NEW EXCHANGE TRADED FUND, ZPR, TRACKS A NEW INDEX, TXPL

Standard & Poor's announced[1] on November 19 that they were launching a new index, the S&P/TSX Preferred Share Laddered index (TXPL), "in response to investors' ongoing demand for income producing securities."

The same press release announced that this index (and two others) were licensed to BMO Asset Management for the development of ETFs.

On cue, the Bank of Montreal announced[2] the establishment of the BMO S&P/TSX Laddered Preferred Share Index ETF (ZPR), based on TXPL and claimed to be *uniquely designed to reduce interest rate sensitivity compared to the preferred share market by using rate resets, while providing investors with portfolio diversification and tax-efficient dividend income.*

Given the very high popularity of CPD (as discussed in the November edition of this newsletter) and the extreme popularity of FixedReset preferred shares, I consider that there is a very good chance that ZPR will become an important part of the Canadian preferred share in a relatively short period of time and therefore have decided to examine both it and the underlying index in more detail in this appendix.

TXPL is Launched

The launch of the TXPL index appears to have been done in something of an unseemly rush, as there were numerous typographical and outright errors in the initial Factsheet and Methodology as published on the TXPL web page.[3] For example:

- The fact sheet referred to the requirement for an "ExhchangeListing"
- Both the methodology and the fact sheet referred to "Dominion Bank Rating Service"; a misnomer for Dominion Bond Rating Service which no longer exists having been renamedDBRS Limited on January 22, 2007.[4] DBRS, Inc. and DBRS Ratings Limited are related companies. However, thehistorical name is still used in news stories.[5]
- The methodology stated that "The index was launched in April 2007" – which is true for TXPR, but not for TXPL
- On page 7 of the methodology, the Index Name was stated to be "S&P/TSX Preferred Share Index", and provided the TXPR Bloomberg and Reuters codes, rather than the information for TXPL.

It seems clear that documentation for TXPL was simply copied from the existing TXPR documentation, without sufficient attention being paid to editing and proofreading.

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[1] Standard & Poor's Canadian Index Operations, S&P Dow Jones Indices, TMX Group Launch Preferred Share Laddered and Equal Weight Sector Indices, Press Release, 2012-11-19, available on-line at http://www.newswire.ca/en/story/1073811/s-p-dow-jones-indices-tmx-group-launch-preferred-share-laddered-and-equal-weight-sector-indices (accessed 2012-11-24)

[2] Bank of Montreal, BMO Asset Management Launches Four New and Innovative Funds Including BMO S&P/TSX Laddered Preferred Share Index ETF, Press Release, 2012-11-20, available on-line at http://newsroom.bmo.com/press-releases/bmo-asset-management-launches-four-new-and-innovat-tsx-bmo-201211200835623001 (accessed 2012-11-24)

[3] S&P Dow Jones Indices, S&P/TSX Preferred Share Laddered Index,http://ca.spindices.com/indices/fixed-income/sp-tsx-preferred-share-laddered-index (accessed 2012-11-24)

[4] DBRS eMail to James Hymas, 2012-11-26

[5] E.g., The Canadian Press, Dominion Bond Rating Service says Nova Scotia's economic outlook looks positive, 2012-6-8, available on-line at http://www.globalnews.ca/dominion+bond+rating+service+says+nova+scotias+economic+outlook+looks+positive/6442657561/story.html (accessed 2012-11-24)

This is rather important, since the prospectus for ZPR[6] states:

> *Each BMO ETF seeks to replicate, to the extent possible, the performance of the applicable Index, net of expenses. The investment strategy of each BMO ETF is to invest in and hold the Constituent Securities of the applicable Index in the same proportion as they are reflected in the applicable Index or securities intended to replicate the performance of the Index. The Manager may also use a sampling methodology in selecting investments for a BMO ETF. As an alternative to or in conjunction with investing in and holding the Constituent Securities, a BMO ETF may invest in or use certain Other Securities to obtain exposure to the performance of the applicable Index. … The Manager may, subject to any required Unitholder approval, change the Index underlying a BMO ETF to another widely-recognized index in order to provide investors with substantially the same exposure to the asset class to which that BMO ETF is currently exposed. If the Manager changes the Index underlying any BMO ETF, or any index replacing such Index, the Manager will issue a press release identifying the new Index, describing its constituent securities and specifying the reasons for the change in the Index.*
>
> *Further, The S&P/TSX Preferred Share Laddered Index includes preferred shares that generally have an adjustable dividend rate and are laddered by S&P with equal weights in annual reset term buckets. Securities are market capitalization weighted within the annual term buckets. Constituents are subject to minimum market capitalization, quality and liquidity screens. Further information about the S&P/TSX Preferred Share Laddered Index and its Constituent Issuers is available from S&P on its web site at www.standardandpoors.com.*

In other words, the management of the fund is totally subject to the whim of the index compiler – as is normal with an Index Fund and is, in fact, what investors expect and want when purchasing such a fund.

Contrary to current regulatory practice, it should be incumbent on the manager to advise investors of any changes in methodology or index composition promptly or, as part of the licensing agreement, to delegate that responsibility to the index compiler. As it now stands, material changes can now be made, or planned, to indices without any notice whatsoever being explicitly brought to the attention of investors in the associated ETF and without a description of such changes even being available to an investor who wishes to apprise himself of the details.

TXPL is Revised

In what must be one of the fastest revisions to officially announced methodology on record, the outright errors in the methodology that were noted above were corrected, and there were a number of substantive changes made as well:

- The market capitalization requirement was reduced to $75-million from $100-million
- Issues deleted from the index are not eligible for re-inclusion until six months after the effective date of the exclusion; they may no longer be added back at the following rebalancing
- It is noted that while issues with a mandatory conversion or scheduled maturity may not be added to the index, this test does not apply for continued membership in the index.

Of these three revisions, the second is by far the most important. As I discussed in the November edition of this newsletter, CPD has grown to such gargantuan size that its trading subsequent to the deletion of an issue from the index was in and of itself enough to make the re-inclusion of the issue at the next rebalancing almost certain. Now, at the next possible re-inclusion date six months following deletion, the trading triggered by the deletion will not be included in the volume calculation that determines possible re-inclusion.
No notice of the changes was made by S&P.

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[6]   BMO Exchange Traded Funds, Prospectus, 2012-11-1, available on-line at http://www.etfs.bmo.com/controller/image?image=prospectus_index_ nov_2012 (accessed 2012-11-24)

TXPR is Revised Too

A revised methodology for the S&P/TSX Preferred Share (TXPR), the index on which CPD is based, was posted on the TXPR web-page[7] on November 26, 2012. This revision includes the same three items as are shown above for TXPL and no other notice regarding the changes was provided by S&P – in other words, the only way to determine whether a change has been made in the methodology is to download the entire document and compare it with your base document – which you must save for yourself, since S&P does not make prior versions available.

These changes will, at least, solve the 'Perpetual Motion' problem highlighted in the November edition of this newsletter, in which the volume of trading sparked by index deletion was sufficient (or nearly so) to qualify the deleted issue for re-inclusion at the next rebalancing.

Characterization of ZPR

I have performed an analysis of ZPR using the same methodology as was used to compare the other funds and index in the November edition of this newsletter and results are presented in the same format as they were in that issue.

Portfolio data were recovered from the statement of holdings from the fund's web page[7] shortly after the fund's inauguration, and analyzed using market prices as of August 31. While this date is, of course, several months before the fund commenced operations, all issues included in the fund were trading as of August 31. Evaluation as of August 31 was performed in order to make the analyses more comparable; while there will be differences in the portfolio compositions between the effective date of the data recovery and the analysis date, I consider that these differences will probably be less important than those implied by changes in the market between the various data collection effective dates.

As may be seen from Table Addendum-A6, the fund indeed holds an overwhelming proportion of FixedResets, but it is interesting to note that the index includes issues that I classify separately as RatchetRate and FixedFloater.

Addendum to November Table A-6 : Sector Composition	
Class	**ZPR**
Ratchet	0.0%
Fix-Float	0.0%
Floater	0.0%
OpRet	0.0%
SplitShare	0.0%
Interest-Bearing	0.0%
Perpetual-Premium	0.0%
Perpetual-Discount	0.0%
FixedReset	67.5%
Deemed-Retractible	0.0%
TOTAL LIQUID INVESTMENT-GRADE	**67.5%**

Addendum to November Table A-6 : Sector Composition	
Class	**ZPR**
Scraps	
Ratchet	0.9%
Fix-Float	6.4%
Floater	0.0%
OpRet	0.0%
SplitShare	0.0%
Interest-Bearing	0.0%
Perpetual-Premium	0.0%
Perpetual-Discount	0.0%
FixedReset	25.6%
Deemed-Retractible	0.0%

This is permitted according to the most recent methodology (which, as we have already seen, may change without notice!): **Type of Issuance**. Preferred shares issued by a company to meet its capital or financing requirements are eligible. Split shares and synthetic preferred shares are not included in the index. Issues are eligible for inclusion when their reset dates are 5 years or less.

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[7]   Standard & Poor's, S&P/TSX Preferred Share [CAD], http://ca.spindices.com/indices/fixed-income/sp-tsx-preferred-share-index

[8]   BMO Exchange Traded Funds, BMO S&P/TSX Laddered Preferred Share Index ETF: Holdings, http://www.etfs.bmo.com/bmo-etfs/holdings?fundId=92496 (accessed 2012-11-24)

I find the description rather clumsily expressed but the gist is reasonably clear. It is interesting to note that the issues BAM.PF.A, BAM.PF.B, BAM.PR.Z, ENB.PR.D, ENB.PR.F, ENB.PR.H, ENB.PR.N, ENB.PR.P, IFC.PR.A, NA.PR.Q, AQN.PR.A, BPO.PR.T, BRF.PR.C, EMA.PR.C, LB.PR.F and NPI.PR.C were not eligible for inclusion as of November 9, 2012 (as the term to the next reset date is in excess of five years); despite this BAM.PR.Z, IFC.PR.A and NPI.PR.C (each of which have their first Exchange Date on 2017-12-31) were incorporated in the ZPR portfolio at commencement.

It is possible that those three exceptions are included in the portfolio under the "basket clause", which the Prospectus effectuates as "As an alternative to or in conjunction with investing in and holding the Constituent Securities, a BMO ETF may invest in or use certain Other Securities to obtain exposure to the performance of the applicable Index", while not actually being included in the index, but this is not clear.

The index methodology states "The index is divided into a laddered structure with staggered reset dates based on calendar years" which could provide an explanation: the calendar years currently included in the index are 2013-2017 inclusive. This is consistent with later explanation of the "term buckets": Each term bucket, as defined by the calendar year of each constituent's rate reset, is equal weighted at each rebalance. Within each bucket, individual securities are weighted by market capitalization. The weight of each individual bucket may be subject to change depending on the market conditions and the universe of Canadian preferred shares. At the onset of the index, there will be 5 equally weighted buckets, should the number of buckets be reduced to 4 or less in the future, each bucket will be equally weighted at each rebalance.

