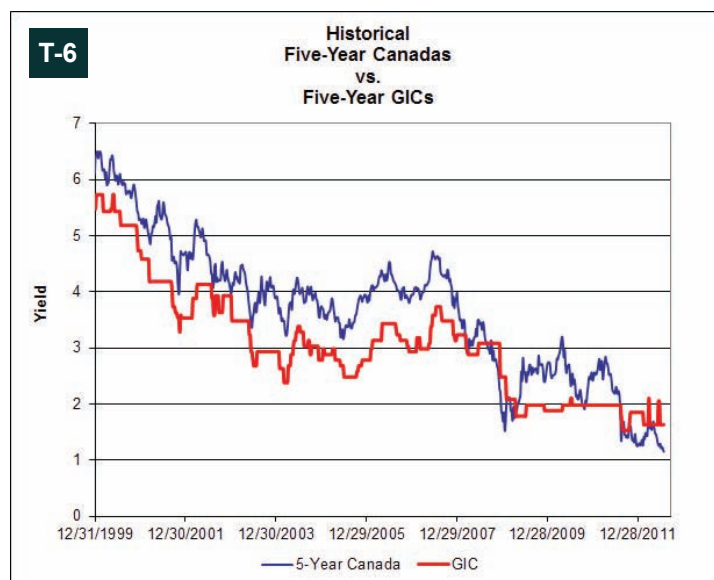
This is important in light of the close correlation between rates offered on 5-Year GICs and 5-Year Canadas, which is graphed in Chart T-6[30]. The adjusted R-squared of the correlation is a very high 94%; this correlation does not appear to vary much through the economic cycle (in sharp distinction to variances between Canada bonds and bonds that are explicitly guaranteed only by the issuing corporation).

[25] See http://www.depositaccounts.com/blog/2010/11/uninsured-deposits-at-failed-banks-how-the-fdic-has-changed.html

[26] See http://www.prefblog.com/?p=3238 and http://www.prefblog.com/wp-content/uploads/2008/10/fdic-assessments.pdf

[27] See http://www.prefblog.com/?p=3238 and http://www.cdic.ca/multimedia/Website/Documents/ar/en/CDIC_AR07E.pdf

[28] See http://www.cdic.ca/multimedia/Website/Documents/ar/en/CDICar09e.pdf

[29] See http://www.fdic.gov/about/strategic/report/2009annualreport/AR09final.pdf

[30] See http://www.bankofcanada.ca/en/rates/bond-look.html and http://www.bankofcanada.ca/en/rates/interest-look.html

Prior to discussing the implications of this close correlation, I will note that I am highly suspicious of the data supplied by the Bank of Canada. As far as I have been able to tell by comparison of BoC reporting to the banks' websites and the GIC offering rates on discount brokerage websites, the BoC appears to be quoting the banks' posted rates, whereas much better yields are available for the asking. This negotiation room does not, however, impair the argument to any material extent.

Given that the 5-Year GIC rate is highly correlated with the 5-Year Canada rate, it is important to understand just what is being received in exchange for the lower yields on Canada issues. Most obviously, there is the credit quality of the issue (which, as I have discussed above, is not necessarily reflected in the quality of a GIC, although a significant loss on GICs due to issuer bankruptcy is a very low probability scenario), but the other major attribute is liquidity. While a Government of Canada bond will be far more liquid than any individual investor could desire, GICs can have no liquidity (if they are not transferable) or have highly limited liquidity (selling on the secondary market will generally attract only very poor bids).

Liquidity

There was a very good discussion of liquidity published the UK magazine "The Actuary":[31]

> The spread on corporate bonds over the liquid risk-free rate (for example, government bonds) represents compensation for several different factors:

> A Expected default losses
> B Unexpected default risk, such as default and recovery rate risk
> C Mark-to-market risk, such as the risk of a fall in the market price of the bond
> D Liquidity risk, such as the risk of not finding a ready buyer at the theoretical market price

> Investors concerned with the realisable value of their investment in the short-term require compensation for all these risks.

> However, investors who can hold bonds to maturity need compensation only for A and B. Such investors can enjoy the premiums for C and D, and we refer to these collectively as a 'liquidity premium'.

The authors also provided their own estimation of the size of this effect, using a model that one of them had developed (see Chart T-7).

The Panic of 2007 brought with it enormous volatility in the size of the liquidity premium and there has been a corresponding surge of interest by central bank academics in defining and measuring the size of this premium.

The Bank of Canada published a paper[32] in 2010 (which, frankly, I found a little dissatisfying[33]) attempting to decompose corporate bond spreads (see Charts T-8 and T-9).

