FixedReset Notes

The Economic Backdrop to FixedReset Pricing

It must always be remembered that FixedResets are perpetual preferred shares[1] and that while the periodic resets in the dividend rate mitigate interest rate risk, they do nothing to mitigate credit risk.[2] While many FixedResets were issued during the Credit Crisis at wildly inflated spreads over Canadas, many have spreads that are more reasonable from a long term perspective – although recent new issues have come with spreads reminiscent of the wild days of 2008–09! There is no reason to believe that lower-spread issues will ever be called[3] – and if market conditions and credit quality should move against the holder, there is no reason to believe that these issues will trade near par.

There have been major changes in the data used to calculate the Yield-to-Worst (YTW) of FixedResets: the Government of Canada Five Year Yield (GOC5) fell to low levels[4] in the period August 2011 to May 2013 (to the point where it was deemed to be "financial repression"[5]) but fears of "tapering" by the US Federal Reserve[6] (that is, a reduction of their $85-billion monthly bond buying programme) in early summer, 2013, caused all but policy yields to rise sharply. However, the realization that the economy was not particularly strong in Canada[7] contributed to a reduction in GoC yields from their September, 2013, highs. Some commentators emphasized that global inflation was nowhere to be seen[8] (fears of extended European deflation were widespread[9] and the hot new financial indicator measured how much European sovereign debt traded at negative yields[10]). In late 2014 a precipitous drop in the price of oil[11] helped government bond yields to drop in Europe,[12] the US,[13] and Canada,[14] fuelling deflation fears.

In Canada, persistently poor employment numbers[15] (particularly when contrasted with impressive US figures[16]) exacerbated the ill effects of a decline in oil prices and led to a cut in Bank of Canada overnight rate on January 21, 2015.[17] Yields on Canadian government bonds immediately plunged[18] from levels that were already at an all-time low.[19] Globally, negative policy rates in Sweden[20] Denmark and Switzerland and the European Community[21]

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1 See *Taxonomy of Preferred Shares* at http://www.prefletter.com/taxonomy.pdf

2 In fact, if they did have a mechanism to address credit risk – such as, for instance, an adjustment to the dividend based on the credit rating of the issuer – then banks, insurers and insurance holding companies would not be able to include them in Tier 1 Capital.

3 Unless they are subject to the NVCC rules and are non-compliant – see the appendix dealing with DeemedRetractibles

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12 David Goodman, *Moribund Inflation Igniting Dash for Bonds From Europe to U.S.*, Bloomberg, 2014-12-12, available on-line at http://www.bloomberg.com/news/2014-12-12/moribund-inflation-igniting-dash-for-bonds-from-europe-to-u-s-.html (accessed 2014-12-13)

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14 Cecile Gutscher and Jacqueline Thorpe, *Fidelity's Wolf Predicts Canadian Bonds to Rally Further*, Bloomberg, 2014-12-10, available on-line at http://www.bloomberg.com/news/2014-12-10/fidelity-s-wolf-positions-for-extended-bond-rally-canada-credit.html (accessed 2014-12-13)

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fuelled deflation fears even while questions swirled about the prospects for Fed tightening in 2015.[22] In April, 2015, however, these deflation fears largely dissipated[23] leading to what has been termed a "global bond rout"[24] leading to a sharp rise in Canadian bond yields, which was partially reversed in early July due to concerns about a possible messy Greek exit from the Euro[25] and an equity melt-down in China[26] exacerbated by forecasts of continuing slow growth in Canada.[27] Most recently, the Chinese devaluation of the Yuan has been referred to as a method of 'exporting deflation',[28] which implies pressure for global yields to be lower than otherwise; the IMF has warned that problems in China could lead to a much weaker outlook for global growth.[29]

The Fed has finally implemented plans to increase US policy rates;[30] payroll data continues to be excellent,[31] and another hike is expected in 2016[32] with encouraging wage growth[33] thought to have bolstered prospects for an increase at the June meeting[34] until a poor June jobs number[35] and renewed global uncertainty[36] indicated that further delay is probably on order.

Concerns about China[37] and low oil prices[38] increased speculation that the next Bank of Canada move may be a rate cut,[39] but fiscal stimulus in the 2016 federal budget appears to have reversed those expectations;[40] recent data provide a mixed view of the economy.[41] The market's deflationary mindset was given encouragement by Japan's entry into the group of countries with negative policy rates,[42] which has renewed speculation that Canada will eventually join the club[43] and even some talk (quickly labelled premature by a Fed governor) that the US will follow that path.[44]

After all the chopping and changing, the GOC5 rate used to calculate Yield-to-Perpetuity for FixedResets is now 0.76%,[45] an 18bp increase from the rate used in August.

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45 I use data from CBID at http://www.pfin.ca/ which currently uses the Canada 0.75% of 2021-9-1 as the source of its "Five Year" yield. Other sites, such as http://www.investing.com/rates-bonds/canada-5-year-bond-yield-historical-data and the Bank of Canada itself, are also currently using this bond, but differences do arise from time to time. Note that the choice of benchmark is a relatively arbitrary decision (see http://prefblog.com/?p=27931) which is why competent Central Banks use a mathematical model to derive an estimated coupon on a notional bond priced at par with exactly five years until maturity (see http://www.federalreserve.gov/releases/h15/current/#fn10)

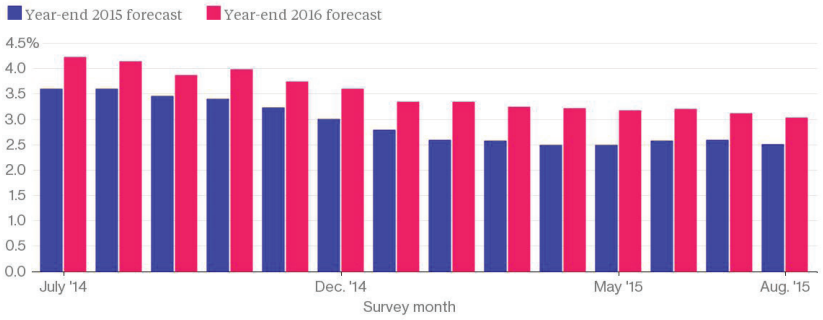
There are, as always, a lot of cross-currents, but for what it's worth, I feel that all short-term influences have been overblown: the real problem is in the real economy and some forecasts have relatively high levels of unemployment remaining until 2018,[46] (the Bank of Canada suggested[47] that the "Canadian economy can be expected to return to full capacity … around mid-2017"; this forecast was reiterated by Bank of Canada Governor Stephen Poloz in a December, 2015, speech,[48] but the forecast was tempered at the January, 2016, meeting, to "around the end of 2017"[49] and reiterated at the April meeting to "the second half of 2017"[50]) with Canada significantly underperforming the US;[51] at the July 2016 meeting the forecast reverted to "towards the end of 2017."[52] I do not, however, recommend that readers indulge in any market timing based on this or any other economic forecast[53] … by way of illustration, Chart FR-1 shows the evolution of market forecasts of the ten-year Treasury yield for the end of 2015 and 2016.[54] On the other hand I believe that it is unsustainable for the five year Canada to yield less than inflation,[55] and there are worries in high places regarding the distorting effects such yields can have on the real economy.[56]

Chart FR-2 shows the history of the five-year Canada bond rate and of three-month Treasury Bills since the turn of the century, while Chart FR-3 shows the spread between the two.

FR-1

Treasury 10-Year Yield Forecasts

Economists have marked down projections amid signs of tepid global growth and weak inflation



Source: Economist forecast data compiled by Bloomberg

Bloomberg

[46] Tavia Grant, *Look for a little more economic drama for Canada in 2014*, Globe & Mail, 2014-1-1, available on-line at http://www.theglobeandmail.com/report-on-business/economy/look-for-a-little-more-economic-drama-for-canada-in-2014/article16157258/ (accessed 2014-1-11) and Tavia Grant, *Private sector pummelled as Canada sheds 11,000 jobs in August*, Globe & Mail, 2014-9-5, available on-line at http://www.theglobeandmail.com/report-on-business/economy/jobs/canada-jobs-story/article20359085/ (accessed 2014-9-13)

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[48] Stephen S. Poloz, *Prudent Preparation: The Evolution of Unconventional Monetary Policies*, Speech, 2015-12-8, available on-line at http://www.bankofcanada.ca/2015/12/prudent-preparation-evolution-unconventional-monetary-policies/ (accessed 2015-12-12)

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[50] Bank of Canada, *Bank of Canada maintains overnight rate target at ½ per cent*, Press Release, 2016-4-13, available on-line at http://www.bankofcanada.ca/2016/04/fad-press-release-2016-04-13/ (accessed 2016-5-21)

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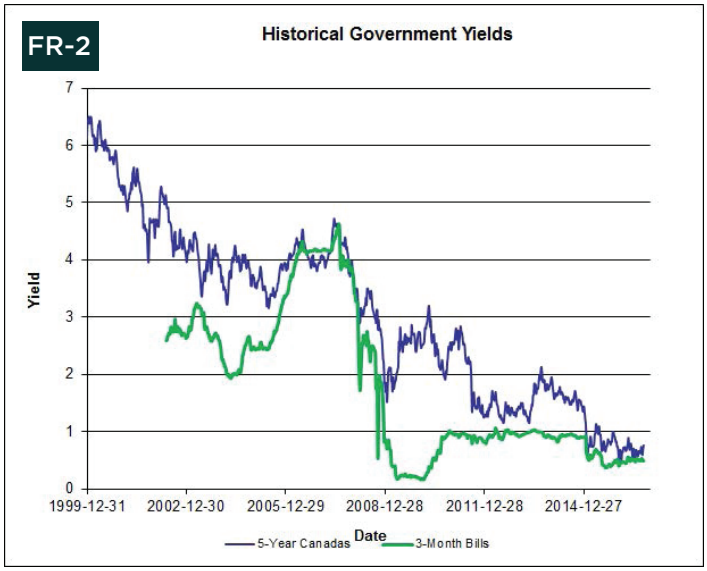
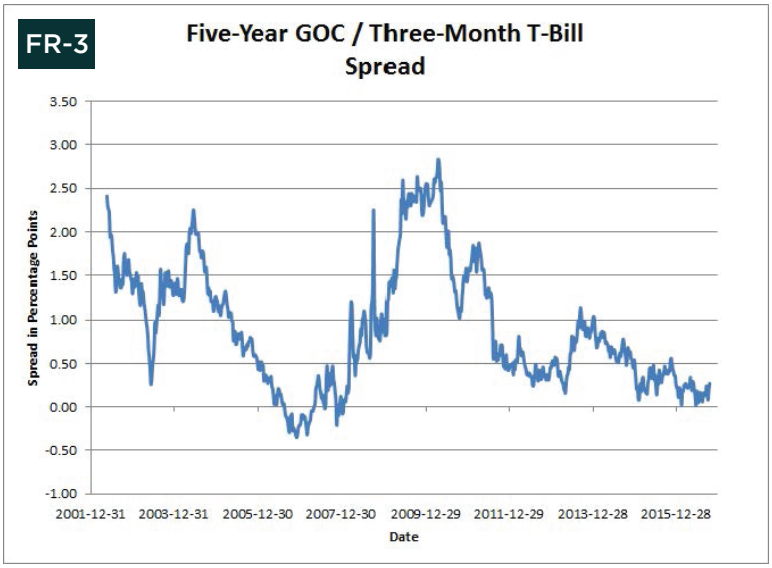
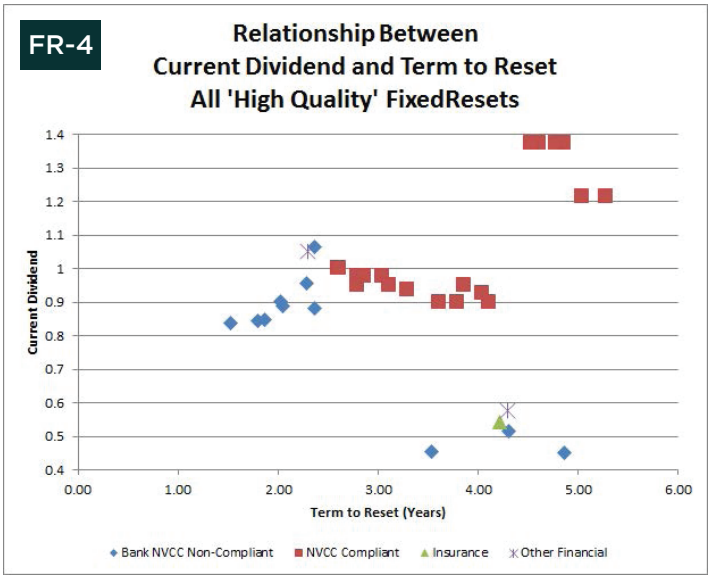