Given that all FixedReset and FixedFloater issues currently extant have a five-year period between Exchange Dates, this does not lead to any immediate contradictions: issues which reset in 2013 will also reset in 2018. However, I consider that the descriptions of index eligibility and bucket formation are rather imprecise at best as well as being incomplete: what happens if an issue comes to market that resets every six years? Will it have five years of eligibility followed by one year of ineligibility? And will the issues listed above with their First Exchange Date occurring in 2018 be added to the 2013-bucket at the first quarterly rebalancing of 2013? The fact that these questions are left open reflects the unseemly rush that resulted in the typographical errors in S&P's first attempt at publishing a methodology.

FixedFloaters&RatchetRates vs. FixedResets&FloatingResets

However, I am more interested in the inclusion of FixedFloaters and RatchetRate issues than I am in the intricacies of FixedReset inclusion determination, since I consider these two classes of preferred shares to be distinct from FixedResets. To recapitulate:

- A **FixedReset** is a perpetual issue which adjusts the dividend on its Exchange Dates to be equal to the five-year Canada yield plus a spread, which is fixed by the prospectus. On every Exchange Date, holders have the ability to exchange their issues to and from FloatingResets, which pay a yield equal to the 90-day Government of Canada treasury bill rate plus a spread (the spread is equal to the spread offered over five-year Canadas with the other series). On every Exchange Date, the issuer has the option to call each issue for redemption at par. Note that a FixedReset and its associated FloatingReset form a Strong Pair.[9] As all such issues have been issued as FixedResets and none of these issues has yet reached its first Exchange Date, no FloatingReset issues are currently trading.

- A **FixedFloater** is a perpetual issue on which the dividend is adjusted according to a resolution of the directors on every Exchange Date; all extant issues have a provision in the prospectus to the effect that the dividend rate will not be less than 80% of the Five-Year Canada rate measured at a certain time shortly prior to each Exchange Date. On each Exchange Date, investors have the opportunity to exchange their holdings to and from the associated RatchetRate issue and the issuer has the option to call each issue for redemption at par. A FixedFloater and its associated RatchetRate issue form a Strong Pair.

- A **RatchetRate** is a perpetual issue on which the dividend is a varying percentage of Canada Prime, calculated quarterly. The percentage varies according to the trading price of the issue, with a limitation on the change of this percentage from month to month. The percentage rises when the issue trades below par and falls when the issue trades above par; and varies between a maximum of 100% and a minimum of 50%

The variation in the percentage paid of par by RatchetRatepreferreds is clearly intended to keep the price near par and the mechanism was very successful at this – within limits. As shown in Chart A-1, the percentage paid for BCE.PR.Y increased to its maximum in the latter half of 2007, keeping the market value of the shares near par despite the Credit Crunch.[10] By the fourth quarter of 2008, negative pressure had become overwhelming and the price of this issue plunged, as the dividend rate as a percentage of Canada prime had reached a maximum while Prime itself was plunging in response to monetary stimulus.

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[9]   See my article Preferred Pairs, available on-line at http://www.himivest.com/media/moneysaver_0710.pdf

[10]   See http://www.prefblog.com/?p=940

As shown in Charts A-2 and A-3, the spread between Canada Prime and three month Treasury Bills varied in a range of 150-200bp prior to the Credit Crunch, while the subsequent spread has been fairly steady at about 200bp (albeit with very little movement to date in either figure).
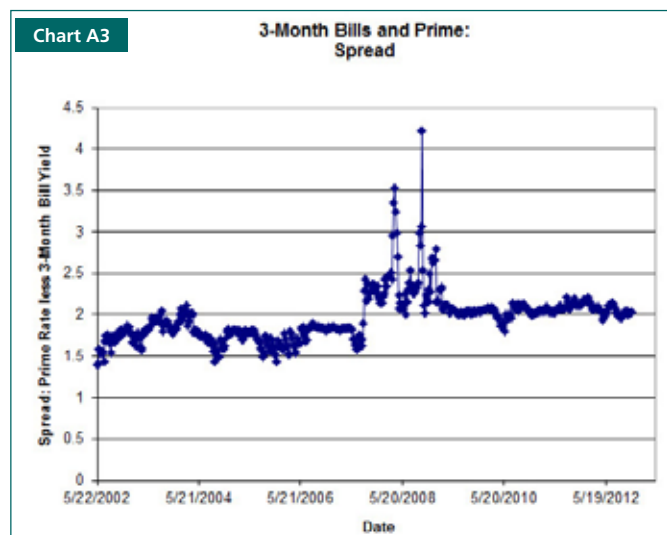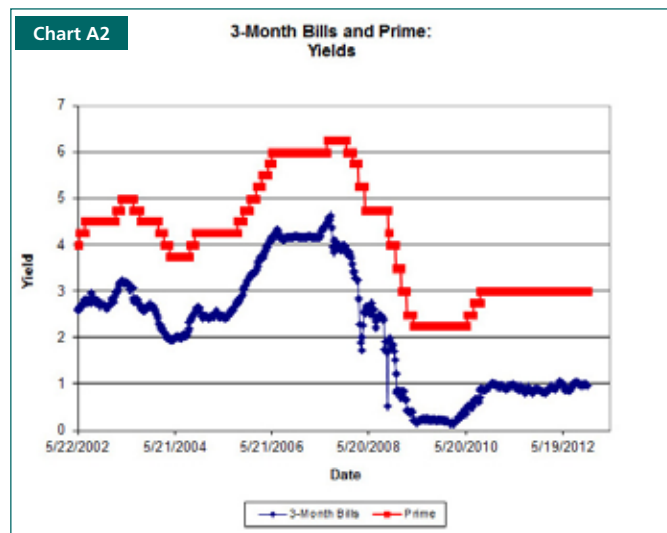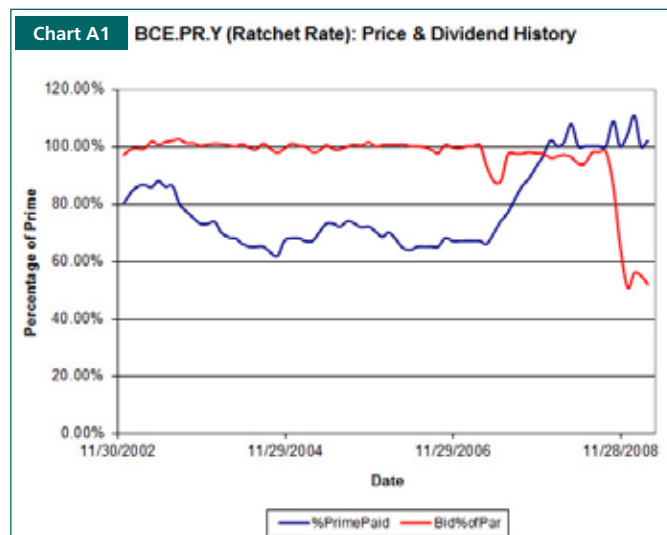
If we may assume that the 200bp spread will be maintained, we can conclude that a FloatingReset with a spread of 200bp will pay about the same rate of dividends as an instrument paying 100% of Prime. Given that this spread is approximately the floor rate for FixedResetissues at the current time, we may conclude that RatchetRatepreferreds are likely to be permanently below par since will pay an amount barely equal to the average FloatingReset, despite being of relatively poor credit quality (most extant issues are BCE, which is rated Pfd-3(high) by DBRS[11] and P-2(low) by S&P.[12]

Note that this reasoning also implies that Floaters, which typically pay a fixed percentage of 72% of Prime paid on par, should have a maximum price (ignoring credit effects) of 72% of par, or $18, implying that losses experienced by these issues during the Credit Crunch will not be recovered in the foreseeable future.

Further, it will be noted that the prices of FixedReset issues are linked to those of RatchetRates due to the fact that they form a Strong Pair and the fact that the issuer has the ability to set the five-year fixed rate at a mere fraction of the Canada five-year yield means that the company has the ability, on every exchange rate, to all but force a rational investor to choose to hold or convert to the Ratchet Rate issue.

It is not difficult to imagine a scenario in which FloatingReset issues will trade at a high premium to par – this might happen in the case of a steeply inverted yield curve. Although the typical structure of FixedResets and their paired FloatingResets allows the redemption of these issues at 25.50 on dates which are not Exchange Dates, it is not particularly difficult to imagine circumstances in which the company would decline to do so, given that a FloatingReset is a permanent source of capital and it simply might not be possible to issue similar shares more cheaply or to access other sources of investment.

In summary, I expect that FixedResets/FloatingResets will exhibit a high degree of correlation with FixedFloaters/RatchetRates in market conditions similar to those we are currently experiencing. However, I anticipate that correlations will deteriorate as Floating Rate issues are deemed to be more attractive by investors – as could very well happen in the event of sharp increases in short term rates such as occurred in 1994, or in the event of an inverted yield curve, such as that of mid-2007 and December 2000.[13]

Chart A1

BCE.PR.Y (Ratchet Rate): Price & Dividend History

Chart A2

3-Month Bills and Prime: Yields

Chart A3

3-Month Bills and Prime: Spread

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[11] See http://www.dbrs.com/research/245994/dbrs-confirms-bce-inc-and-bell-canada-s-ratings-following-its-announced-acquisition-of-astral-media.html

[12] See http://www.standardandpoors.com/prot/ratings/debt-ratings/en/us/?debtType=PREFDSTK&entityID=270381&debtName=Preferred+Stock&entityName=BCE+Inc.

[13] Frank Pingue, Canada is not headed toward recession, no matter what the bond market's tea leaves say, Reuters, 2007-6-5, available on-line at http://www.reuters.com/article/2007/06/05/us-bonds-idUSN0526094820070605 (accessed 2012-11-26)

So, while one can certainly make a good argument that the decision to include RatchetRates and FixedResets in the TXPL index is in accordance with the general principal that individual constituents of indices be well correlated with each other[14], I feel that a better one can be made that these classes do not belong together. However, another factor may have been that including these two older classes of shares allows better issuer diversification than would otherwise be the case (BCE has only a single FixedReset now outstanding, but a great many FixedFloater and RatchetRates) and it is possible that this consideration tipped the scales.