T-7

Figure 2: Average A-rated credit spread decomposition (1970 onwards calibration)

---
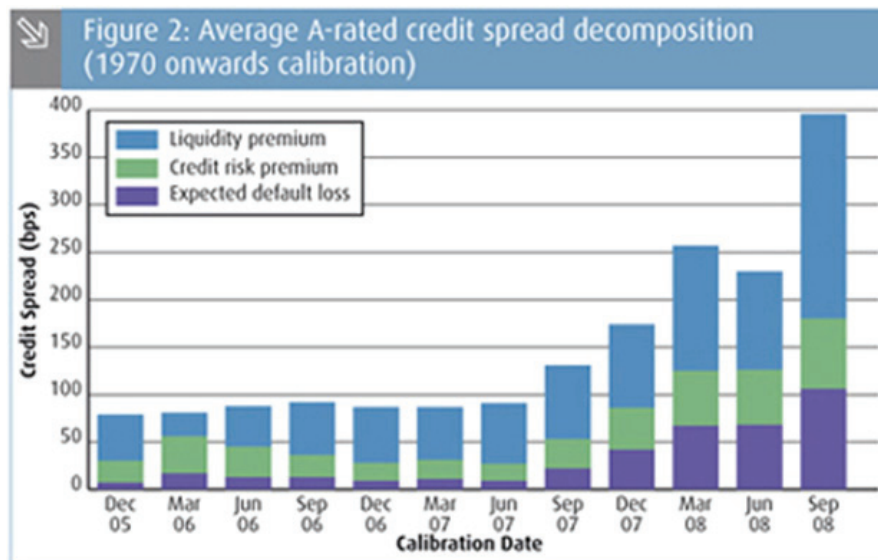
[31] Paul Fulcher and Colin Wilson, *Financial Crisis: The value of liquidity*, The Actuary, 2009-1-14, available on-line at http://www.the-actuary.org.uk/834588 (accessed 2010-8-28)

[32] Alejandro Garcia and Jun Yang, *Understanding Corporate Bond Spreads Using Credit Default Swaps*, Bank of Canada Review, Autumn 2009, available on-line at http://www.bankofcanada.ca/en/review/autumn09/review_autumn09.pdf (accessed 2010-8-28)

[33] See http://www.prefblog.com/?p=8767

T-8

Chart 2: Corporate bond spreads for an average investment-grade firm
Synthetic zero-coupon 5-year bond

Mean liquidity   Mean default   Mean spread
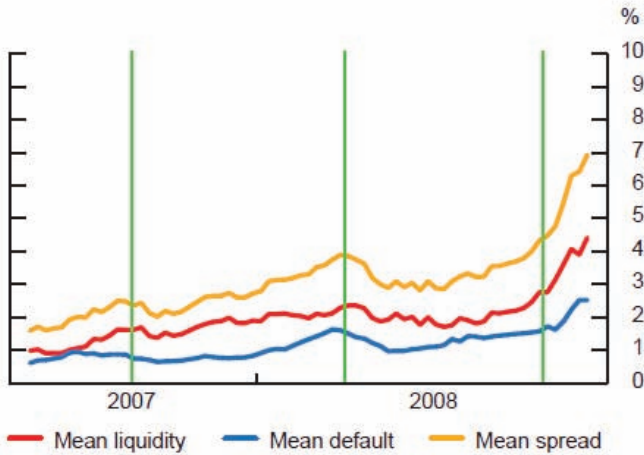
Note: The green lines represent the dates when Bear Stearns liquidated two hedge funds that had invested in mortgage-backed securities (31 July 2007), the Federal Reserve Bank of New York announced that it would provide term financing to facilitate JPMorgan Chase's acquisition of Bear Stearns (24 March 2008), and Lehman Brothers filed for Chapter 11 bankruptcy (15 September 2008).
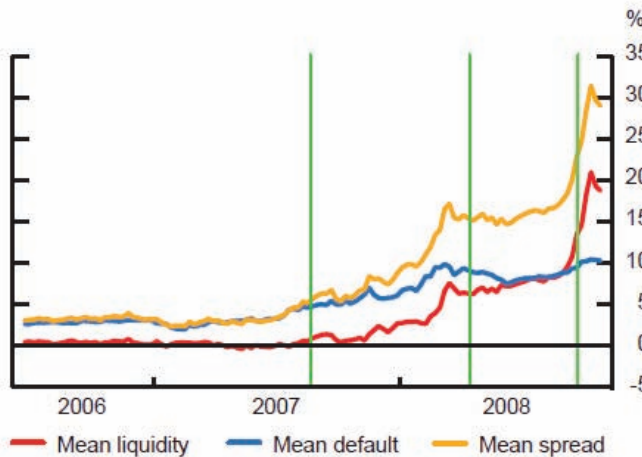Source: Bank of Canada estimates

It is very difficult to obtain details on the algorithms used to decompose credit spreads (much of the date used is proprietary to the investment dealers and made available to central bank researchers only with restrictions on further redistribution), but I am currently most impressed with the Bank of England's model[34] which gave rise to Chart T-10 from their June 2010 Financial Stability Report.[35]

I have also published a stand-alone article titled *Credit Spreads and Default Risk*[36] which some may find of interest.