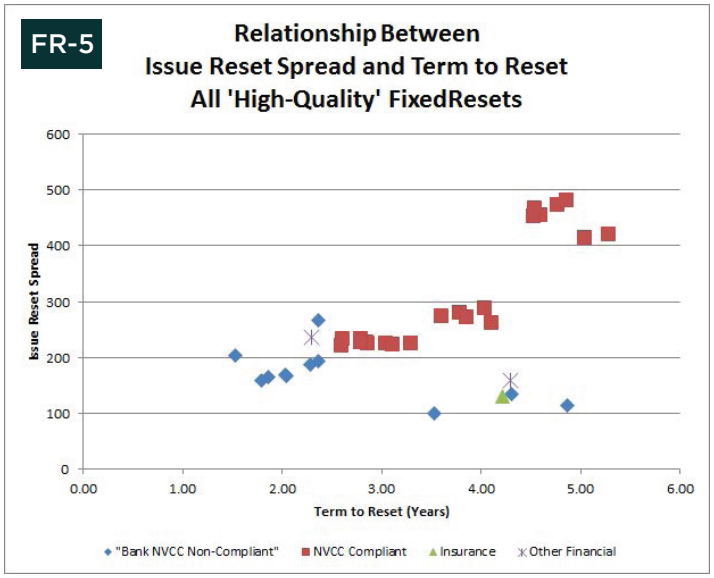


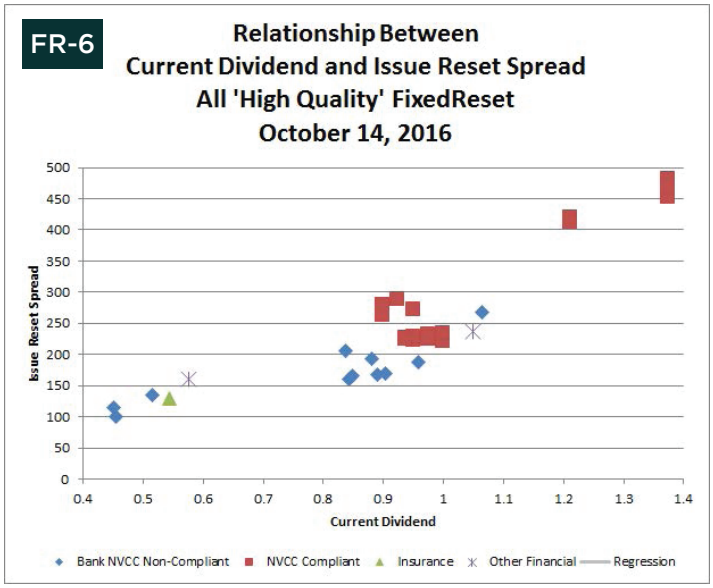
Extant FixedResets were almost all issued when the GOC5 was higher than the current level and the Issue Reset Spreads were calculated such that the dividend yield would remain constant if the GOC5 remained constant (albeit with a certain amount of sleight of hand – the initial term to reset is usually somewhat in excess of five years and occasionally as much as six and a half years – which has the advantage of using a longer-term, higher-yielding, bond to calculate the Issue Reset Spread).

The initial determinants of both Current Dividend and Issue Reset Spread has been the state of the credit markets at time of issue, but this influence is becoming less clear with the passage of time, as some issues are called and the others intermingled with new issues, as illustrated by Charts FR-4 and FR-5.

The intermingling, however, is offset by the effects of recent resets (at very low spreads and GOC-5 levels) and recent new issues (with very high spreads and initial dividends) and a correlation between the two variables has been re-established., as displayed in Chart FR-6.







Digression: BAM.PF.E

One problem with correlations between current dividends and Issue Reset Spreads arises from issuers playing games with the initial term to select a more favourable bond that will be used as the basis for setting the spread; this problem will persist until, with the passage of time, a large majority of FixedResets have been reset.

This effect is well illustrated by BAM.PF.E[57], issued in March, 2014, which is a FixedReset, 4.40%+255. It is reasonable to assume that the initial dividend of 4.40% was considered the most important thing by the underwriters who had to distribute these things and that this 4.40% rate would have been very difficult to change if the issue was to meet the requirements of both investors and issuer. There is more flexibility with the Issue Reset Spread, though, given the market's lamentable obsession with the less important initial coupon. On the day this issue was announced the Canada five-year rate was 1.67%, so one might think that the issue would be 4.40%+273 with a five year initial term. However, the seven year rate at that time was 1.98%, so it might have been possible to issue at 4.40%+242. That's a significant difference! However, it is my belief that the underwriters, as a matter of policy, prefer to keep the FixedReset class of shares reasonably homogeneous (there are already enough complaints about how complicated preferred shares are![58]) and limit the initial term on such offerings to about six and a half years.

As I stated in the March, 2010, edition of this newsletter (regarding another BAM issue): *An unusual feature of the financing was the relatively long term until the first exchange date: the press considered[59] this to be an unusual move because:* BAM was asking investors to lock in at 5.4 per cent for six and a half years. That may seem a subtle difference, but 18 months represents a 30 per cent extension on the dividend rate on this issue.

BAM was trying to nail down financing at a time when interest rates are near historic lows. How did investors respond? After all, they were being asked to make a longer commitment, at a time when interest rates seem likely to rise in the future.

This commentary illustrates one misconception regarding FixedResets: the length of the commitment. Many who should know better regard them as five year instruments, but it is only the dividend that is reset, not the principal. The commitment is perpetual, just as with straights.

The commentary also puts misplaced emphasis on the rationale behind the unusually extended time prior to the first reset: it is almost certainly not to provide Brookfield with greater certainty with respect to its financing costs – although that is consideration – but rather to allow a lower reset while maintaining a few scraps of integrity in the standard FixedReset structure.

[57] See discussion at http://prefblog.com/?p=24603

[58] I have never understood how something can be described as complicated when you can get the answer by looking it up in the prospectus, but I don't understand a lot of things

[59] Andrew Wills, *Brookfield re-writes rules on preferred shares*, Globe and Mail, 2010-1-6, available on-line at http://www.theglobeandmail.com/blogs/streetwise/brookfield-re-writes-rules-on-preferred-shares/article1420756/ (it appears that this link is no longer operable)

More Digression: BCE.PR.K

An even better, although more dated example is BCE.PR,K, which was announced[60] in June, 2011, as a FixedReset, 4.15%+188. Five year Canadas were trading at about 2.20% at that time.

The master-stroke was the announcement[61] six months later of a reopening of this issue, when the term to the first Exchange Date was almost exactly five years. At that time, five year Canadas were trading at about 1.33%, so an issue with an initial dividend of 4.15% should have come with an Issue Reset Spread of about 280bp, not the actual 188bp.

Despite my protestations on PrefBlog,[62] the issue did well, with the entire $250-million offering and the $30-milllion greenshoe option being taken up by the underwriters.

This episode illustrates the complete indifference exhibited by investors at that time to the effects of the Issue Reset Spread. BCE.PR.K is now bid at 14.19 with a calculated yield of 4.87% to perpetuity, in line with other BCE issues.

Calls Are (Almost) Always Bad For the Holder!

It must also be remembered that the issuer's call option is a Bad Thing – all else being equal, investors should generally seek minimize the likelihood of an eventual call.[63]

Some time ago I received an eMail from a client that said, in part: *There are quite a few fixed resets from Enbridge to choose from, but the best to me at this time appears to be ENB.PR.D. It has a 227 reset spread with about 4 years to reset. If it's redeemed (a crap shoot for sure) the Yield to Reset would be about 5.15%. The Current Yield is about 4.17% and the 30 year Limit Maturity Yield to Worst is about 4.18% (using a 1.64% GOC5 yield).*

This actually seems like a better deal than adding to the PrefLetter recommended CIU.PR.C (acknowledging the change in rating). I would realize a much better long term YTW (~ 4.18% vs ~ 3.76%), with a chance of a nice capital gain if called in 4 years. CIU.PR.C seems to have impossibly low volume, often high bid/ask spreads, a very low reset spread (136bp vs 237bp) almost guaranteeing it to be reset and perpetual in 2 years (with its drop in dividend and subsequent drop in share price), cementing a fairly low YTW of 3.76% for the long term.

Barring violent changes in market conditions and creditworthiness of the two companies[64], the client was quite correct in his assumption that ENB.PR.D is much more likely to be called than CIU.PR.C, although the chance of either being redeemed were slim. However, this is a circumstance that favours the lower-spread issue, CIU.PR.C.

A call of ENB.PR.D will almost certainly mean that market conditions have changed such that Enbridge can refinance at a lower spread; that is, that market spreads will be significantly below its Issue Reset Spread of 237bp, a decline of market spreads from current levels.

As market spreads decline, both issues will gain in price; but as the price of ENB.PR.D approaches and eventually exceeds $25, its rate of increase will slow. When market spreads are well below 237bp (e.g., if Enbridge could issue new FixedResets with a spread of 200bp over Five Year Canadas), a call of ENB.PR.D will become a virtual certainty, and the price of ENB.PR.D will become almost insensitive to market conditions – and throughout all the slowing and eventual halt of price appreciation of ENB.PR.D, the lower-spread CIU.PR.C will continue to appreciate in price with all of its initial price sensitivity (until spreads start getting close to its Issue Reset Spread of 136bp).

Thus we can say that in market conditions that will give rise to ENB.PR.D achieving its windfall gain through being called, it should be possible for holders of CIU.PR.C to achieve a greater gain by selling into the market.

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60 BCE Inc, *BCE announces $300-million offering of cumulative redeemable first preferred shares, series AK,* Press Release, 2011-6-20, available on-line at http://www.bce.ca/news-and-media/releases/show/2011-06-20-2011-06-20-2011-06-20-2011-06-20-bce-announces-300-million-offering-of-cumulative-redeemable-first-preferred-shares-series-ak?page=1&perpage=10&year=2011&month=6&keyword= (accessed 2014-5-10)

61 BCE Inc., *BCE announces $250 million additional offering of cumulative redeemable first preferred shares, series AK,* Press Release, 2011-12-12, available on-line at http://www.bce.ca/news-and-media/releases/show/bce-announces-250-million-additional-offering-of-cumulative-redeemable-first-preferred-shares-series-ak?page=1&perpage=10&year=2011&month=12&keyword= (accessed 2014-5-10)

62 See http://prefblog.com/?p=17291

63 This general rule does not apply when one is purchasing premium issues with the expectation and desire that they will be called.