Credit Quality of ZPR

Addendum to November Table A-7 : Credit Quality		
Credit Rating	**ZPR**	**Scoring Factor**
Pfd-1	0.0%	0.22%
Pfd-1(low)	39.9%	0.33%
Pfd-2(high)	9.6%	0.66%
Pfd-2	0.0%	0.86%
Pfd-2(low)	17.9%	1.06%
Pfd-3(high)	18.7%	2.12%
Pfd-3	12.2%	2.62%
Pfd-3(low)	1.1%	3.12%
Pfd-4(high)	0.0%	4.24%
Pfd-4	0.0%	5.24%
Pfd-4(low)	0.0%	6.24%
Pfd-5(high)	0.0%	8.48%
Pfd-5	0.0%	10.48%
Pfd-5(low)	0.0%	12.48%
Undefined	0.5%	0
Weighted Average Scoring Factor	1.14%	

The index methodology states: **Rating**. *Preferred shares must have a minimum rating of P-3 or its equivalent by Standard & Poor's, Dominion Bank Ratings Service or Moody's Investor Service. [Note] If more than one of the ratings agencies has issued a rating on the stock, the lowest rating is used to determine eligibility.[Note reads: The index was launched in November 2012. Prior to that time, the index was back tested using Standard & Poor's ratings only.] This would appear to disqualify three issues which are in fact included in the portfolio holdings: Pfd-3(low) issues are DC.PR.B, GMP.PR.B and RON.PR.A*

Table DEC-1				
Ticker	**Issuer**	**DBRS**	**S&P**	**Moody's**
DC.PR.B	Dundee Corporation	Pfd-3 [Upgraded on November 8[15]]	P-3(low)[16]	NR
GMP.PR.B	GMP Capital Inc.	Pfd-3(low), Trend Negative [Confirmed with Trend Change on November 16[17]]	NR	NR
RON.PR.A	RONA Inc.	Pfd-3(low), Trend Negative[18]	P-3, Outlook Negative[19]	NR

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

[15] See http://www.dbrs.com/research/243296/dbrs-upgrades-rating-on-dundee-corporation-to-bbb.html

[16] Effective 2009-11-5

[17] See http://www.dbrs.com/research/252519/dbrs-confirms-gmp-preferred-shares-at-pfd-3-low-trend-changed-to-negative.html

[18] See http://www.dbrs.com/research/248308/dbrs-confirms-rona-at-bbb-low-and-pfd-3-low-trend-negative.html

[19] See http://www.standardandpoors.com/prot/ratings/articles/en/us/?articleType=HTML&assetID=1245340803278

It is interesting to note that DC.PR.B is reported to be rated P-3(low) by S&P, while DC.PR.A is rated P-3; it is highly unusual for two preferred share issues considered to be parri passu to have different ratings from the same Credit Rating Agency. In fact, the only other example that comes to mind is the bank NVCC issues: those without the NVCC clause were unaffected by the NVCC rules, while the CRAs are currently reviewing those for which the NVCC is effectively present. There is no freely available discussion of the difference in the S&P material freely available on their website.

However, the 2009 prospectus[20] for DC.PR.B states The Series 2 Preference Shares are provisionally rated "Pfd-3 (low) with a Stable Trend" by DBRS Limited ("DBRS"). The "Pfd-3" rating is in the third highest category available from DBRS for preferred shares. A rating trend that is "Stable" actsas a signal indicating that the rating is secure and that the trend is stable according to active surveillance and performanceupdates.

The Series 2 Preference Shares are rated "P-3" by Standard & Poor's ("S&P") using the S&P Canadian scale for preferredshares and "BB" using S&P's global scale for preferred shares. The "P-3" rating is the third highest of the five categoriesused by S&P on its Canadian preferred share scale. The "BB" rating is the sixth highest of the nine mid-level categories usedby S&P on its global scale.

Thus, it is possible that DC.PR.B does in fact qualify for the index as the criteria are stated, provided we assume that:

- Ratings were collected subsequent to the DBRS upgrade on November 8
- The P-3(low) rating reported on the S&P website is a stenographical error and the P-3 rating reported by the prospectus is correct.

Dundee Corporation has announced[21] that its preferred shares will no longer be rated by any agency, so the problem has become moot.

Additionally, it is possible that RON.PR.A is properly included in the index, provided we assume that the backtest using S&P ratings only included the inaugural index portfolio and that other ratings will be used only for updates.

However, I am unable to rationalize the presence of GMP.PR.B. It may be an error on the part of the index compilers; it may be held by the fund without being in the index through the good offices of the "basket clause".

These quibbles aside, however, it is apparent that the credit quality of ZPR is significantly below the average of the portfolios examined in the November edition. Only Manulife Preferred Income Fund, with 32.5% of its portfolio rated as junk (using DBRS ratings) is worse; the Manulife fund has a Weighted Average Scoring Factor of 1.23%, compared to 1.14% for ZPR (CPD was calculated to be 0.89%, while the BMO-CM "50" index came in at 0.79%).

This relatively poor credit quality may be ascribed quite simply to the nature of the market.. I have been very surprised over the past few years at the immense amount of issuance by junk-rated companies and virtually all of this issuance has been of the FixedReset structure. Certainly in years gone by it was difficult, if not impossible, to issue junk preferreds but times have changed! There seems to be some feeling that FixedResetpreferreds embody less credit risk than Straight Perpetuals and it is appropriate to examine this hypothesis here.

Credit Quality of FixedResets vs. Straight Perpetuals

As part of its promotional activities, BMO Exchange Traded Funds has prepared a document titled "Understanding Preferred Shares"[22] that provides a brief description of the asset class – albeit one that appears to have been written with the intent of promoting the FixedReset class.

For example, they divide the preferred share universe into four classes:

- "**Perpetuals**", which are what I would describe as "Straight Perpetuals". They state "This type of preferred share has no maturity date and pays a fixed dividend for as long as it remains outstanding. Due to its long duration, a perpetual preferred share can be very sensitive to credit spreads and interest rates. This type of preferred share can be redeemed by the issuer, but the holder has no retraction rights, which limits price appreciation."

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[20] Prospectus available via http://www.sedar.com with identifiers "Dundee Corporation", "Sep 9 2009", "Final short form prospectus – English"

[21] Dundee Corporation, Dundee Corporation Discontinues Arrangements With Credit Rating Services, Press Release, 2012-12-7, available on-line at http://www.dundeecorp.com/pdf/2012-12-07-Ratings-Cancellation.pdf (accessed 2012-12-7)

[22] BMO Exchange Traded Funds, Understanding Preferred Shares, available on-line at http://www.etfs.bmo.com/ETFConsumer/controller/image?image=understanding_pref_shares&lang=en (accessed 2012-11-28)

- "**Floating Rate**", which are a combination of what I would classify as "Floaters" and "RatchetRates". They do not mention that these shares almost always have no maturity date (the only current exception I can think of is BK.PR.A).

- "**Rate Resets**", which are what I describe as "FixedResets", although the class I describe as "FixedFloater" can also be considered as being included by their description. Oddly, they state *The holder's other option at reset date is to exchange the issue for a floating rate preferred share* which implies a change of class according to their terminology. They do not mention that these shares also have no maturity date.

- "**Retractables**", which I call "Retractibles". Tom-ay-to, tom-ah-to![23]

Further, they publish a table, reproduced here as Chart A-4, which makes a rather surprising (and unsupported) claim regarding the credit risk of FixedResets relative to the other classes (as they have defined them) of preferred shares.[24]

To investigate the veracity of this claim, we will examine the base prospectus for the preferred shares[25] which states: The Class A Preferred Shares of each series rank on a parity with the Class A Preferred Shares of every other series and with every series of Class B Preferred Shares and are entitled to preference over the Common Shares and over any other shares ranking junior to the Class A Preferred Shares and the Class B Preferred Shares with respect to the payment of dividends and in the distribution of property in the event of the liquidation, dissolution or winding-up of the bank.

Chart A4

Interest Rate Risk	Credit Risk
Perpetuals	Perpetuals
Retractables	Floating Rate
Rate Resets	Rate Resets
Floating Rate	Retractables

Higher ↕ Lower

Source: BMO Asset Management Inc.

Currently, all outstanding preferred shares of BMO are Class B. I am unable to determine any difference between Class A and Class B from the shelf prospectus, but the BMO website claims[26] Class B Preferred Shares may be issued in non-Canadian currency, without making any reference to the allowable issuance currency of Class A preferreds. I will be very pleased to hear from any reader who can provide an explanation, with evidence, of why the bank chooses to have two different classes.[27] An inquiry to BMO Investors Relations resulted in a link to their Annual Information Form;[28] the descriptions of the two series have the following differences (apart from substituting "Class A" for "Class B" throughout and vice versa):

- Class A has an extra sentence stating As at December 1, 2012, there were no outstanding Class A Preferred Shares.

- Class B has an extra sentence stating As at December 1, 2012, there were no outstanding Class B Preferred Shares which carry the right to cumulative dividends.

So as far as BMO is concerned – and as is the case with almost every other preferred share issuer of which I am aware[29] – all preferred shares rank equally and, to be more specific, the FixedResets are parri passu[30] with Straight Perpetuals.

Thus, the credit quality of each preferred share is equal – and by this I mean all of them! A FixedReset, a Straight Perpetual and a Retractible all have the same probability of defaulting during any period in which they default and the recovery on default will be identical.[31]

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[23] Let's call the whole thing off! See http://www.youtube.com/watch?v=zZ3fjQa5Hls and http://www.prefblog.com/?p=9666

[24] This is not an isolated instance; a claim that FixedResets and other perpetuals with varying dividends have lower credit risk than Straight Perpetuals is also made by Tara Quinn, Guide to Preferred Shares Winter 2011, ScotiaMcLeod, available on-line at http://www.jordanwealthmanagement.ca/media/documents/Guidetopreferreds2011.pdf (accessed 2012-12-9)

[25] BMO Bank of Montreal, Short Form Base Shelf Prospectus, 2008-1-4, available on-line at http://www.bmo.com/bmo/files/financial%20information%20slides/3/1/Shelf%20Prospectus%20Jan%204%202008%20Eng.pdf (accessed 2012-11-30)

[26] BMO Financial Group, Shareholder Information: Preferred Shares, available on-line at http://www.bmo.com/home/about/banking/investor-relations/shareholder-information/preferred-shares (accessed 2012-11-30)

[27] I will also encourage such a reader to obtain a psychiatric evaluation of possible obsessive-compulsive disorder.

[28] BMO Bank of Montreal, Annual Information Form for the Year Ended October 31, 2012, available on-line at http://www.bmo.com/ir/files/F12%20Files/2012AIF.pdf (accessed 2012-12-4)

[29] Sometimes there are junior preferreds issued by Split Share corporations; BNA has such an issue, but it does not trade publicly. Note that shares from related issuers can effectively be junior or senior to one another; e.g., TRP should be considered junior to TCA, since TCA is issued by the operating company and is therefore 'closer to the money' than is TRP.

[30] i.e., "not only are the different series on an equal footing, but I can say it in Latin".

[31] Barring the existence of very rare junior preferreds.