T-9

Chart 3: Corporate bond spreads for an average speculative-grade firm
Synthetic zero-coupon 5-year bond

Mean liquidity   Mean default   Mean spread

Note: The green lines represent the dates when Bearn Stearns liquidated two hedge funds that had invested in mortgage-backed securities (31 July 2007), the Federal Reserve Bank of New York announced that it would provide term financing to facilitate JPMorgan Chase's acquisition of Bear Stearns (24 March 2008), and Lehman Brothers filed for Chapter 11 bankruptcy (15 September 2008).
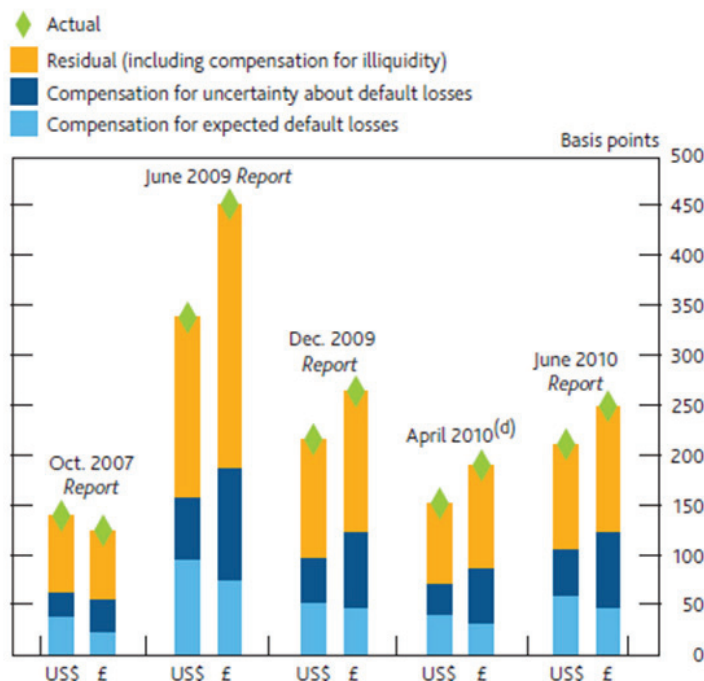Source: Bank of Canada estimates

---

[34] Lewis Webber and Rohan Churn, *Decomposing corporate bond spreads*, Bank of England Quarterly Bulletin 2007 Q4, available on-line
      at http://www.bankofengland.co.uk/publications/quarterlybulletin/qb070403.pdf (accessed 2010-8-28)

[35] Bank of England, Financial Stability Report, June 2010, available on-line at http://www.bankofengland.co.uk/publications/fsr/2010/fsrfull1006.pdf (accessed 2010-8-28)

[36] Available on-line at http://www.himivest.com/media/moneysaver_0907.pdf

T-10

Chart 3.16 Decomposition of sterling and dollar investment-grade corporate bond spreads[(a)(b)(c)]

♦ Actual
■ Residual (including compensation for illiquidity)
■ Compensation for uncertainty about default losses
■ Compensation for expected default losses

June 2009 *Report*

Dec. 2009 *Report*

June 2010 *Report*

April 2010[(d)]

Oct. 2007 *Report*

Basis points
500
450
400
350
300
250
200
150
100
50
0

US$ £   US$ £   US$ £   US$ £   US$ £

Sources: Bank of America Merrill Lynch, Bloomberg, Thomson Reuters Datastream and Bank calculations.

(a) Webber, L and Churm, R (2007), 'Decomposing corporate bond spreads', *Bank of England Quarterly Bulletin*, Vol. 47, No. 4, pages 533–41.
(b) Option-adjusted spreads over government bond yields.
(c) Data to close of business on 14 June 2010.
(d) Trough in spreads on 23 April 2010.

Strip Bonds

Another attempt to escape the problems of differential taxation on high-coupon, high-premium bonds is through stripping the bond.

It should be very easy to see that the strips resultant from stripping a bond will be taxed more favourably than the bond itself. Consider a bond with a remaining term to maturity of less than six months, with only one coupon left to be paid in addition to repayment of the principal. If the coupon is higher than prevailing market rates, then the bond will be priced at a premium and buyers will be in the familiar position of being taxed on the gross coupon income, with a potential for claiming a capital loss.