64 In fact, Enbridge recently announced some very shareholder-friendly restructuring plans (see http://enbridge.com/~/media/www/Site%20Documents/Investor%20Relations/2014/ENB_Dec_2014_Dividend_Increase_NewsRelease.pdf?la=en) which were met with disapproval from Moody's (see https://www.moodys.com/research/Moodys-Affirms-Enbridge-and-subsidiary-ratings-outlooks-changed-to-negative--PR_314257), S&P (see http://www.standardandpoors.com/prot/ratings/articles/en/us?articleType=HTML&assetID=1245378255128) and DBRS (see http://dbrs.com/research/274696/dbrs-places-enbridge-inc-enbridge-pipelines-inc-and-enbridge-income-fund-under-review-with-developing-implications.html)

Sharp-eyed readers will have noticed the word 'almost' in the heading of this section, and similar weasel-words are sprinkled throughout this section. The most common reason for relative call probabilities between issuers to change is simply a change in the credit quality of one or both of the issuers; the above reasoning will not apply if CIU should become significantly more creditworthy while ENB falls on hard times.[65] More dramatically and less frequently, a company may exercise its call privileges even when this is not economically rational; this has occurred sometimes in corporate reorganizations in which the company simply does not want to leave preferred shares outstanding[66] (or to let them vote on a plan of arrangement). Another mechanism is changes in regulation, as is happening with bank issues right now (and should be happening with insurance issues!) as discussed at length in the appendix dealing with DeemedRetractibles. These intermittent occurrences should be treated as surprise gifts however and should not be relied upon as a standard element of security analysis.

Dividends and Reset Spreads

Since the GOC5 has in fact declined substantially since FixedResets became popular, the currently presumed dividend rate on reset has also declined; this creates a tendency for the YTW scenario to be that in which the issue is never called.[67] Chart FR-7 plots the current dividend for all high quality FixedReset issues against their expected dividend on reset, given a constant GOC5 yield of 0.76%. Changes in GOC5 will move each point on the graph by a constant vertical increment. As will be seen, the expected decline in dividends, which began to have an effect on market pricing in December 2012, when it was noticed by retail and became an important factor in performance.

Chart FR-8 repeats the exercise for lower-quality issues, restricted to those for which the YTW Scenario is existence to perpetuity. Some of the expected dividend drops are quite substantial; the greatest expected drop in percentage terms is BAM.PR.X which has a current dividend of $1.15 (4.60% of par), currently expected to drop to (0.76%+180bp)*25 = 2.56% * 25 = $0.64 when it resets on June 30, 2017, a 44% decline. It is also of interest to note that the most severe percentage reductions in this group over the next five years are expected to occur sooner rather than later, as illustrated in Chart FR-9.

The collapse in prices of FixedResets with low Issue Reset Spreads that has occurred since December, 2014, indicates a market realization that a return of government policy rates (and therefore, to a large degree, of the GOC five-year rate) to more historically normal levels will not necessarily occur in the near future, either in Canada[68] or the US[69]; that the issuers may well leave many issues outstanding based on the Issue Reset Spreads; and that therefore dividend yields on the issues outstanding may drop (Chart FR-7). This was probably triggered by the 29% reduction in dividend on the widely held TRP.PR.A[70] announced in early December, 2014, although a reduction on such scale had surely been one of the less challenging forecasts for the prior six months. There is always somebody who gets the news last, though! John Heinzl published the fruits of an interview with me in the Globe on March 31, 2015, addressing the future changes expected in FixedReset dividends[71] and the market promptly collapsed; one commenter thought[72] there might be a connection: *an article in the Globe and Mail earlier this month with the sensationalist heading "Think preferred dividends are safe? Wrong" may have led some individual investors to sell their holdings. The article didn't present any new information, in our opinion, but it may have caused some investors to wake up to the problems with the rate reset structure and some particular issues*.

If a pattern of over-reaction to actual and foreseen dividend changes is ultimately established, there may be opportunities over the next few years to buy underpriced issues, given the very large population of issues with expected dividend cuts (see Charts FR-7 and FR-8),[73] although at this point the market has discounted the effects of projected cuts.

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65 As is, in fact, currently happening, at least as far as credit quality is concerned. See http://prefblog.com/?p=29577

66 As happened with TLM.PR.A after the plan of arrangement with Repsol; Talisman Energy Inc., *Repsol to Acquire Talisman Energy for US$8.00 Per Common Share In All-Cash Transaction*, Press Release, 2014-12-16, available on-line at http://talismanenergy.mwnewsroom.com/press-releases/repsol-to-acquire-talisman-energy-for-us8-00-per-common-share-in-all-cash-trans-tsx-tlm-201412160984226001 (accessed 2015-1-10); Talisman Energy Inc., *Talisman Announces Completion of the Acquisition by Repsol*, Press Release, 2015-5-8 available on-line at http://talismanenergy.mwnewsroom.com/press-releases/talisman-announces-completion-of-the-acquisition-by-repsol-tsx-tlm-201505081006106001 (accessed 2015-5-9); more recently, REI.PR.A was the lucky 'lottery ticket' for a company that simply did not wish to leave its preferreds outstanding: RioCan Real Estate Investment Trust, *RioCan Real Estate Investment Trust Announces Redemption of Cumulative Rate Reset Preferred Trust Units, Series A*, Press Release 2016-2-2, available on-line at http://investor.riocan.com/English/investor-relations/press-releases/press-release-details/2016/RioCan-Real-Estate-Investment-Trust-Announces-Redemption-of-Cumulative-Rate-Reset-Preferred-Trust-Units-Series-A/default.aspx (accessed 2016-2-13); for discussion, see http://prefblog.com/?p=32248 This is also happening with RON.PR.A/RON.PR.B: Lowe's Companies, Inc., *Lowe's Agrees to Acquire Rona's Preferred Shares for C$24 Per Share*, Press Release, 2016-10-7, available on-line at http://phx.corporate-ir.net/phoenix.zhtml?c=95223&p=irol-newsArticle&ID=2210113 (accessed 2016-10-15)

67 For investment grade issues, this effect was swamped by the fact that most of the top-rated issues came from banks during the Credit Crunch – the enormous spreads at that time ensured that for such issues, a call at the first opportunity was overwhelmingly likely for most of their lives. However, the number of outstanding issues to which this applies has dwindled to almost none.

68 Bank of Canada, *Bank of Canada maintains overnight rate target at 1 per cent*, Press Release, 2013-3-6, available on-line at http://www.bankofcanada.ca/2012/12/press-releases/fad-press-release-2012-12-04/ (accessed 2013-3-9). See also the reference to bearish predictions by Julie Dickson, OSFI, Revised Transcript of Question and Answer Session, KPMG 21st Annual Insurance Issues Conference, December 12, 2012, available on-line at http://www.osfi-bsif.gc.ca/app/DocRepository/1/eng/speeches/jd20121212_e.pdf (accessed 2013-1-12) and commentary by Gordon Isfeld, Bank of Canada softens stance, but rate hike still on horizon, Financial Post, 2013-3-7, available on-line at http://business.financialpost.com/2013/03/06/bank-of-canada-holds-rates-softens-tone-on-future-hikes/ (accessed 2013-3-9)

69 Federal Reserve, *FOMC Statement*, Press Release, 2012-12-12, available on-line at http://federalreserve.gov/newsevents/press/monetary/20121212a.htm (accessed 2012-12-15)

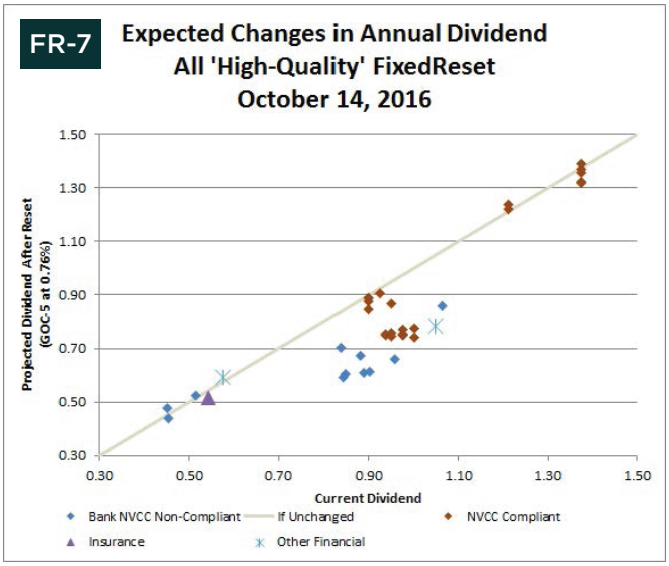
70 TransCanada Corporation, *TransCanada Provides Series 1 Preferred Shares Conversion Privilege and Dividend Rate Notice*, Press Release, 2014-12-2, available on-line at http://transcanada.com/news-releases-article.html?id=1901717&t= (accessed 2014-12-13)

71 John Heinzl, *Think preferred dividends are safe? Not these ones*, Globe & Mail, 2015-3-31, available on-line at http://www.theglobeandmail.com/globe-investor/investment-ideas/strategy-lab/dividend-investing/think-preferred-dividends-are-safe-wrong/article23722085/ (accessed 2015-5-9)

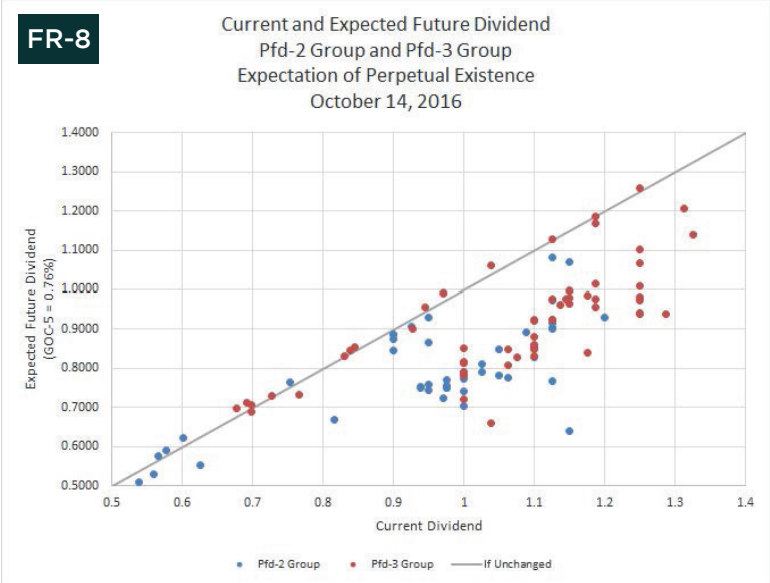
72 Jeff Herold, *What the Heck is Going On?*, NexGen Financial Blog, 2015-4-16, available on-line at http://www.nexgenfinancial.ca/blog/what-the-heck-is-going-on/ (accessed 2015-5-9)

73 Capitalizing on over-reaction is, of course, a value investor's stock in trade; nevertheless, I was gratified to learn of a US-based bond ETF which fetishizes over-reaction to credit downgrades: Eric Balchunas, *Purgatory is Heaven for One Bond ETF*, Bloomberg, 2015-9-11, available on-line at http://www.bloomberg.com/news/articles/2015-09-11/purgatory-is-heaven-for-one-bond-etf (accessed 2015-9-12)