Credit Risk

However, Credit Quality is not quite the same thing as Credit Risk, at least according to the definitions I will use in the course of this essay. While Credit Quality reflects the chance of default during any fixed period, Credit Risk includes:

- The chance of default during the term of the specific instrument being examined

- The Mark-to-Market Risk due to changes in Credit Quality during the term of the instrument being examined.
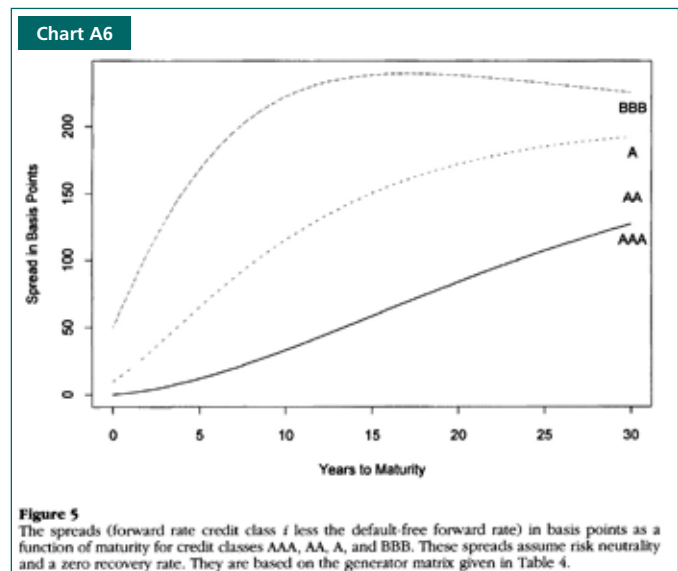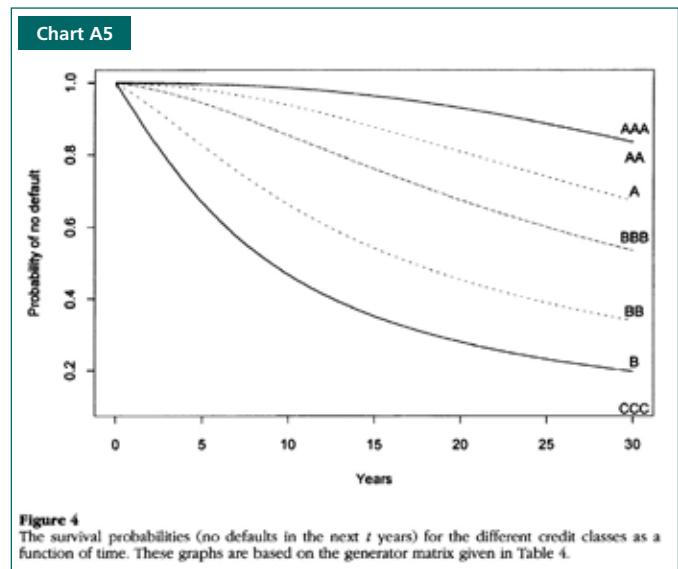
With respect to the first point, it should be clear that Credit Risk will increase with the term of the instrument, since there is more time during which the instrument may default. One may estimate the relationship between default probability and term with as much mathematical precision as desired – one such attempt[32] is shown in Chart A-5. Further assumptions and computations may yield estimates of the spread requirement for each instrument (relative to default-free bonds) that will result in the expected return of risky and default-free bonds being equal, as shown in Chart A-6.

Chart A-6 illustrates a very important precept of fixed income portfolio management: the ability to allow investments with a deteriorating credit quality to "run off the books" (that is, to mature and thereby to change the credit quality of the bond portfolio without any trading being required; and without have realized any loss whatsoever from the decline in Credit Quality).

Thus, while a five-year bond has the same Credit Quality as a ten-year bond, the Credit Risk of these two instruments will be different.

Additionally, the fact that the required credit spread increases as Credit Quality declines for any fixed term illustrates Mark-to-Market Risk, since the price of the instrument will decline as the credit spread increases.

Unfortunately, perpetual preferred shares – regardless of whether they are structured as Straights, Floater, FixedResets or any other structure that might be brought to us by the imagination of the underwriters – will never run off the books. Thus, while the decline in price of a thirty-year bond due to increased credit spread will be recovered in full when it matures (barring default), a permanent change in Credit Quality for a perpetual preferred will result in a permanent change in market price (relative to default-free securities).

Chart A5

Figure 4
The survival probabilities (no defaults in the next t years) for the different credit classes as a function of time. These graphs are based on the generator matrix given in Table 4.

Chart A6

Figure 5
The spreads (forward rate credit class i less the default-free forward rate) in basis points as a function of maturity for credit classes AAA, AA, A, and BBB. These spreads assume risk neutrality and a zero recovery rate. They are based on the generator matrix given in Table 4.

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[32] Robert A. Jarrow, David Lando& Stuart M. Turnbull, A Markov Model for the Term Structure of Credit Risk Spreads, The Review of Financial Studies, Summer 1997, Vol. 10, No. 2, available on-line at http://forum.johnson.cornell.edu/faculty/jarrow/055%20Markov%20Model%20Credit%20Risk%20RFS%201997.pdf (accessed 2012-12-4)

Credit Risk of FixedResets vs. Straight Perpetuals (assuming Perpetuality)

The critical question is of the implications of perpetuality on the price sensitivity of FixedResets versus Straight Perpetuals.

Let us assume:

- The Government of Canada Five-Year Rate (GOC5) is a constant 3%
- Company X has a FixedReset outstanding that resets every five years at GOC5 + 200bp.
- Company X has experienced difficulty and issues a new FixedReset at GOC5 + 300bp. This issue is fairly valued at par, $25 and therefore pays $1.50 p.a.
- The Exchange Dates for the two series is identical and immediate. The first issue therefore resets to 5%, or $1.25 p.a.

It should be apparent that, at least to a first approximation, the ratio of the prices of the FixedResets should be equal to the ratio of their dividends. Given that the new issue trades at $25, the older issue should trade at about 20.83.

You will note my careful use of the phrase "first approximation" in the above paragraph. I suggest that in a rational market, the yield of the new issue will be higher than that of the old, due to the uncertainty regarding whether the issue will be called – as well as the fact that there is the potential for a large capital gain on the outstanding issue and no prospect of such a significant gain on the new issue. Since the older issue should have a relatively lower yield, it should have a relatively higher price – but accounting for these elements of valuation require estimates to be made of investor risk-aversion and market volatility, so they will be conveniently ignored.

Now consider Straight Perpetuals from the same issuer, which trade at a yield spread of 100bp over the FixedResets. A new issue carries a coupon of 7%, paying $1.75 p.a. and trades at 25.00; the old issue has a coupon of 6%, paying$1.50 and trading to yield 7%, implying a price of 21.42. Again, we are ignoring effects due to investor risk aversion and market volatility – a more sophisticated model would reflect the market's usual tendency for lower-coupon issues to trade at a lower Current Yield (and therefore at a relatively higher price) due to Implied Volatility.[33]

Thus, the parallel shift in required yields of 100bp due to credit quality has resulted in a price decline of 16.7% for the FixedReset and 14.3% for the Straight: this simple example shows a greater sensitivity to a change in credit quality for the FixedReset.

This is entirely proper. As is well known (or should be) the Macaulay (D_{MAC}) and Modified (D_{MOD}) Durations of a perpetuity can be expressed very simply:[34]

$$D_{MAC} = (1+r) / r$$
$$D_{MOD} = 1 / r$$

Where "r" is the yield per period.If we assume perpetuality, a FixedReset can be expected to have a lower yield than a Straight Perpetual at any given point in time, its durations will be higher and hence its sensitivity to changes in credit spread will be greater.

A possible objection to this argument – and one that may be is at the heart of the dealers' claims of lower Credit Risk for FixedResets – is the question of how much extra yield will be required for differing structures given an identical change in Credit Quality. In the above example I assumed that if a deterioration in Credit Quality caused a 100bp increase in the market yield of a Straight Perpetual, then it should also require a 100bp increase in the market yield of a FixedReset (given the assumption that no call can be reasonably expected for either instrument). One might argue that this assumption is not valid: that only 50bp extra yield will be required for the FixedReset, on the grounds that credit spreads decrease with term.

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[33] See the January, 2010, edition of this newsletter for more discussion of Implied Volatility, a method for pricing call probability; the calculator is available via http://www.prefblog.com/?p=9733.

[34] For a proof, see http://www.prefblog.com/?p=2582

Chart A10

CZP.PR.A (Security A41270) Properties from 2011-01-31 to 2012-02-06

Chart A11

AZP.PR.A (Security A35520) Properties from 2012-02-07 to 2012-11-28
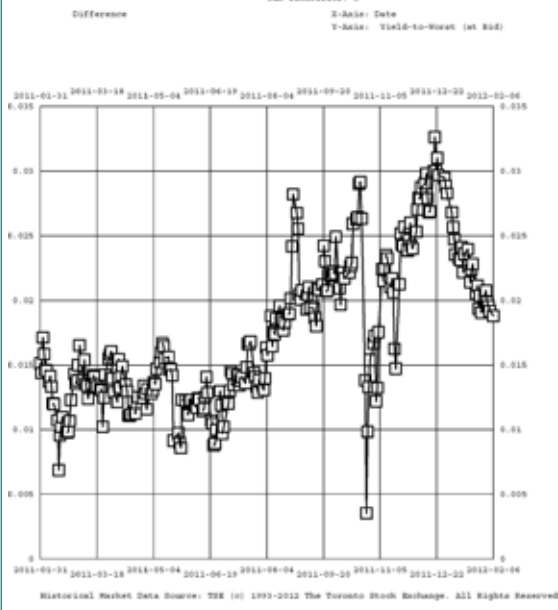
I do not consider this objection valid. The Credit Spread exists due to the risk of loss of principal during the term of the instrument. I consider the objection to result from an improper conflation of the concepts of Credit Risk and Interest Rate Risk, but supporters of the concept might point to the example of CZP.PR.A / CZP.PR.B (now AZP.PR.A / AZP.PR.B following consummation of the takeover of Capital Power by Atlantic Power[35]), which were a Straight Perpetual and a FixedReset, respectively. The yield spread between the two issues varied in the range 100-150bp until the announcement of the potential takeover and warnings of a potential downgrade,[36] peaked at about 325bp (see Charts A-10 and A-11) and is now at about 250bp; the spread between the two has increased quite significantly as the credit quality of the company has deteriorated.

Naysayers might also refer to the variation of Break-Even Rate Shock[37] (which measures the degree of interest rate protection provided by FixedResets compared to Straight Perpetuals) over time, pointing out that it reached its peak at the height of the Credit Crunch (and the bottom of the Straight Perpetual market).

I can only state that I do not believe these instances of change in spreads between FixedResets and Straight Perpetuals to reflect fundamental changes in Credit Risk. They may well reflect retail perceptions of Credit Risk – for now – but as such, I consider the variations to be more of a change in the relative liquidity premia resulting from changes in preferred habitat.[37] I have not seen any argument to support the various assertions of differences in Credit Risk arising solely from structure.
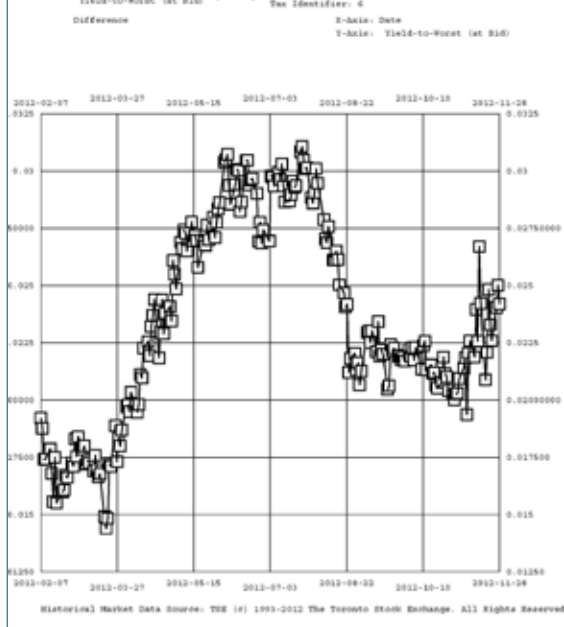
Credit Risk of FixedResets vs. Straight Perpetuals (without assuming Perpetuality)

In many cases it is not correct to assume perpetuality of either FixedResets or Straight Perpetuals; these cases arise when the terms of the preferreds are very favourable to the investor – so favourable that a call for redemption is forecast with non-zero probability at some point in the future.

In such a case, Credit Risk must be determined by examining the fundamentals of the instrument and possibly the fundamentals of the company itself, so no generalization is possible.