However, if the bond is stripped by the dealer and the coupon and principal sold separately, then both will be sold at a discount to their face value (the discount representing the yield, which is taxable as income) and there will be no capital loss. Hence, stripping a bond can be seen as a form of tax arbitrage.

While Strip Bonds may appear to address the taxation problems due to differing coupons and yields in the straight bond market, investors should be aware that the yields quoted on strips cannot be directly compared with bonds of similar term;[37] in fact, strips can generally be sold with a yield 25bp higher than bonds of the same term and still generate a handsome profit for the dealer; which is, of course, equivalent to saying "expensive for the purchaser".

I have examined the Strip Bond offerings of one major dealer as of August 10, 2012, and have determined that a five-year Ontario strip is quoted at 89.73-91.21 to yield 2.27%-1.93%. The very wide spread indicates that in practice a small holding of Strip Bonds will be illiquid, despite the fact that the instruments are priced in relation to the source of the strips (usually a government bond) – in fact, I very well remember a dealer refusing to bid at all on my small holding of some Ontario Hydro ten-year coupons during the crisis. This is much the same liquidity problem as afflicts GICs.

The same dealer was offering the Ontario 4.3% bonds of 2017-3-8 at 111.12 to yield 1.76% to maturity; this implies that the "25bp spread" rule of strip bond pricing is still more or less applicable. Taxable investors will be horrified to learn that the algorithm used earlier demonstrates that the after tax yield for this bond is 0.47% (with a claim for the capital loss) or -0.02% (without a claim). Being a taxable investor in this environment is just no fun at all!

One useful public service that comes to mind is the potential for bond dealers to offer their retail clients "self-stripping". In such a programme, dealers would quote a bond in the normal way, but also provide a slightly different quote for the same bond completely stripped: the trade in the client account would not be a single trade for the bond, but a (potentially very large) number of trades, one for each coupon and the residual. The taxable investor would then have the usual problems of the taxation accrual rule (whereby accumulated interest on each strip must be declared as income for tax purposes, even when the strip has not yet matured and the cash not actually received) but at least the problem of differential taxation will have been addressed.

The mechanics of such a process could be very easily automated and performed very cheaply, although certainly not for free – the broker's custodian will charge a fee for reflecting the stripping of the bond in the broker's account.

Whether or not the Canada Revenue Agency would recognize such trades as being valid is another matter entirely – I will leave questions of the legality of such a scheme to those among my readers who are tax accountants!

Investment Conclusions

There's not much out there for a taxable investor and I suspect there will be many readers who will be horrified to learn of the extreme effective tax rates they are paying on their earnings from bond funds and individual holdings of high-coupon bonds.

In this environment, taxable investors will find it well worth-while to become their own bond managers, selling off chunks of their bond funds and high-coupon issues to buy new issues and, when available, current-coupon issues on the secondary market.

As I noted in my article on bond portfolio management,[38] bond portfolios must be managed in an opportunistic fashion, since there will rarely, if ever, be the opportunity to purchase an ideal portfolio on any given day – or in any given month. Instead, one must review the offerings available on a regular basis and determine whether any of these issues will fill a gap in the portfolio as a whole. Additionally, by its nature a bond portfolio is constantly declining in average term to maturity, resulting in a constant need to rebalance.

It should also be noted that government policies of financial repression[39] have made cash in High Interest Savings Accounts quite competitive[40] with bonds of less than five year term, particularly when tax-effects on the current bond universe are considered. Given the current term structure of available choices, there is no great harm done if portfolios are overweight cash and underweight short-term bonds for the forseeable future.

In order to gain access to a wider variety of new issues than may otherwise be available, some investors may wish to open account with full-service brokers for the express purpose of purchasing new issues. RBC headed the Canadian "league tables" for debt underwriting in 2011,[41] a position which they have held for ten years, although they were edged by CIBC in terms of number of deals.[42] Note, however, that a major problem with Canadian bonds is that the sector is dominated by financial issuers: the largest seven issues in 12Q1 were all financial, and two-thirds of total issuance was financial.[43] Financial issues should be deprecated in the bond portfolios of preferred share investors, as the preferred share portfolio will be overweighted in financial issues due to the nature of the market.

---

[38] The Bond Portfolio Jigsaw Puzzle, available online at http://www.himivest.com/media/moneysaver_0911.pdf

[39] See http://www.bloomberg.com/news/2012-03-11/financial-repression-has-come-back-to-stay-carmen-m-reinhart.html

[40] See http://www.highinterestsavings.ca/chart/

[41] See http://www.investmentexecutive.com/-/canadian-debt-and-equity-issuance-slumps-in-2011

[42] See http://bullandbear.musonline.com/2012/03/the-canadian-investment-banking-market-debriefed/

[43] See http://iiac.ca/resources/5025/q1_12_debt_en.pdf