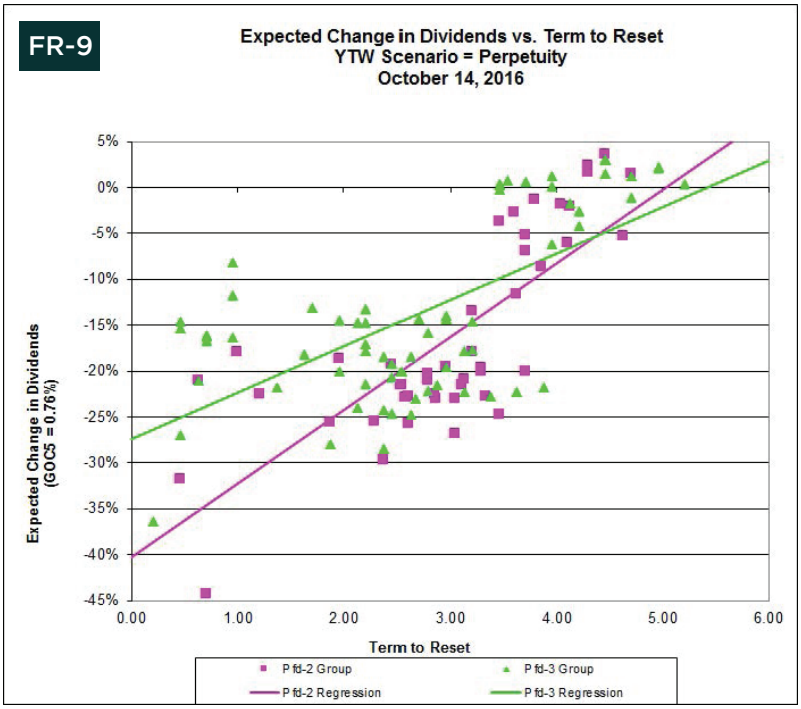
FR-7



FR-8



FR-9



Modelling FixedReset Prices

In the relatively early days of FixedResets there was a very strong relationship between the Current Yield of FixedResets rated Pfd-1(low) by DBRS and their price. This was consistent with the idea that retail investors – who dominate market pricing – were seeking to maximize an objective function which had twin objectives:

- Maximize Current Yield (current dividend divided by price)
- Minimize total expected capital loss on call

It will be noted that such an objective function is inherently suspicious because the first term is a rate, while the second is a total.

In the August, 2010, edition, I termed this the "Expected Total Loss Model" (EL) – there is an alternative specification, the "Expected Loss Rate Model" (ELR), which also takes account of the term until the first call.

Commencing in December 2012 the market appeared to recognize extension and reset risk, and Current Yield is now reasonably well correlated with the Issue Reset Spread (IRS) of each issue; with a correlation that has become better than that of the other two models; this relationship is reasonable to the extent that the issue is expected to be left outstanding after the next Exchange Date.

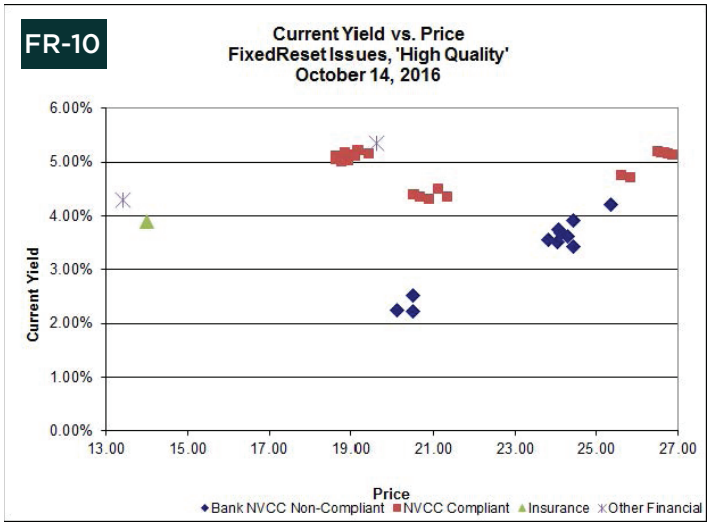
Rather than simply correlating the IRS with Current Yield, it is better theoretical practice to estimate the value of the call option embedded in each issue according to its IRS; obviously, the issuer's ability to call an issue is more valuable for higher IRSs and, equally obviously, becomes even more valuable when the issuer can issue new FixedResets with a lower IRS (that is, when the theoretical Market Spread for a par issue is less than the IRS in question) – even when that option cannot be exercised immediately.

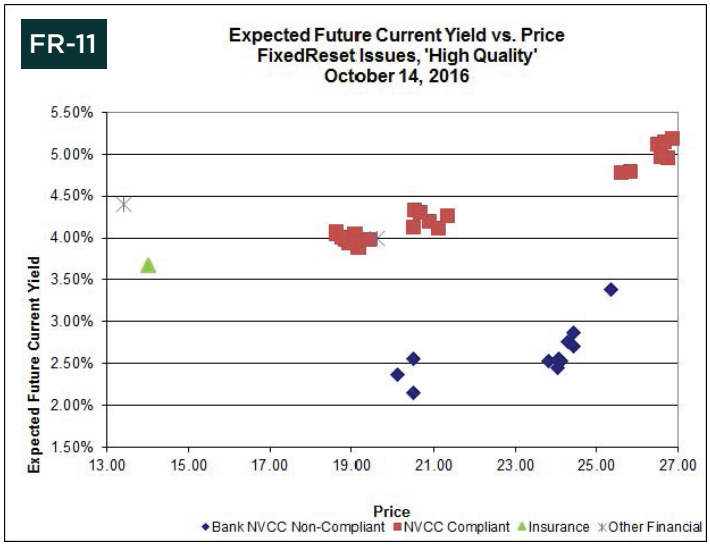
This insight – which I discussed in my 2009 seminar on FixedResets[74] – has been formalized in an appendix to the September, 2013, newsletter and is termed the "Implied Volatility Model", which will be discussed later.

Chart FR-10 shows that the once very strong positive relationship between Price and Current Yield (the EL Model) has disappeared – given the clear heterogeneity of the data, I will no longer be calculating the correlation. Results for the ELR Model will no longer be published – correlation is abysmal. The decline in the correlation coefficients of these two series from their initial values (about 90% in the early days of FixedResets) indicates that the market is incorporating call features, Issue Reset Spreads and ex-Dividend dates into pricing, albeit somewhat imperfectly.

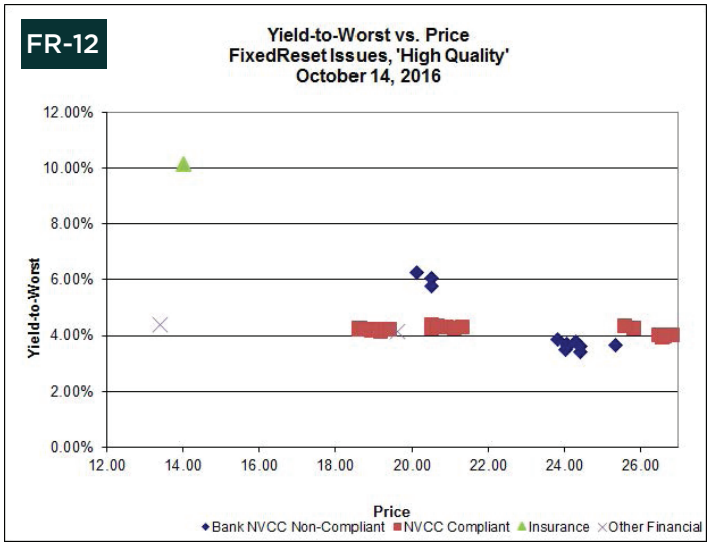
The negative slope of the relationship between between Current Yield and Price is unexpected, but some progress can be made in understanding the phenomenon by disaggregating the data and viewing other attributes. Chart FR-11 shows the relationship between Expected Future Current Yield (that is, the expected dividend after reset with GOC5 = 0.76%, divided by Price) and Price, with the three non-bank issues identified. If we examine the types of issues individually, the relationship between Expected Current Yield and price is positive for the bank NVCC compliant issues, which is in line with the prediction of Implied Volatility Theory (see the section "Implied Volatility of Market Spreads", below); Chart FR-12 shows that the relationship does not when the more accurate YTW is factored into the equation – the yields-to-worst are almost identical!

The bank non-NVCC issues also show a reasonable relationship; we expect all of these to be called in the medium term (see the appendix dealing with DeemedRetractibles) and therefore the lower priced ones should have a lower cash yield, as they may be assumed to be due for a capital gain once they are called. However, as shown in Chart FR-12 (YTW vs. Price) there seems to be insufficient compensation for this effect, since the bank non-NVCC issues priced significantly below par have higher yields-to-worst than those priced nearer par. This may be due to some preferred share investors not accounting for the DeemedMaturities of the NVCC non-compliant issues (perhaps knowingly, if they believe that the Issue Reset Spreads of these issues is sufficiently small that the issuers will leave these issues outstanding despite their not being eligible for Tier 1 Capital), or it may be more rationally due to uncertainty regarding the actual call date (see the section *Issues with Low Spreads* for more discussion of this issue) and the potential for the banks to offer exchanges or a change of terms. It will be interesting to see how this all works out!





[74] Available for subscription at http://www.prefletter.com



Issues with a Low Spreads

While virtually all of these low-Reset issues are regulated and not NVCC compliant and are therefore presumed to be subject to a Deemed Maturity, it will be noted that banks have been highly successful in offerings of NVCC-compliant FixedResets[75] (although the recent issues, to be discussed later, required coupons significantly above the pre-issue market). This success, which has been referred to as a 'watershed event' indicating the potential for $20-billion in such issues to be issued[76] opens up the possibility that the lucky issuers of these lower-spread issues will seek shareholder approval to add NVCC compliance to the issues' terms. I suspect that this could be accomplished relatively cheaply, particularly if stockbrokers are paid a nice proxy solicitation fee if their clients vote in favour; it will be remembered that Bell Canada preferred shareholders agreed to have the guarantor changed to the parent company, BCE, with a derisory extra payment received in compensation for the decline in credit quality;[77] it will also be noted with approval that Dundee's initial Exchange Offer for DC.PR.C[78] was harshly criticized[79] for its exhorbitant consent and proxy-solicitation fees; the former coercive tactic was withdrawn in their second attempt[80] at a Plan of Arrangement. It will be noted that OSFI has specifically encouraged the banks to pursue amendments to their NVCC non-compliant issues.[81]

Table FR-2: High-Quality FixedResets With Low Issue Reset Spreads

Ticker	Current Dividend	Spread on Reset	Reset Date	NextEx (mostly estimates)	Yield-to-Worst	Bid	Ask	Current Yield
BNS.PR.Y	0.455	100	2020-4-25	2016-12-30	5.78%	20.51	20.80	2.22%
BMO.PR.Q	0.975	115	2021-8-25	2016-10-28	6.28%	20.11	20.20	2.24%
GWO.PR.N	0.544	130	2020-12-31	2016-12-01	10.14%	14.00	14.23	3.89%
BNS.PR.Z	0.51575	134	2021-2-1	2016-12-30	6.08%	20.51	20.59	2.51%
PWF.PR.P	0.5765	160	2021-1-31	2017-01-05	3.49%	24.05	24.17	3.50%
TD.PR.S	0.8428	160	2018-7-31	2017-01-06	4.39%	13.40	13.55	4.30%
BMO.PR.M	0.8475	165	2018-8-25	2016-10-27	3.86%	23.82	24.15	3.56%
TD.PR.Y	0.8899	168	2018-10-31	2017-01-05	3.61%	24.11	24.23	3.69%
BNS.PR.Q	0.9025	170	2018-10-25	2016-12-30	3.69%	24.06	24.10	3.75%

Note that all these issues, with the sole exception of PWF.PR.P, are considered in my analysis to be subject to the NVCC rules (this is explicitly the case for bank issues; it is assumed for insurers) and hence have their Yield-to-Worst calculated with the assumption of a Deemed Maturity on 2022-1-31 (banks) or 2025-1-31 (insurers).