Say, for instance, we have a Straight Perpetual with a coupon of 10% at a time when the issuer is able to find buyers for new issues with a coupon of only 5%. In such a case, we expect the issue to be called at the first opportunity (while always remembering that there is a non-zero chance of this not happening, due to changes in either the market or the company) and therefore we may expect

- The market price will reflect a lower credit spread than would be the case if the issue was not expected to be called
- The market price will be relatively insensitive to changes in Credit Quality, since the required coupon on new issues can increase substantially without affecting the conclusion that the issue is likely to be called (in other words, the issue has, effectively, an extra layer of first-loss protection)

The same reasoning applies to FixedResets except that for these issues, of course, the critical number is the Issue Reset Spread[39] rather than the current coupon.

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[35] Atlantic Power Corporation, Capital Power Income L.P. and CPI Preferred Equity Ltd. Announce Name Changes, Press Release, 2012-2-1, available on-line at http://www.snl.com/irweblinkx/file.aspx?IID=4098671&FID=12583799 (accessed 2012-12-9)

[36] See http://www.prefblog.com/?p=12473 , http://www.prefblog.com/?p=15426 and http://www.prefblog.com/?p=16747

[37] See the June, 2009, edition of this newsletter and my article at http://www.himivest.com/media/moneysaver_0910.pdf

[38] For an explanation of Preferred Habitat in its usual usage with respect to term structure in the bond market, see DimitriVayanos&Jean-Luc Vila, A Preferred-Habitat Model of the Term Structure of Interest Rates, National Bureau of Economic Research, Working Paper 15487, 2009, available on-line at http://www.nber.org/papers/w15487.pdf (accessed 2012-12-9)

[39] The spread at which the issue will reset over five-year Canadas if the issue is not called

Given that so many FixedReset issues were brought to market by banks during the Credit Crunch, there is a substantial population of high Credit Quality issues with Issue Reset Spreads far in excess of what is currently required (note that National Bank, rated Pfd-2 by DBRS,[40] recently brought a FixedReset to market with an Issue Reset Spread of 243bp[41]) as shown in Chart A-7. The population of Straight Perpetuals with such excessive coupons is much lower, as shown in Chart A-8 (the most recent comparable issue was GWO. PR.R, with a coupon of 4.80%[42]).

It is possible, therefore, to argue that the Credit Risk of the current population of FixedResets is lower than the Credit Risk of the current population of Straight Perpetuals – but only if we make it clear that we are referring to the current population only, which will change as issues are redeemed and issued.

There is nothing fundamental about the structure of FixedResets that causes their Credit Risk to be lower than that of Straight Perpetuals; in fact, given that the lower Interest Rate Risk should cause the issue to trade with a lower yield than an otherwise comparable Straight Perpetual, it should be clear that Credit Risk will normally be slightly higher, since Credit Risk will be related to the Modified Duration of the instrument.

Digression: Money Market Funds and Spread-WAM

The difference between the terms used to calculate Interest Rate Risk and Credit Risk for FixedResets follows the mutual fund industry's success with the concept of "Spread-WAM", where WAM is an acronym for Weighted Average Maturity.

We may examine the definition of a Money Market Fund according to National Policy 81-102 as of September 28, 2009:[43] "money market fund" means a mutual fund that has and intends to continue to have
(a) all of its assets invested in any or all of
…
(iv) floating rate evidences of indebtedness not referred to in subparagraph (ii) or (iii), if the principal amounts of the obligations will continue to have a marketvalue of approximately par at the time of each change in the rate to be paid to theholders of the evidences of indebtedness,

(b) a portfolio with a dollar-weighted average term to maturity not exceeding 90 days,calculated on the basis that the term of a floating rate obligation is the period remainingto the date of the next rate setting,

Part (a)(iv) of the definition contains language only a lawyer could love – it does not appear to have occurred to any of the drafters that there is no way to ensure the market value of any security will remain at approximately par at any specific time short of actually making a market in the security. It may be assumed that maintaining a constant spread against some index – e.g., T-Bills +10bp – is sufficient to meet the requirements of this section.

Chart A7

Frequency Distribution of Issue Reset Spreads
Pfd-1(low) Issues Only

Chart A8

Frequency Distribution of Annual Dividend
Pfd-1(low) DeemedRetractible Issues Only

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[40] DBRS, DBRS Confirms National Bank at AA(low) and R-1(middle), Press Release, 2012-10-12, available on-line at http://www.dbrs.com/research/251598/dbrs-confirms-national-bank-at-aa-low-and-r-1-middle.html (accessed 2012-12-4)

[41] National Bank of Canada, National Bank of Canada Announces Preferred Share Offering, Press Release, 2012-10-30, available on-line at http://www.nbc.ca/bnc/cda/newsdetail/0,2714,articleCode-17431_divId-2_langId-1_navCode-6100_viewFilter-2012,00.html (accessed 2012-12-5)

[42] Great-West Lifeco Inc., Great-West Lifeco Preferred Share Issue, Press Release, 2012-10-3, available on-line at http://www.greatwestlifeco.com/web5/groups/common/@public/documents/web_content/s7_028823.pdf (accessed 2012-12-5)

[43] Ontario Securities Commission, National Instrument 81-102 – Unofficial Consolidation – September 28, 2009, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category8/rule_20090918_81-102_unofficial-consolidated.pdf (accessed 2012-12-5)
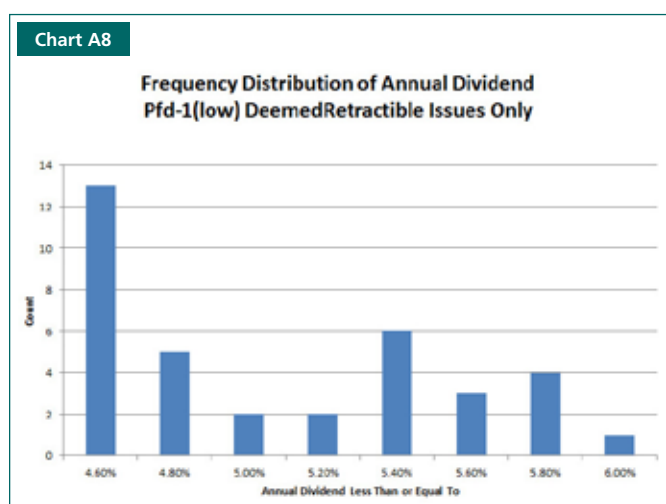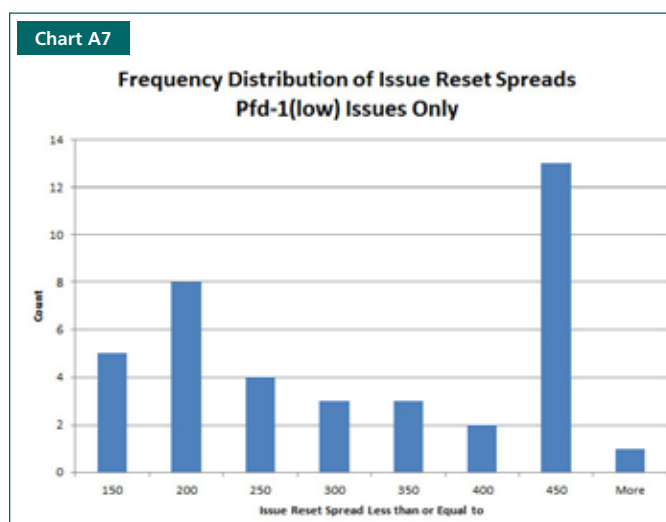
The critical portion of the definition is part (b), that allows the next rate-setting to be considered the maturity date. This ignores the question of credit risk completely.

Still, given enough time, even a regulator can be made to understand a simple concept and in early 2012 amendments were announced:[44] *The Amendments introduce new investment restrictions for money market funds under new section 2.18 of NI 81-102. That section includes new liquidity provisions requiring a money market fund to have at least 5% of its assets in cash or readily convertible to cash within one day and 15% of its assets in cash or readily convertible to cash within one week. It also includes a new dollar-weighted average term to maturity limit of 180 days that is to be calculated based on the actual term to maturity of all securities in a money market fund portfolio.*

By way of comparison, an international body of regulators[45] has published[46] recommendations such that: *In order to limit asset-liability mismatches, limits should be imposed regarding the remaining maturity until the legal redemption date of the instruments held in the portfolios. In addition, MMF regulation should define limits on the average weighted term to maturity (WAM) and the weighted average life (WAL) of the portfolio [note 1]*

Restrictions may be tailored to reflect the level of risk associated with the funds' investment objectives. As an illustration, for the more conservative money market funds, the WAM should generally not exceed 60 days and the WAL should generally not exceed 120 days. [note 2]

[Note 1 reads] WAM is a measure of the average length of time to maturity of all of the underlying securities in the fund weighted to reflect the relative holdings in each instrument. It is used to measure the sensitivity of a money market fund to changing money market interest rates. WAL is the weighted average of the remaining life (maturity) of each security held in a fund. It is used to measure the credit risk, as well as the liquidity risk.

[Note 2 reads] Generally, the use of interest rate resets in variable- or variable-rate notes should not be permitted to shorten the maturity of a security for purposes of calculating WAL, but may be permitted for purposes of calculating WAM. Securities may have a shortened maturity due to unconditional put rights for purposes of both WAL and WAM, subject to conditions defined by the regulators.

With this in mind, we can consider the recent affirmation of the credit quality of two USD-denominated BMO funds by Fitch Ratings:[47] MATURITY PROFILE The funds seek to minimize interest rate and spread risks by limiting their weighted average maturities (WAM) and weighted average life (WAL) to 60 days and 120 days, respectively, consistent with Fitch's 'AAAmmf' rating criteria. As of June 15, 2012, BMO Prime Money Market Fund had WAM of 28 days and WAL of 57 days, while BMO Government Money Market Fund had WAM of 39 days and WAL of 63 days.

There is nothing egregiously horrible in the holdings of BMO Prime Money Market Fund as of October 31, 2012:[48] all holdings have an actual maturity within one year of the reporting date thereby meeting the basic definition of money market instruments, but the huge difference between the WAM and the WAL of the fund illustrates the importance of care when Credit Risk and Interest Rate Risk are significantly different.

The best example I can remember of such a difference arose on the transfer of a package of mutual funds from one Canadian fund company to another: the transfer of the Money Market Fund was not accepted by the receiving Portfolio Manager on the grounds that a portion of the holdings was comprised of 100-year Floating Rate Notes – and the PM wasn't in the mood for taking a 100-year view on credit quality within a money market portfolio for which he had responsibility.[49] In the end, the MMF which held the 100-year note had to be liquidated rather than transferred.

At any rate, the point of this digression is that even the regulators have discovered that there is a difference between Credit Risk and Interest Rate Risk for instruments that reset their pay-outs prior to maturity. Investors and their advisors have no excuse for not applying this distinction to the analysis of FixedResetpreferreds.

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[44] Canadian Securities Administrators, Notice of Amendments to National Instrument 81-102 Mutual Funds and Companion Policy 81-102CP and to National Instrument 81-106 Investment Fund Continuous Disclosure and to National Instrument 81-101 Mutual Fund Prospectus Disclosure and to National Instrument 41-101 General Prospectus Requirements, 2012-2-9, available on-line at http://www.osc.gov.on.ca/en/SecuritiesLaw_rule_20120210_81-102_noa-mutual-funds.htm (accessed 2012-12-5)

[45] A phrase that should freeze thy blood and make thy hair stand on end like quills upon the fretful porpentine.