[75] These issues are marked with "NVCC" in the tables listing all the extant FixedResets

[76] Tim Kiladze, *RBC's preferred-share experiment could open a $20-billion market*, Globe and Mail, 2014-1-22, available on-line at http://www.theglobeandmail.com/report-on-business/streetwise/rbcs-preferred-share-experiment-could-open-a-20-billion-market/article16458059/ (accessed 2014-2-15)

[77] BCE Inc., *Announcement of Approval of Bell Plan of Arrangement for Exchange of Bell Canada Preferred Shares*, Press release, 2007-1-23, available on-line at http://www.bce.ca/news-and-media/releases/show/announcement-of-approval-of-bell-plan-of-arrangement-for-exchange-of-bell-canada-preferred-shares (accessed 2014-2-15)

[78] Dundee Corporation, *Dundee Corporation Announces Proposed Exchange of Series 4 Preferred Shares for Series 5 Preferred Shares Pursuant To A Plan Of Arrangement*, Press Release, 2015-11-23, available on-line at http://dundeecorp.com/pdf/2015-11-23-Series-4-Pref-Share-Exchange-Announcement.pdf (accessed 2016-1-9)

[79] Niall McGee, *Dundee faces backlash over new share-exchange plan*, Globe & Mail, 2015-12-4, available on-line at http://www.theglobeandmail.com/report-on-business/streetwise/dundee-faces-backlash-over-new-share-exchange-plan/article27616704/ (accessed 2016-1-9)

[80] Dundee Corporation, *Dundee Corporation Announces Postponement of Special Meeting and Proposed Amended Terms to its Series 4 Preferred Share Exchange Transaction*, Press Release, 2016-1-6, available on-line at http://dundeecorp.com/pdf/2016-01-06-amended-terms.pdf (accessed 2016-1-9)

[81] See the original NVCC draft advisory, no longer available from OSFI but discussed at http://prefblog.com/?p=13995; see also OSFI, *Analysts briefing by Mark White on two Advisories relating to BASEL III: Treatment of non-qualifying capital instruments under Basel III and Non-Viability Contingent Capital*, Transcription, 2011-2-7, available on-line at http://www.osfi-bsif.gc.ca/eng/fi-if/in-ai/pages/2011-02-04b-ntcavs.aspx (accessed 2014-2-15).

One point of note not addressed in Table FR-2 is a comparison of Expected Future Current Yields between PWF.PR.P (presumed not to have a Deemed Maturity) and GWO.PR.N (which I presume to have a Deemed Maturity 2025-1-31). Given a constant GOC-5 yield of 0.76%, the issues are expected to have future dividend rates of 0.590 and 0.515, respectively, for Expected Future Current Yields of 4.40% and 3.68%, respectively. This is a substantial difference and possibly indicative of market recognition of some potential for NVCC rules to be extended to insurers, but there's not enough data to make an informed judgement.

Chart FR-13 shows the relationship between Yield-to-Worst and the Modified Duration of the Yield-to-Worst scenario. It is of great interest to note that there are three outliers among the bank NVCC non-compliant issues, each of which actually has a higher yield to their Deemed Maturity date than the tightly clustered NVCC-compliant bank issues. These are the three very low-reset issues, BNS.PR.Y, BMO.PR.Q and BNS.PR.Z (see Table FR-2): the market may have forgotten (to a small extent) that they are non-compliant; or believe that these issues are so low-spread that the issuers will leave them outstanding even when they cannot be included in Tier 1 Capital; or be assigning a risk premium to the chance of a shareholder-approved change of terms; or there may be another explanation entirely.[82]

These outliers are also apparent in Chart FR-12 and in Chart FR-14, which relates the YTW to the term to reset; it is this latter chart which suggests an explanation based on yield-to-call, since in terms of term-to-reset, the large group of issues is clustered around three years term to call, while the high-yielders-low-spread issues are the outliers.

Accordingly, we can prepare Chart FR-15, which shows the yields-to-call calculated to the actual potential call dates for all bank NVCC non-compliant issues, rather than the calculation to the arbitrary Deemed Maturity Date of 2022-1-31. I interpret this graph as suggesting that the market is pricing the issues with a term to reset of about three years as if they will all be called on the first possible dates, which are all fairly close to year-end, 2018. However, it appears that the outliers are being priced as if they will not be called until after the Deemed Maturity date; that is, with the assumption that the banks will leave them outstanding on their call dates in 2020–2021 and redeem the on the available dates in 2025–2026. This is, of course, entirely possible – and it is also possible that the issuers will seek to amend the terms of these three issues – but this will probably involve paying a high rate of interest-equivalent dividends on issues which cannot be counted as part of Tier 1 Capital. Clearly, if the issues are called during the earlier period, then purchasers at current prices will realize a substantial increment in realized yield, but the situation is murky!

Note that in Chart FR-15 points representing the same issue with different call-date assumptions have been connected with a straight line. This is done for convenience in comparing the two points only; for deeply discounted issues the two points will be joined by a curve that drops steeply at the short term end and gradually flattens out.[83] Thus, the point at which the line crosses the Deemed Maturity Date will not necessarily be close to the actual yield to this date – the error will increase as the price difference from par increases.

It will also be noted that the above explanation regarding how the yields of the two groups may be reconciled requires that, of the two dates bracketing the Deemed Maturity date, each issue be redeemed on the Exchange Date that is furthest from the Deemed Maturity. This observation does not falsify the hypothesis, but it is an inconvenient thing to have to explain!

Note that GWO.PR.N, with a Modified Duration of 7.12, is an outlier in Chart FR-13 because I am calculating the YTW on the assumption of a Deemed Maturity for this issue,[84] which is not fully accepted in the market pricing as discussed above.

It should be noted that there are two problems associated with the Modified Durations calculated in the course of this analysis:

i) A constant GOC-5 yield is forecast but in reality this will change and the dividend payments of an extended FixedReset will change on its Reset Dates accordingly. Thus, the Modified Duration of the YTW scenario of any presumably extended FixedReset with respect to changes in short-term interest rates will be less than five; the Modified Duration of the YTW scenario of this issue with respect to changes in credit quality will be the larger number. As discussed in the appendix to the December, 2012, edition (see the digression on "Spread-WAM") this difference in price-sensitivities to the two major sources of price changes is something that is not handled very well by classical bond mathematics, the industry, or the regulators.[85]

ii) The Deemed Maturity date does not correspond with the potential call dates of any instrument, as discussed in connection with Chart FR-15.

Chart FR-16 shows that there is no longer a clear relationship between Issue Reset Spread and Yield-to-Worst for all the high-quality issues, but there may be a relationship if we restrict our examination to the bank-issued NVCC-compliant issues. This relationship is quite apparent when the full universe is examined.

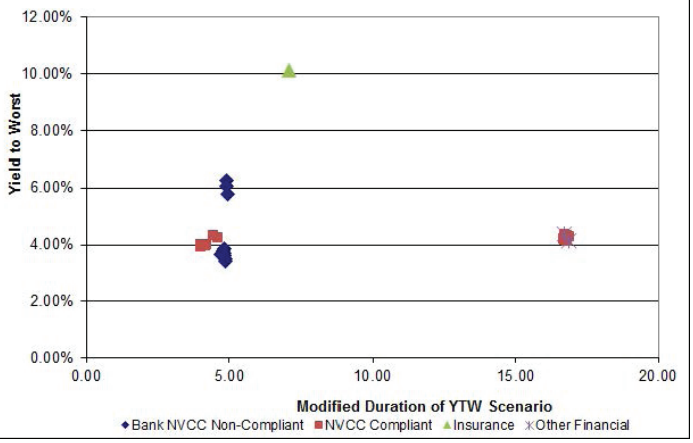
[82] There! That covers me!

[83] This is due to the effect of amortization of the discount on yield. If the instrument matured in one year, the entire discount would be captured in the first year; if it matured in two years, only half the discount is captured in the first year; if it matured in three years, only one-third. Extending the term of the instrument will have a larger effect from one to two than from two to three, and so on. Thanks to reader PL for drawing my attention to the potential misinterpretation!

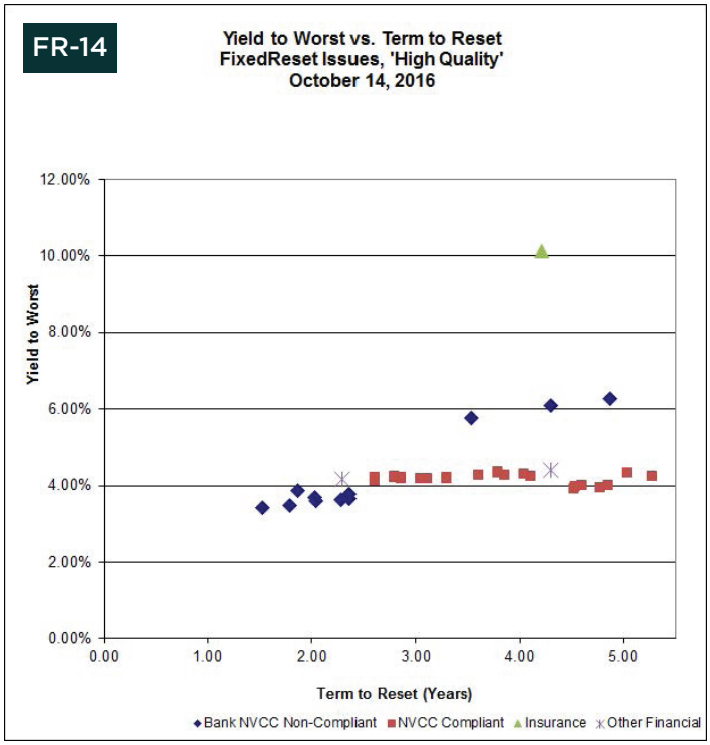
[84] See the appendix dealing with Deemed Retractibles

[85] For a brief review of 'Spread-WAM' as it applies to Money Market Funds, see http://prefblog.com/?p=5930

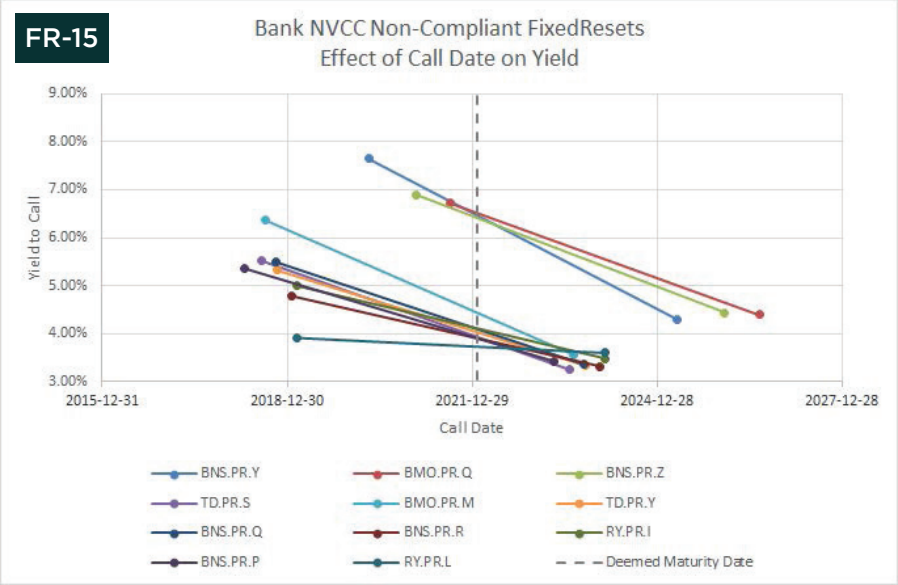
FR-13

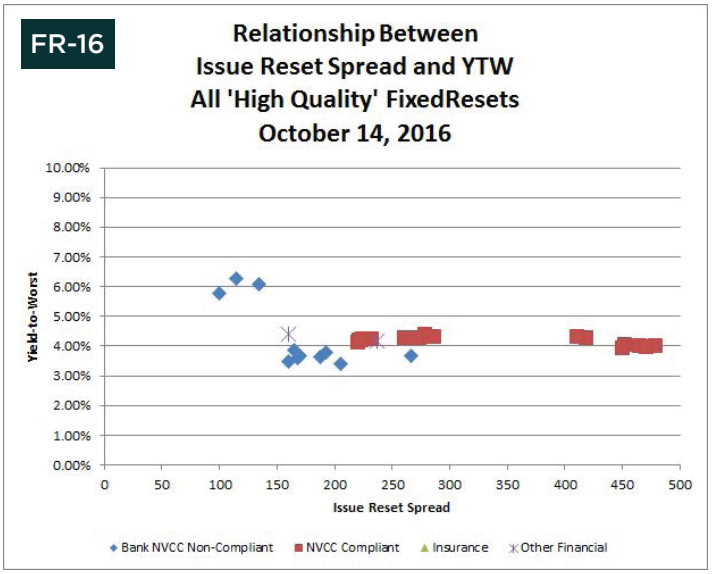


FR-14



FR-15





First Issue of NVCC-Compliant Bank Subordinated Debt

In July, 2014, Royal Bank of Canada announced[86] *an inaugural Basel III-compliant offering of $1 billion of subordinated debentures ("the Notes") through its Canadian Medium Term Note Program.*

This watershed event generated a fair amount of press coverage,[87] but for all that the bank sub-debt market is likely to remain a niche. Commenters from Torys LLP have pointed out:[88] *Prior to the introduction of Basel III, subordinated debt could account for almost one-third of the total capital of a bank. With the new minimum total capital requirement of 10.5%2 (including a countercyclical capital buffer of 2.5%) of risk-weighted assets and a 8.5% minimum for tier 1 capital, effectively the most that can be satisfied with subordinated debt is 2% of the bank's risk-weighted assets.* Royal Bank's total Risk Weighted Assets in 2014Q2 were $349.1-billion[89], so their effective maximum issuance of sub-debt is about $7-billion.

The bank states that *The Notes bear interest at a fixed rate of 3.04 per cent per annum (paid semi-annually) until July 17, 2019, and at the three-month Banker's Acceptance Rate plus 1.08 per cent thereafter until their maturity on July 17, 2024 (paid quarterly).* It is not clear to me how the spread to BAs in the final five year term was derived, given that the Canada 10-year was trading around 2.20%, the five year around 1.55% and three-month BAs a little above 1.20%. As with FixedResets, the intent of the regulations is that spreads be constant throughout the life of the issue, so that the bank does not have an economic incentive to redeem; for instance, if the spread on reset was impossibly high, then the bank would have huge incentive to redeem on that date; the issue would be considered very likely to mature on that date, defeating the purpose of the instrument.

However, it is the terms of conversion that are of most interest. Their marketing material states[90] that *The "Contingent Conversion Formula" is (Multiplier x Note Value) ÷ Conversion Price = number of Common Shares into which each Note shall be converted,* where the multiplier is 1.5, the Note Value is par plus accrued interest, and the conversion price is the greater of the market price of RY common and $5.00. This may be contrasted with the conversion formula for the NVCC-compliant preferreds issued so far, but the "Multiplier" for preferreds is 1.0.

86 Royal Bank of Canada, *Royal Bank of Canada announces Subordinated Debenture Issue*, Press Release, 2014-7-11, available on-line at http://www.rbc.com/newsroom/news/2014/20140711-nvcc-sub-debt.html (accessed 2014-7-12)

87 Barry Critchley, *RBC prepares country's first NVCC subordinated debt offering*, Financial Post, 2014-7-10, available on-line at http://business.financialpost.com/2014/07/10/rbc-prepares-countrys-first-nvcc-subordinated-debt-offering/ (accessed 2014-7-12) and Cecile Gutscher, *RBC Sells First Bond by Canadian Bank to Satisfy Basel III Rules*, Bloomberg, 2014-7-11, available on-line at http://www.bloomberg.com/news/2014-07-11/rbc-sells-first-bond-by-canadian-bank-to-satisfy-basel-iii-rules.html (accessed 2014-7-12), inter alia

88 Blair Keefe, David Seville and Thomas Yeo, *The Preferred Share Market Finally Re-Opens For Canadian Banks*, Torys LLP, Capital Markets 2014 Mid-Year Report, available on-line at http://www.torys.com/Publications/Pages/The-Preferred-Share-Market-Finally-Re-Opens-For-Canadian-Banks.aspx (accessed 2014-7-12)

89 Royal Bank, *Supplementary Financial Information Q2 2014*, available on-line at http://www.rbc.com/investorrelations/pdf/q214supp.pdf (accessed 2014-7-12)

90 SEDAR (http://www.sedar.com), filed under "Royal Bank of Canada", "Marketting Material", "July 9, 2014". I am not permitted to provide a direct link to this draft term sheet, due to the SEDAR's exploitation of the monopoly granted to them by the regulators. SEDAR is indirectly owned in large part by the banks; the banks have been granted exemptions from Canada's competition law in exchange for regular payments made to the regulators.

Moody's has rated the issue Baa1(hyb),[91] two notches above NVCC-compliant preferreds,[92] while S&P rates them A- on the global scale[93], one notch above the BBB+ of the NVCC-compliant preferreds. DBRS rates the issue A(low)[94], three notches below the bank's "Intrinsic Assessment", compared to a four-notch reduction for NVCC-compliant preferred shares.[95] The difference is attributed to "a potential for recovery that is sufficiently better than RBC's existing NVCC Preferred Shares to allow for a differentiation".

S&P takes care to point out another element of the seniority of the sub-debt over the preferreds (bolding added): *The following constitute trigger events: OSFI publicly announces it has advised RBC that it believes the bank has ceased, or is about to cease, to be viable and that,* ***after converting the preferred shares and all other contingent instruments RBC has issued …***

So it appears that OSFI will have a lot of discretion in the event that a crisis takes down a Canadian bank, as their discretion to declare 'non-viability' may select elements of the capital structure to be converted to common equity – presumably with great losses to the holders – rather than a single declaration. This will certainly mean a great deal of lobbying of OSFI personnel by large bond-holders and other potential future employers of OSFI personnel – as we found with MFC during the crisis, the rules are interpreted and amended in accordance with the lobbying prowess of the company affected.[96] This discretion is likely to be exacerbated by the federal government's proposed 'bail-in' regime.[97]

Just how the sub-debt/preferred share interaction will play out in the future remains to be seen – and the effects of a future crisis are, of course, impossible to forecast. However, it behooves preferred share investors to be aware of this new element of banks' capital structure and consider whether any given preferred share carries enough expected yield to compensate for its additional risk.

In addition, investors should be well aware of the implications of 'bail-in debt', discussed in the DeemedRetractible appendix under the heading *Potential Change: Bail-In Debt*. The recovery value of bank preferred shares given a 'non-viability' determination by OSFI will be virtually impossible to estimate since:

- Senior Debt may or may not be forcibly converted
- The proportion of senior debt that is converted will be set by OSFI at the time of the non-viability determination
- Pre-existing common shares of the bank may or may not be cancelled by OSFI at the time of the non-viability determination.

Given the extreme imprecision inherent in calculation possible recoveries in such a scenario, it is likely that an anticipated collapse of a major bank will render its preferred shares all but worthless.

And finally, it is worth noting that the performance of bank NVCC-compliant sub-debt issues has been disappointing since issue[98] with so-called spreads widening 25bp from issue date in the first year; I have also been advised that news of the private placement of $600-million high-yielding BMO preferred shares[99] in October, 2015, was very poorly received by the sub-debt market. Note that these so-called spreads consider an early call to be a certainty; this bond market convention makes it easier to sell new issues and to get them included in short-term bond indices[100] although there is no such obligation by the issuing bank,[101] which surprised some incompetent portfolio managers during the Credit Crunch.[102] [103] Even more incompetent portfolio managers were recently surprised by Great-West Lifeco's decision not to call some of its subordinated debt on the call date, which has led to fears of a wider shake-up in the Canadian sub-debt market.[104]

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81 Moody's, *Moody's assigns Baa1(hyb) to Royal Bank of Canada's non-viability contingent capital (NVCC) Subordinated Debt*, Rating Action, 2014-7-11, available on-line at https://www.moodys.com/research/Moodys-assigns-Baa1-hyb-to-Royal-Bank-of-Canadas-non--PR_303620 (accessed 2014-7-12)

82 Moody's, *Moody's assigns Baa3(hyb) to Royal Bank of Canada's non-viability contingent capital (NVCC) non-cumulative first preferred shares series AZ*, Rating Action, 2014-1-21, available on-line at https://www.moodys.com/research/Moodys-assigns-Baa3-hyb-to-Royal-Bank-of-Canadas-non--PR_291014 (accessed 2014-7-12)

93 Standard & Poor's, *Royal Bank of Canada Tier 2 Nondeferrable Subordinated Debt Rated 'A-'*, Press Release, 2014-7-11, available on-line at http://www.standardandpoors.com/prot/ratings/articles/en/us?articleType=HTML&assetID=1245371262884 (accessed 2014-7-12)

94 DBRS, *DBRS Assigns Provisional Rating to RBC's Non-Viability Contingent Capital Subordinated Debt of A(low) Stable*, Press Release, 2014-7-11, available on-line at http://dbrs.com/research/269737/dbrs-assigns-provisional-rating-to-rbc-s-non-viability-contingent-capital-subordinated-debt-of-a-low-stable.html (accessed 2014-9-13)

95 DBRS, *DBRS Provisionally Rates RBC's Non-Viability Contingent Capital Preferred Shares at Pfd-2*, Stable, Press Release, 2014-1-21, available on-line at http://dbrs.com/research/264518/dbrs-provisionally-rates-rbc-s-non-viability-contingent-capital-preferred-shares-at-pfd-2-stable.html (accessed 2014-9-13)