[46] The Board of the International Organizations of Securities Commissions, Policy Recommendations for Money Market Funds, October 2012, available on-line at http://www.csrc.gov.cn/pub/csrc_en/affairs/AffairsIOSCO/201210/P020121010500138903810.pdf (accessed 2012-12-5)

[47] Reuters, TEXT-Fitch affirms 2 Bank of Montreal money market funds, 2012-6-29, available on-line at http://www.reuters.com/article/2012/06/29/idUSWNB211320120629 (accessed 2012-12-5)

[48] Available on-line at http://bmofundsus.rightprospectus.com/MMD/Fund.aspx?cu=572353100

[49] This happened, I believe, in the late 1990s at the dawn of the Internet and I haven't been able to find any references to refresh my memory. Any assistance in helping a forgetful old man will be much appreciated – even if it's just the name of the fund in question!

Liquidity

Addendum to November Table A-9 : Liquidity	
Average Daily Trading Value (per HIMIPref™)	**ZPR**
< 50,000	2.3%
50,000 – 100,000	9.9%
100,000 – 200,000	47.3%
200,000 – 300,000	20.4%
> 300,000	20.2%

Dividend Sustainability

As I have emphasized in previous discussion of FixedResets, the decline in the Government of Canada Five Year Yield (GOC-5) over time and the fact that many issues with a high Issue Reset Spread are likely to be called at the first opportunity (see Chart A-7, above) implies that dividends from this sector will probably decline as issues begin to move through their first Exchange Dates.

As might have been foreseen, ZPR is forecast to have a more severe decline in income over the next five years than any of the other funds examined but, it will be noted, this assumes an unchanged GOC-5. It is quite possible that an increase in GOC-5 will revert to more historical levels during the next five years and make a mockery of this prediction – as I mentioned in the last issue: *Some readers may remember that I have performed a similar exercise previously,[50] in the fall of 2006 when I projected a 10% decline in gross dividends for several funds over the next four years. Naturally, it wasn't too long after publication that the market dropped dramatically, it was no longer advantageous for the issuers to call the issues on the originally projected date, and gross dividends were relatively unaffected. Asset prices, of course, were another matter entirely.*

Addendum to November Table A-10 : Dividend Sustainability							
Fund	**Current Dividend**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
ZPR	100.00	99.95	96.81	89.74	83.67	79.66	77.31

Tax Effects

An issue that affects ZPR more than any of the other funds examined is the issue of effective tax rates.

As discussed in the March, 2010, edition of this newsletter (with an Excel Spreadsheet developed[51] to make the computations easier) high-premium FixedResets (actually, high premium issues of any kind, but the problem is pervasive and severe among FixedResets) have a problem due to differential taxation:

- The high coupon that gives rise to the premium to the premium is taxed annually
- The offsetting capital loss cannot be claimed until realized, which is assumed to be when the issue is called
- Investors may not even have the ability to claim the loss, as it can only be used to offset capital gains realized by other elements of an investment portfolio[52]

The third point is even worse when the loss is realized through a fund, as is the case with the potential for losses in ZPR, since the fund cannot pass Capital Losses through to its holders; therefore, these losses will be useful only in the event ZPR realizes capital gains, or to the extent that the taxpayer sells his holdings of ZPR on the market and realizes the capital loss in that manner (which is only useful to the extent offsetting capital gains are available).

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[50] See http://www.himivest.com/media/advisor_0610.pdf

[51] Available for download at http://www.prefblog.com/xls/resetTaxEffects.xls

[52] However, net capital losses may be used upon the demise of the taxpayer. For details, see Canada Revenue Agency, Preparing Returns for Deceased Persons 2011, available on-line at http://www.cra-arc.gc.ca/E/pub/tg/t4011/t4011-11e.pdf

Table DEC-2: Data for Computation of Tax Effects on Realized Yield of RY.PR.N, using Spreadsheet at **http://www.prefblog.com/xls/resetTaxEffects.xls**	
Data	**Value**
Current Price	26.25
Call Price	25.00
Settlement Date	2012-12-5
End-Date	2014-2-24
Quarterly Dividend	1.5625/4 = 0.390625
Cycle	2 (February, May, August, November)
Pay Date	24
Include First Dividend?	1 = "yes"
Reset Date	2014-2-24 [Irrelevant]
Quarterly Dividend After Reset	0.390625 [Irrelevant]
Marginal Tax Rate on Dividends	25.78%
Marginal Tax Rate on Capital Gains	21.85%

Tax Rates have been taken from http://www.ey.com/CA/en/Services/Tax/Tax-Calculators-2012-Personal-Tax which "reflects known rates as of 30 June 2012", for a BC resident with taxable income of $150,000 (accessed 2012-12-6)

Table DEC-3: Results of Tax-Effect Calculation for RY.PR.N from Data in Table		
Scenario	**Realized Yield on Call**	**Effective Tax Rate**
Non-Taxable	2.24%	0.00%
Taxable [Claim Capital Loss]	1.50%	33.06%
Taxable [No Claim of Loss]	0.63%	71.62%

One may conclude that although the tax effect is relatively small if the investor is able to claim the loss after the issue is called, the effective tax rate is extremely severe if the loss cannot be claimed.

Naturally, RY.PR.N is an extreme example, but it serves to illustrate one of the great weaknesses of Index Funds: when you buy the index, you are by design buying everything in the index, even if individual elements are grossly unsuitable. This is particularly aggravating with Fixed Income Index Funds – while one may argue that the Efficient Market Hypothesis serves to mitigate (or even eliminate, according to its more strident defenders) the utility of stock selection, the importance of differential taxation in the Fixed Income market means that different groups of investors can have wildly varying views on the desirability of any given investment that are firmly based on mathematical analysis.

Given the importance of capital losses for analysis of ZPR, I have attempted to estimate future prices by an elaboration of the simple algorithm for income introduced in the November issue. It will be recalled that: I then estimated the dividends that would be received on a new issue purchased at that time with the redemption proceeds using a very simple (too simple?) algorithm:

- 4.0% for issues rated Pfd-1(low)
- 4.5% for issues rated from Pfd-2(low) to Pfd-2(high)
- 5.0% for issues rated Pfd-3(high) and lower

I assume that dividends received in the year of redemption are a 50/50 mix of the current dividend and the future dividend calculated in accordance with this algorithm; after that date, dividends are received at the new rate.

If the YTW scenario involves a reset, rather than a call, the dividends are calculated according to the terms of the instrument, with a presumed Government of Canada 5-Year Yield (GOC-5) of 1.35%.

I then estimate the future price of the issue by assuming that the eventual price of the issue will be such that the Current Yield at the post-adjustment dividend rate will be equal to the 'new issue rate' specified above. Therefore, all instruments currently expected to be called are presumed to decline in price to $25 and remain there, while paying dividends at the indicated rate. However, instruments expected to be reset will decline in price until their reset dividend divided by the price (i.e., the Current Yield) is equal to the rate specified above.

This is, of course, a very crude estimate and sensitive to the presumed GOC-5, but it will suffice to give a rough indication of what we might expect. The most severe predicted loss of value is calculated for TRP.PR.B, which resets in 2015 at GOC-5 + 128bp. Calculations for expected dividend and price are shown in Table DEC-4.

Table DEC-4: Projected Dividend and Price for TRP.PR.B			
Year	**Calculated Dividend**	**Calculated Price**	**Calculated Current Yield**
Current	1.00	25.30	3.95%
2012	1.00	22.63	4.42%
2013	1.00	19.96	5.01%
2014	1.00	17.28	5.79%
2015	0.8284	14.61	5.67%
2016	0.6575	14.61	4.50%
2017	0.6575	14.61	4.50%

The projected price decline for TRP.PR.B seems very harsh – but it follows quite logically from some very reasonable assumptions. Applying this algorithm to each instrument in the ZPR portfolio and multiplying each year's projected price by the calculated August 31 weight (which, it will be remembered, is an arbitrary construct derived to be compatible with analyses of the other portfolios investigated in the November edition) results in the weighted-average-price projection for ZPR shown in Table DEC-5

Table DEC-5 : Projected Weighted Average Price of Portfolio Holdings for ZPR							
Fund	**Current**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
ZPR	25.44	24.29	23.14	22.38	21.80	21.48	21.40
ZPR (normalized to Current = 100)	100.00	95.48	90.98	87.98	85.70	84.45	84.12

A comparison with the projection of a decline in dividends on the portfolio from the current normalized figure of 100.00 to a projected 77.31 in 2017 leads to the conclusion that these numbers are all internally consistent – provided one agrees with the fundamental assumption of a constant GOC-5 of 1.35%, the projections seem quite reasonable. There will be some, of course, who have their own projections for GOC-5 … but, by and large, those confident individuals should be levering up massive bets in the futures market based on their projections, not fiddling around with boring preferred shares.

This projected decline in price implies a very substantial expected capital loss for the fund; investors who hold the fund through period of rapid substantial declines in 2012-2014 may be paying tax on excessive dividends while the capital losses remain on the books of the fund itself for quite some time before the fund makes offsetting capital gains. It will be remembered that in contrast to the equity market, there can be no expectation of significant capital gains in the fixed income market since instruments are issued at par and are eventually redeemed at par (or perhaps a little over, for some instruments, but not much and not often!).

This tendency, due to the current nature of the FixedReset market, may well be exacerbated by market-timing by investors, who may well buy high and sell low, which will in and of itself cause capital losses to accumulated in the fund.

Market Timing and Calculation of Returns

Mutual fund investors frequently indulge in market timing that is contrary to their own interests; as has been noted[53] in the case of equity funds: *The bear market of 2008 led to mass redemptions of equity funds just as those equity funds were primed for their best year of the decade.* Morningstar calculates "Investor Return" as the dollar-weighted return on mutual fund investments;[54] their figures[55] comparing these dollar-weighted return to time-weighted return for the five tumultuous years ending 2009-12-31 are shown in Table DEC-6.

Another company making an attempt to quantify the effects of investor behavior[56] is DALBAR[57], which attempted to explain the difference in its 2012 Report[58]: DALBAR claims that nine psychological factors are likely to be responsible for destroying investment returns and that they must be curbed to produce desirable results for investors:

1. **Loss Aversion:** Expecting to find high returns with low risk.
2. **Narrow Framing:** Making decisions without considering all implications.
3. **Anchoring:** Relating to the familiar experiences, even when inappropriate.
4. **Mental Accounting:** Taking undue risk in one area and avoiding rational risk in others
5. **Diversification:** Seeking to reduce risk, but simply using different sources.
6. **Herding:** Copying the behavior of others even in the face of unfavorable outcomes.
7. **Regret:** Treating errors of commission more seriously than errors of omission.
8. **Media Response:** Tendency to react to news without reasonable examination.
9. **Optimism:** Belief that good things happen to me and bad things happen to others.