96 See http://prefblog.com/?p=3898

97 See discussion in the appendix dealing with DeemedRetractibles

98 Cecile Gutscher, *Banks might be on the hook for bailout bond flop*, Globe & Mail, 2015-7-22, available on-line at http://www.theglobeandmail.com/globe-investor/investment-ideas/banks-might-be-on-the-hook-for-bailout-bond-flop/article25633046/ (accessed 2015-8-15)

99 Bank of Montreal, *Bank of Montreal Announces $600 Million Preferred Shares Private Placement*, Press Release, 2015-10-8, available on-line at http://newsroom.bmo.com/press-releases/bank-of-montreal-announces-600-million-preferred--tsx-bmo-201510081027856003 (accessed 2015-10-11) and commentary at http://prefblog.com/?p=30824

100 James Hymas, *Bond ETFs demystified*, Advisor's Edge Report, March 2010, available on-line at http://www.himivest.com/media/advisor_1003.pdf (accessed 2015-8-15)

101 James Hymas, *A Vale of Tiers*, Advisor's Edge Report, March 2008, available on-line at http://www.himivest.com/media/advisor_0803.pdf (accessed 2015-8-15)

102 Boyd Erman, *Bank of America shocks Maple market*, Globe & Mail, 2011-5-3, available on-line at http://www.theglobeandmail.com/report-on-business/streetwise/bank-of-america-shocks-maple-market/article2008298/ (accessed 2015-8-15)

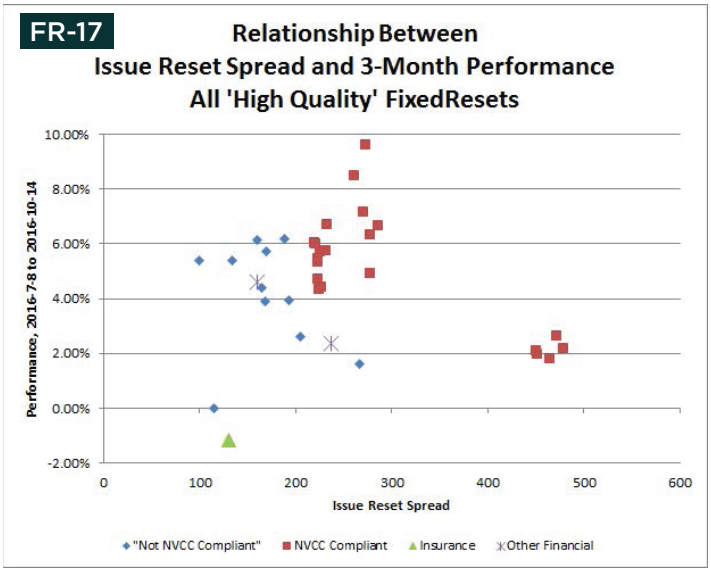
103 James Hymas, *Deutsche Bank Ignores Sub-Debt Pretend-Maturity*, PrefBlog, 2008-12-17, available on-line at http://prefblog.com/?p=4539

104 Ari Altstedter, *Canada Gets Wake-Up Call on Hybrids as Great West Opts to Float*, Bloomberg, 2016-4-19, available on-line at http://www.bloomberg.com/news/articles/2016-04-19/canada-gets-wake-up-call-on-hybrids-as-great-west-opts-to-float (accessed 2016-4-20)

Recent Performance of High-Quality Issues

The relationship between Issue Reset Spreads and Performance over the past three months is displayed in Chart FR-17, while the past month is shown in Chart FR-18.

FR-17



FR-18

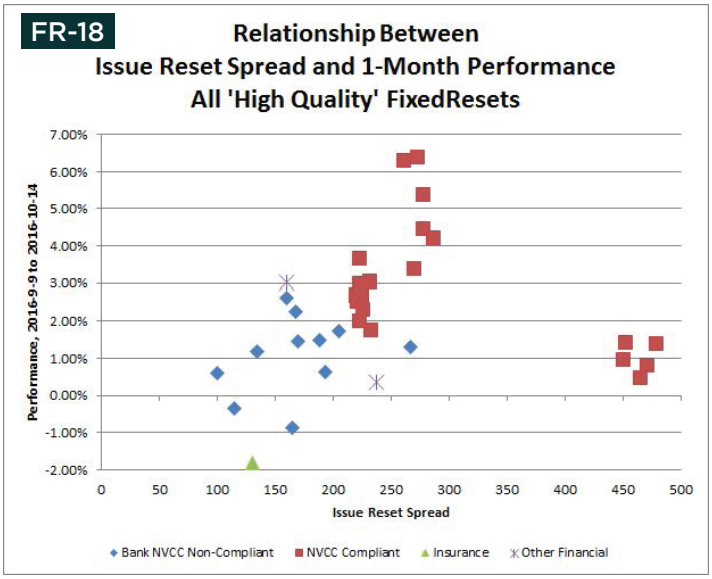


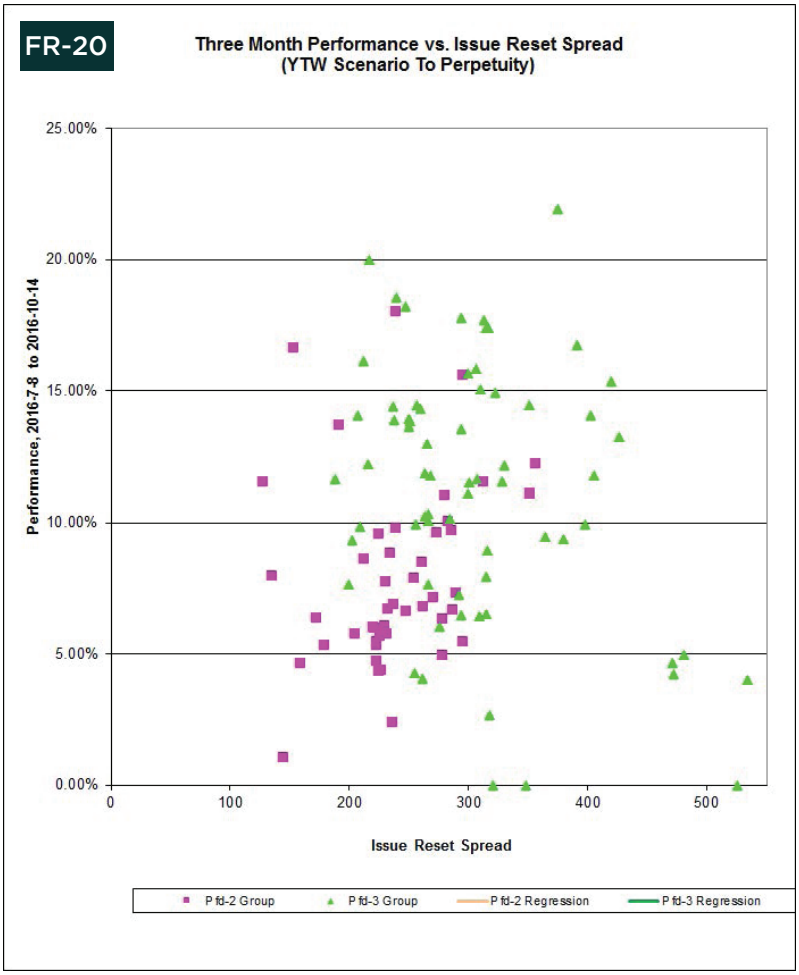
Chart FR-18 shows that performance in the last month of high quality issues had very little to do with the Issue Reset Spread, with the type of preferred being of far greater importance. A similar wide range of returns with very little correlation is observed in the larger group of lesser credits, as shown in Chart FR-21: both groups of issues are negligibly correlated.

The three month performance of those lesser credits against Issue Reset Spreads (Chart FR-20) shows insignifant correlations for the Pfd-2 Group and the Pfd-3 Group.

As noted previously, there is very little dependence of YTW on Issue Reset Spread for NVCC-compliant bank issues, as shown in Chart FR-16. There are sixteen issues in the lower-spread group which comprise all such issues with Issue Reset Spreads from 221bp (RY.PR.Z) to 287bp (TD.PF.E) and five in the higher-spread group (with spreads between 451bp (BNS.PR.E) and 480bp (RY.PR.R)).

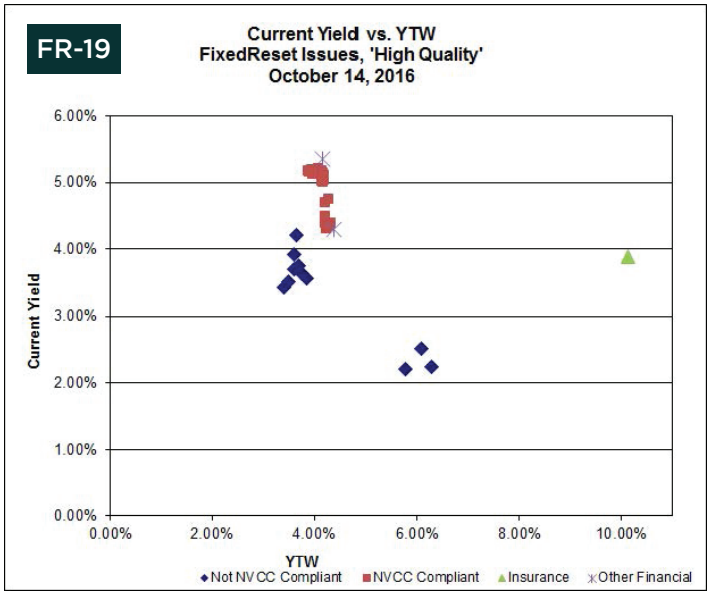
The boundary between issues with a high Current Yield that are expected to be called on their first Exchange Date (given that their price and Initial Dividend were also high) and therefore have a low Yield-to-Worst and those with a lower Current Yield that are not expected to be called has disappeared as redemptions of issues of the first type has now been completed. The current relationship is illustrated in Chart FR-19.