Table DEC-6: Dollar-Weighted vs. Time-Weighted Returns for Five-Years Ending 2009-12-31 (per Morningstar)		
Asset Class	**Dollar Weighted Return**	**Time Weighted Return**
US Equity Funds	+0.64%	+0.91%
International Equity Funds	+3.27%	+5.23%
Balanced	+1.57%	+2.22%
Alternative	+5.48%	+3.03%
Taxable Bond	+3.22%	+3.89%
Municipal	+1.45%	+3.02%
All Funds	+1.66%	+2.38%

The attribution of the entire difference between Dollar Weighted Return and Time Weighted Return to investor timing decisions has been bitterly attacked[59] on the grounds that Time Weighted Return is not the proper baseline for an investor. Harry Sit claims[60] that the investor is just faithfully investing in an index fund for the long term using dollar cost averaging and that the presence of these cash flows introduces an element of Sequence of Returns risk:[60] if a constant amount is added to the portfolio annually, the dollar-weighted returns for a long-term period will be higher when the market return is higher at the end of the period. However, Mr. Sit simply asserts that dollar-cost averaging (with annual contributions, rather than annual withdrawals) is the correct baseline and offers no argument or evidence to support this view.

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[53] RusselKinnel, Bad Timing Eats Away at Investor Returns, Morningstar, 2010-2-15, available on-line at http://news.morningstar.com/articlenet/article.aspx?id=325664 (accessed 2012-12-8)

[54] Morningstar, Fact Sheet: Morningstar Investor Return, 2006-7-27, available on-line at http://corporate.morningstar.com/cf/documents/MethodologyDocuments/FactSheets/InvestorReturns.pdf (accessed 2012-12-8)

[55] Morningstar, How the Average Investor's Returns Compare with the Average Fund's, Data through 2009-12-31, available on-line at http://news.morningstar.com/PDFs/avginvret.pdf

[56] DALBAR, Quantitative Analysis of Investor Behavior 2012, available on-line at http://www.qaib.com/public/default.aspx (accessed 2012-12-8)

[57] http://www.dalbar.com/

[58] Cited by Glenn Szlagowski, DALBAR 2012 Report, 2012-4-10, available on-line at http://www.wealthadviser.ca/index.php/newsletters/133-dalbar-2012-report (accessed 2012-12-8)

[59] Harry Sit, DALBAR Study Overstates Investors' Bad Timing, The Finance Buff (blog), available on-line at http://thefinancebuff.com/dalbar-study-overstates-investors-bad-timing.html (accessed 2012-12-8)

[60] Harry Sit, Does the DALBAR Study Grossly Overstate the Behavior Gap?, 2012-10-3, available on-line at http://www.kitces.com/blog/archives/406-Does-The-DALBAR-Study-Grossly-Overstate-The-Behavior-Gap-Guest-Post.html (accessed 2012-12-8)

[61] I have frequently discussed Sequence of Returns Risk, most thoroughly in the April, 2011, edition of this newsletter, as well as in December, 2010. I have also discussed it in a recent article, It's all about sequence, available on-line at http://www.himivest.com/media/advisor_1209.pdf

Dan Hallett agrees[62] that DALBAR overstates the difference between dollar-weighted and time-weighted investment returns but on different grounds – the impression given by the DALBAR 2001 report that DALBAR calculates what it calls investor returns by applying dollar-weighted fund redemption rates to benchmark returns – rather than applying a DWRR calculation directly to the funds. Mr. Hallett prefers the Morningstar methodology – in which the DWRR is calculated according to fund returns, rather than benchmark returns, but notes that even that is an estimate because it's based on monthly data; and daily fund flows are required for a precise DWRR.

However, the overall conclusion remains – and has been echoed by formal academic papers[63] - the tendency of retail investors (who, of course, dominate the preferred share market, either through direct holdings or through investment vehicles which must reflect their purchase and sale decisions) to buy high and sell low may well exacerbate the clear bias towards a capital loss in ZPR that will not be claimable by the fund or its holders for a possibly quite lengthy period of time.

Digression: The Importance of Time-Weighted vs. Dollar Weighted Returns

It is important to understand the differences inherent in the two methodologies because the Canadian Securities Adminstrators are proposing[64] to make time-weighted reporting mandatory: We are proposing to mandate that registrants use the dollar-weighted method in calculating the percentage return on a client's account or portfolio, in order to promote consistency and comparability in investor reporting from one registrant to another.

We had previously considered permitting registrants to choose between a time-weighted and dollar-weighted performance calculation method. We have decided to mandate the dollar-weighted method because it most accurately reflects the actual return of the client's investments. This is in keeping with one of the main themes of the project -- allowing investors to measure how their investments have performed.

Time-weighted methods are generally used to evaluate the registrant's performance in managing an account, as the returns are calculated without taking into consideration any external cash flows. These methods isolate the portion of an account's return that is attributable solely to the registrant's actions. The philosophy behind time-weighted methods is that a registrant's performance should be measured independently of external cash flows, because contributions and withdrawals by an investor are out of the registrant's control.

The first paragraph shows that the regulators, quite simply, do not have the faintest idea of what they are talking about. Dollar-Weighting of investment returns will result in less comparability between advisors, rather than more, due to Sequence of Returns Risk.

Let us assume, for instance, that my father and I both have investments accounts, but with rather different cash-flows: I am saving for my retirement and making monthly deposits; he is financing his retirement and is making monthly withdrawals. We both have an advisor and we are both 100% invested in the same fund.

We compare our statements after a few years to determine who has the better advisor. Naturally, any rational methodology of calculating returns will give us precisely the same number: we have had precisely the same investment. However, those readers of this newsletter who have been paying attention will recognize that the soon-to-be-mandatory time-weighted method of calculation will almost inevitably provide us with very different numbers: his return will exceed mine if the fund had a greater return at the beginning of the period; my return will exceed his if the fund had a greater return at the end of the period.

How does this "promote consistency and comparability in investor reporting from one registrant to another"? It doesn't. In fact, it virtually assures that comparability is degraded, because while two clients may have very similar portfolio sizes and investment objectives, they may have very dissimilar cash flows – perhaps just because one likes to make withdrawals on the 15th of every month, while another withdraws their monthly expenses on the 1st.

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[62] Dan Hallett, Does DALBAR really calculate investor returns?, The Wealth Steward, 2011-4-16, available on-line at http://thewealthsteward.com/2011/04/does-dalbar-really-calculate-investor-returns/ (accessed 2012-12-8)

[63] E.g. Wolfgang Breuer and Olaf Stotz, Mutual Fund Flows and Extrapolative Investors' Expectations: The German Case, 2007-8-17, available on-line at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1007739 (accessed 2012-12-9)

[64] Canadian Securities Administrators, NOTICE AND REQUEST FOR COMMENT ON PROPOSED AMENDMENTS TO NATIONAL INSTRUMENT 31-103 REGISTRATION REQUIREMENTS, EXEMPTIONS AND ONGOING REGISTRANT OBLIGATIONS AND TO COMPANION POLICY 31-103CP REGISTRATION REQUIREMENTS, EXEMPTIONS AND ONGOING REGISTRANT OBLIGATIONS, June 14, 2012 (2nd Publication), available on-line at http://www.osc.gov.on.ca/en/SecuritiesLaw_rule_20120614_31-103_proposed-amendments.htm (accessed 2012-12-9)

Related objections were brought to the attention of the CSA in a comment letter from the Canadian GIPS Council,[65] the Alternative Investment Management Association[66] (which used the rather clever example of an RRSP account and a taxable account managed using precisely the same strategy having very different Dollar-Weighted returns), IA Clarington Investments,[67] CI Financial,[68] RBC,[69] Pacific Spirit Investment Management Inc.[70] (a rather interesting and, I think, unfounded claim that "A qualified CFA would likely be unable to deliver dollar weighted returns and comply withtheir professional code of conduct."), Heathbridge Capital Management Inc.[71] (comparability), Sun Life Financial[72] (cost and familiarity), Peak Investment Services[73] (complexity and cost), Scotia Capital[74] (comparability), Portfolio Management Association of Canada[75] (contrary to goal to "help investors understand and assess the costs and benefits of the advice they receive and assess the value of the advice added by the registrant."), Investment Industry Association of Canada[76] (comparability, cost), National Bank Securities[77] (comparability, cost), Greystone Managed Investments Inc.[78] (cost).

Supporting Dollar-Weighted return reporting were the Investment Planning Counsel,[79] (no reason given), Rogers Group Financial[80] (no reason given), Investors Group[81] (no reason given), OSC Investor Advisory Panel[82] ("This method best addresses the primary concern of investors, how their investments have performed net of deposits and withdrawals."), Advocis[83] ("most accurately reflects the actual return of the client's Investments"), Invesco[84] ("much more meaningful and relevant to an investor"), Steadyhand Investment Funds[85] ("relate more closely to the clients' experience and what they really want to know"), Mackenzie Investments[806] (no reason given).

I have not reported those comment letters which merely urge that firms be allowed to choose one or the other.

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[65] KarimManaa, Letter, 2012-9-7, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120907_31-103_manaak.pdf (accessed 2012-12-9)

[66] Ian Pember, Letter, 2012-9-12, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120912_31-103_pemberi.pdf (accessed 2012-12-9)

[67] Matthew Campbell, Letter, 2012-9-13, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120912_31-103_campbellm.pdf (accessed 2012-12-9)

[68] David C. Pauli, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_paulid.pdf (accessed 2012-12-9)

[69] David Agnew, Mark Neill, Wayne Bossert, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_agnesd.pdf (accessed 2012-12-9)

[70] John S Clark, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_clarkjs.pdf (accessed 2012-12-9)

[71] Richard M. Tattersall, Letter, 2012-9-13, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_tattersallr.pdf (accessed 2012-12-9)

[72] Afsar Shah, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_shaha.pdf (accessed 2012-12-9)

[73] Jean Carrier, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_carrierj.pdf (accessed 2012-12-9)

[74] Barbara Mason, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_masonb.pdf (accessed 2012-12-9)

[75] Portfolio Management Association, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_walmsleyk_mahaffys.pdf (accessed 2012-12-9)

[76] Investment Industry Association of Canada, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_alexanderm_walratha.pdf (accessed 2012-12-9)

[77] Michael Falk, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_falkm.pdf (accessed 2012-12-9)

[78] Jacqueline Hatherly, Letter, 2012-9-18, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120918_31-103_hatherlyj.pdf (accessed 2012-12-9)

[79] Chris Reynolds, Letter, 2012-9-13, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120913_31-103_reynoldsc.pdf (accessed 2012-12-9)

[80] Clay Gillespie, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_gillespiec.pdf (accessed 2012-12-9)

[81] Murray J. Taylor, Letter, 2012-9-13, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120913_31-103_taylorm.pdf (accessed 2012-12-9)

[82] Investor Advisory Panel, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_iap.pdf (accessed 2012-12-9)

[83] Greg Pollock, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_pollockg.pdf (accessed 2012-12-9)

[84] Eric Adelson, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_adelsone.pdf (accessed 2012-12-9)

[85] Tom Bradley, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_bradleyt.pdf (accessed 2012-12-9)

[86] Charles R. Sims, Letter, 2012-9-14, available on-line at http://www.osc.gov.on.ca/documents/en/Securities-Category3-Comments/com_20120914_31-103_simsc.pdf (accessed 2012-12-9)

Nested Digression: Cost of Mandatory Reporting of Dollar-Weighted Returns

I will also point out that I have very little patience with comment letters that merely cite "cost" as a reason for or against any given proposal without providing an estimate of cost.[87]

I agree (subject to confirmation by a proper mathematician) that there will be an increase in the preparation time of client statements if Dollar Weighted Return reporting becomes mandatory due to the nature of the mathematical problem to be solved. As discussed below, calculating this figure requires finding the roots of a polynomial of degree N, where N could be as large as 36,525, given a maximimumaccount life of 100 years and daily reporting of cash flows (if the Modified Dietz method is permitted, which would assume that all monthly cash flows for all accounts occur on one particular day, then the maximum degree of the polynomial will 'merely' 1,200).

The question of efficiency in solving such very high degree polynomials is one that is the subject of intensive research among mathematicians and computer scientists, having implications for cryptography among other things, and I regret that I am not enough of a mathematician to state firmly – or even opine on - just how quickly computation time will increase with an increase in the polynomial degree. However, J.B. Moore published[88] a chart over thirty years ago that is of interest and is shown here as Chart A-12. It may be seen that computation time increases significantly with increasing polynomial degree; further, with respect to investment industry calculation of Dollar Weighted Returns, it will be observed that the computation must be performed from scratch with every new statement; one cannot store January's result and use it to speed up February's!

This is in distinction to calculations of Time-Weighted Returns, which require only one computation per cash-flow plus one computation per period – thus, one can calculate the Time-Weighted Return on a monthly basis for an RRSP account with one cash flow per year with only thirteen calculations per year. Furthermore, these calculations can be stored and re-used when the period of computation is extended.

Chart A12

FIG. 3. (a) Performance data. (b) Solution of $z^n + 1 = 0$ for all zero

So, while I agree qualitatively with the statements of various commentators that cost – and time of preparation – will increase with mandatory Dollar Weighted Return reporting, I am at a loss to estimate the quantitative effect of such a change; and I assert that if one is going to use these increases as an argument against such mandatory reporting, it is necessary to provide a quantitative estimate. I will also note that CPU clock-cycles are not only incredibly cheap, but continue to get cheaper.

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[87] Not a single objection to the proposed rules on the basis of cost provided an estimate, or even an explanation, of the so-called increased cost

[88] J. B. Moore, A Consistently Rapid Algorith for Solving Polynomial Equations, J. Inst. MathsApplics (1976), available on-line at http://users.cecs.anu.edu.au/~john/papers/JOUR/043.PDF (accessed 2012-12-9)
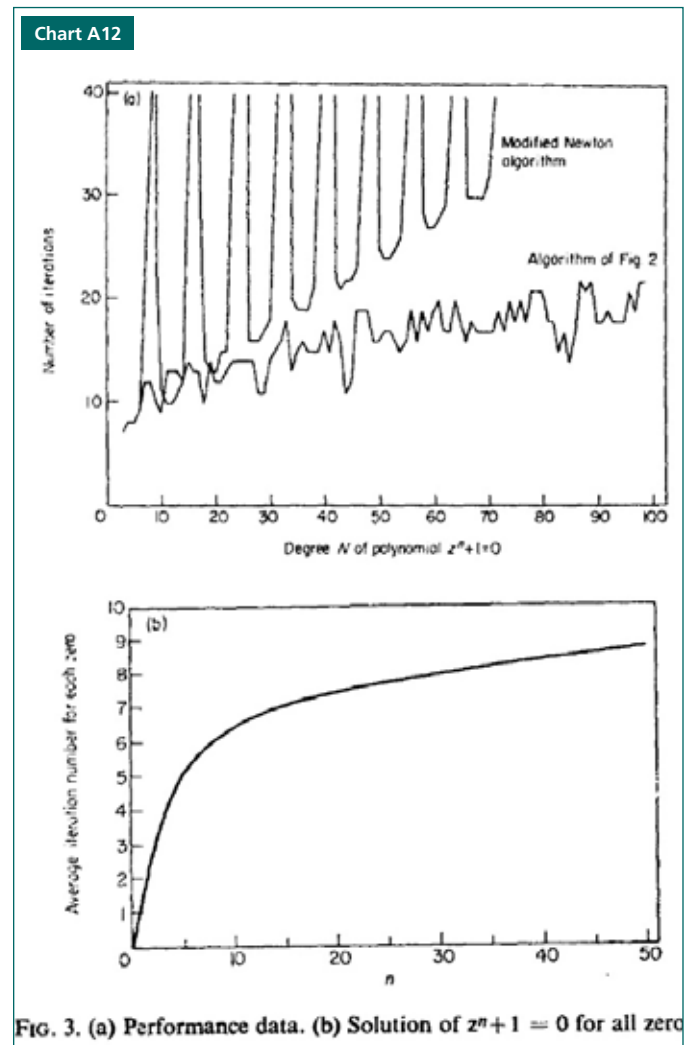
## Return to the Digression on Relative Importance of TWR vs DWR

Peter Ponzo points out[89] that the Internal Rate of Return (aka "Dollar Weighted Return") answers the question "What constant, annual, bank-like interest am I getting, considering various deposits and withdrawals at arbitrary times", and that[90] it is calculated by determining the roots of a polynomial equation, e.g.:

If the cash flows are A_1, A_2, ... A_N which are invested for times T_1, T_2, ... T_N, then
$f(R) = A_1(1+R)T + A(1+R)T^2 + A_3(1+R)T_3 + ... + A_N(1+R)T_N - P = 0$
where P is the current portfolio balance. That defines the annualized return(s), **R**.

As we all remember from high-school math, however, a polynomial of such a form will have multiple roots – i.e., it will cut the y axis at more than one value of x, as illustrated for the third degree polynomial in Chart A-9.

In his example, he considers the case in which the client account has the cash flows shown in Table DEC-6.

Time	Action
4 Years ago	Initiate account with deposit $10,000
3 Years ago	Withdraw $10,000
2 Years ago	Withdraw $10,000
1 Year ago	Deposit $10,000
Now	Account Value is $1,000

Chart A11

Error *versus* Return(s)
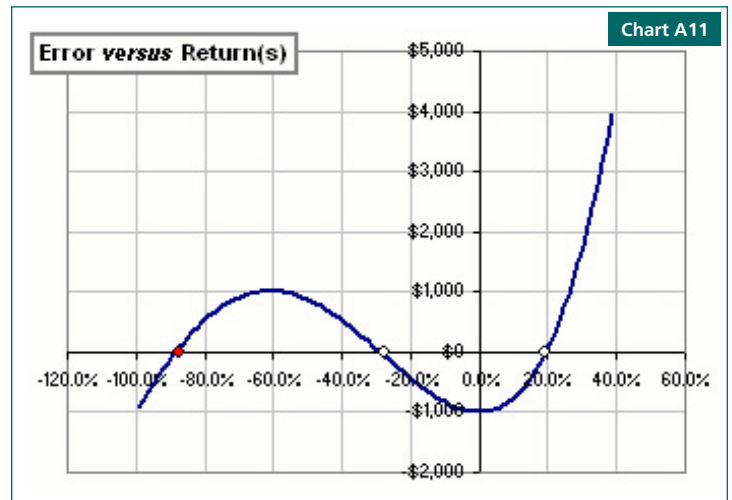
Obviously a very volatile account! The initial return must have been very high, to allow two successive withdrawals of $10,000 after an initial deposit of only $10,000; additionally, the final year's return must have been horrible, given that only $1,000 is left at the next measurement following a deposit of $10,000. However, this is just an example, chosen to illustrate the problems, which arise when we insist that the returns meet the Dollar-Weighted return calculation assumption of a constant rate of return applied to all deposits and withdrawals. We therefore find we are forced to solve the following equation:

$f(R) = 10,000(1+R)^4 - 10,000(1+R)^3 - 10,000(1+R)^2 + 10,000(1+R) - 1,000 = 0$
where **R** is the annualized rate of Return

We find to our surprise that there are three solutions: -88.56% and -28.58% and +19.52%.
Each of those three numbers is a perfectly valid Dollar Weighted annualized rate of return derived from the input data.

Naturally, the above example is extreme, but it's great fun to play with the numbers and to "reverse-engineer" a sequence of cash flows that will result in less different, but quite significant, multiple roots to the Dollar Weighted equation. As I wrote on an Internet forum[91] some time ago:
*(x-1.09) * (x - 1.10) * (x-1.11) = x^3 - 3.3x^2 + 3.6299x - 1.33089*
So:
March, 2000 : deposit $1K
March, 2001 : withdraw $3,300
March, 2002 : deposit $3,629.90
March, 2003 : portfolio value $1,330.89

Portfolio return is 9%, 10% or 11%, whatever you like.

[89] Peter Ponzo (aka Gummy), Return on Investment, available on-line at http://www.financialwebring.org/gummy-stuff/Return-on-Investment.htm (accessed 2012-12-9)
[90] Peter Ponzo (aka Gummy), Portfolio Return(s), available on-line at http://www.financialwebring.org/gummy-stuff/multiple-returns.htm (accessed 2012-12-9)
[91] http://www.financialwebring.org/forum/viewtopic.php?f=4&t=103793
[92] Peter Ponzo (aka Gummy), Portfolio Returns … With Additional Information!, available on-line at http://www.financialwebring.org/gummy-stuff/multiple-returns.htm (accessed 2012-12-9)

More reasonable patterns of hypothetical annual cash flows can be constructed by saying that – for instance – two of the roots are negative. And, as always, each of those three numbers is a perfectly valid Dollar Weighted annualized rate of return derived from the input data. As Dr. Ponzo points out to conclude his discussion[92] the calculation of Time Weighted Return, with its requirement for knowing the portfolio value on every cash-flow date, eliminates the ambiguity.

Knowledge that Internal Rate of Return equations are can have multiple roots is now beginning to trickle into undergraduate studies.[93] We can only hope that someday it will trickle into the regulatory process.

Investment Conclusions

An Exchange Traded Fund focussing on FixedResetpreferreds is a very good thing; it allows knowledgeable small investors wanting to narrow their investment focus while retaining the benefits of very wide diversification at low cost. However, in the present environment, there are unpleasant projected tax effects from an investment in ZPR, in addition to a projected decline in future distributions that may come as surprise to the unwary. Additionally, the overall credit quality of the index and, therefore, of the fund, is low relative to most alternative preferred share pooled investments.

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[92] Peter Ponzo (aka Gummy), Portfolio Returns … With Additional Information!, available on-line at http://www.financialwebring.org/gummy-stuff/multiple-returns.htm (accessed 2012-12-9)

[93] Jeng-Hong Chen, Finding Multiple Internal Rates of Return For A Project With Non-Conventional Cash Flows: Utilizing Popular Financial/Graphing Calculators And Spreadsheet Software, College Teaching Methods & Styles Journal – September 2008, available on-line via http://www.google.ca/url?sa=t&rct=j&q=computation%20time%20of%20irr&source=web&cd=14&ved=0CD4QFjADOAo&url=http%3A%2F%2Fwww.journals.cluteonline.com%2Findex.php%2FCTMS%2Farticle%2Fdownload%2F5569%2F5652&ei=11DEUIKmFqK_yQGE2oGACA&usg=AFQjCNEY2pnbibvB0kx6TxCeaspM5TvWYg