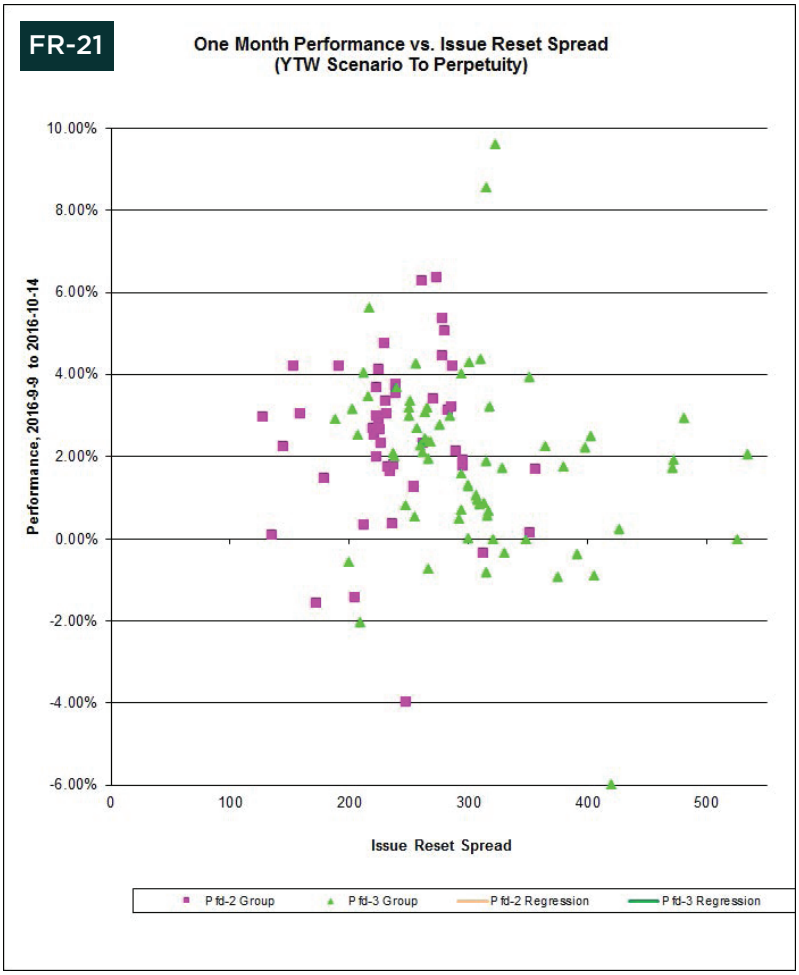
FR-20



[104] The lower-spread issues are RY.PR.Z, BMO.PR.S, CM.PR.O, BMO.PR.T, TD.PF.A, RY.PR.H, BMO.PR.W, TD.PF.B, TD.PF.C and CM.PR.P. The higher-spread issues are BMO.PR.Y, CM.PR.Q, RY.PR.J, RY.PR.M, TD.PF.D and TD.PF.E

[105] The higher-spread issues are RY.PR.Q, BNS.PR.E, TD.PF.G, RY.PR.R and BNS.PR.G


FR-19
Current Yield vs. YTW
FixedReset Issues, 'High Quality'
October 14, 2016
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
Current Yield
0.00%
2.00%
4.00%
6.00%
8.00%
10.00%
YTW
Not NVCC Compliant
NVCC Compliant
Insurance
Other Financial


FR-21
One Month Performance vs. Issue Reset Spread
(YTW Scenario To Perpetuity)
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
-2.00%
-4.00%
-6.00%
Performance, 2016-9-9 to 2016-10-14
0
100
200
300
400
500
Issue Reset Spread
Pfd-2 Group
Pfd-3 Group
Pfd-2 Regression
Pfd-3 Regression

Effects of Proximity to Par Value

The summer's volatility of higher-spread vs. lower-spread bank NVCC-compliant issues suggests the hypothesis that in a falling market, issues priced near par might experience smaller losses than issues priced significantly below par, irrespective of other characteristics. The causal mechanism for such an effect could be that retail investors (who continue to dominate the Canadian preferred share market) believe that:[107]

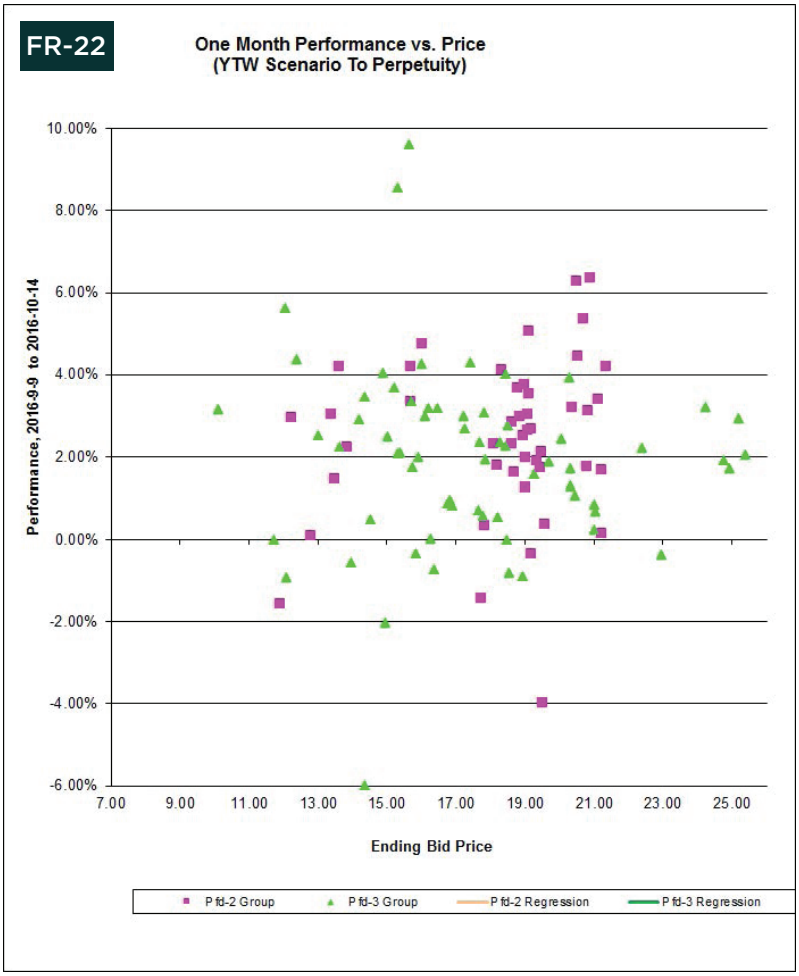
- Anything priced near par will always remain near par
- Anything priced significantly below par has something wrong with it

There is some support for this hypothesis in previous experience; for example, in October 2007 Rob Carrick of the Globe and Mail wrote an article regarding what he referred to as "Distressed Preferreds"[108] which he defined as *A distressed preferred trades below $20, which implies a 20-per-cent price decline, and it usually has a credit rating of less than pfd-3 (low) from DBRS Inc.*

This definition is clearly faulty since it makes no allowance for the yield of the instrument. It is entirely normal for a perfectly good long term issue to trade below 80% of par, if market yields have increased substantially above the coupon rate. However, the misconception is quite common amongst retail investors.

It should be noted that this effect may be easily confused with normal behavior due to Implied Volatility, which will also provide a small cushion against rising yields, since an issue priced at par will have a value of the embedded call option that is large and negative; this value will move towards zero as yields rise and the price declines, which results in a lower "Effective Modified Duration" for issues; this can be exacerbated by a decline in Implied Volatility, which is generally observed as the price declines (although this makes no sense).

However, there is no dependence this month of the prior month's performance on end-of-period price with either Pfd-2 or Pfd-3 credits (Chart FR-22). Note that the correlation of one-month performance with Issue Reset Spread (a function of Implied Volatility) was also negligible for both Pfd-2 and Pfd-3 groups.



[107] This hypothesis was first described in http://prefblog.com/?p=28441 and christened the "Par Always, Shit Forever Hypothesis" on Financial Webring Forum (http://www.financialwisdomforum.org/forum/viewtopic.php?f=33&t=113976&start=550#p549392)

[108] This article is no longer available on-line; it was discussed at http://prefblog.com/?p=1326

A Practical Example of the Need to Differentiate Between Current Yield and YTW

I occasionally get complaints about all the details and the plethora of charts in this section, but for those seeking to find cheap issues on their own – or simply to achieve a level of comfort with the recommendations I make in this newsletter – it is vital that the difference between Current Yield and Yield To Worst be understood. In early 2013 I received an email from an investment professional who asked: *Was wondering if you might know why the yield on AZP.PR.B is higher than AZP.PR.A at this point? Since the B is a rate-reset and the A a perp.....* As I explained (using prices as of 2013-4-11) *The YTW on [AZP.PR.B] is significantly lower than its Current Yield due to my assumption that the GOC rate will remain unchanged at its current 1.18%; therefore, the issue will reset on 2014-12-31 at GOC-5 + 418bp, or 5.36%, or $1.34 p.a., a significant decline from its current payment of $1.75.*

As an aside, the market eventually woke up to the fact that these issues were highly mispriced: over the summer of 2013 from June 14 to September 13, AZP.PR.A recorded a total return of +4.74%, while AZP.PR.B lost 17.19%. This represents a good example of a "Wile E. Coyote moment"[109] for the FixedReset issue: the market suddenly realized there was nothing supporting the price of AZP.PR.B.

The FixedReset and the Straight Perpetual yields have now have returned to their more traditional relationship: 7.80% at the August 12 bid of 16.25 for AZP.PR.B (assuming a permanent GOC-5 rate of 0.58%), compared to 8.84% for AZP.PR.A at its bid of 14.01. A yield premium had persisted through the massive changes experienced in 2014-15, during which the issues were affected by speculation regarding their hiring of financial advisors[110] which one would expect to result in increased examination of the issues' relative merits, and the more recent failure of those advisors to find a buyer,[111] as well as the massive changes in the assumed reset rates of AZP.PR.B.

Term Extension

Term extension (which is simply another way of looking at call risk; it depends on whether your base scenario extends to the call date or to perpetuity) is an ever-present risk with any issue with embedded issuer options – an unusual feature with FixedResets is that changes in the calculated Yield-to-Worst Scenario for FixedResets may be due to changes is the GOC-5 yield, as well as the more normal risks of changes in credit quality and/or credit spreads.

Investors were willing to accept very low yields for the benefit of the FixedReset structure (at least until they realized that resets could reduce the dividend!) and projected yields remain significantly below those of Straight Perpetuals; but the structure is not without risk to the issuers, which is why we have continued to see Straight Perpetuals being issued. It is particularly noteworthy that GWO, the most conservatively capitalized of the big four insurers, has issued four Straight Perpetuals (GWO.PR.P, GWO.PR.Q, GWO.PR.R and GWO.PR.S) since issuance of its last FixedReset (GWO.PR.N).

However, it must always be remembered that the decision by the issuer regarding whether to call the issue or to allow it to reset will have little, if anything, to do with the GOC-5 yield: the relationship between the Issue Reset Spread and the level achievable in the marketplace at that time will be much more important. For example, one might think that if GOC-5 reaches 1980's levels of 10%, then TRP will not wish to pay a 12.38% dividend on TRP.PR.D. But calling the issue will require them to fund their operations from other sources – which, given a GOC-5 yield of 10%, might make 12.38% look cheap!

This is a very difficult concept for many retail investors to grasp. I have had a conversation with an investor – a sharp guy in his own field – who took the view that if GOC-5 rose to 5% then his FixedReset preferred, resetting at +300, would trade close to or above par because it would then have a coupon of 8%, for heavens' sake! It took a little work to convince him that if GOC-5 rose to 5% then other sources of financing will also rise (to a greater or lesser extent) and that the company's call decision regarding the preferred would depend on where the company could issue new shares. If market conditions at that time are such that the issuers' preferred shares trade to yield 9%, then his holding would (almost certainly) continue to trade well below par.

There is a beautiful illustration of the importance of the Issue Reset Spread in the issuer's call decision provided by February 24, 2014, redemption date for five separate Royal Bank issues, specified in Table FR-4. Royal Bank announced[112] its intention to redeem the three with the highest Issue Reset Spreads, while leaving the two with the lower IRSs outstanding[113]. Regrettably, the example is not perfect – the ranking of issues by IRS is the same as the ranking by current dividend. But until the happy day when the rankings are different and the IRS ranking is demonstrated to be the effective one, this will have to do.

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[109] Paul Krugman, *Is This the Wile E. Coyote Moment?*, New York Times, 2007-9-20, available on-line at http://krugman.blogs.nytimes.com/2007/09/20/is-this-the-wile-e-coyote-moment/?_r=0 (accessed 2013-8-10)

[110] Atlantic Power Corporation, *Atlantic Power Corporation Comments on Press Rumors*, Press Release, 2014-05-05, available on-line at http://www.snl.com/Cache/1500059862.PDF?Y=&O=PDF&D=&FID=1500059862&T=&IID=4098671 (accessed 2014-5-10)

[111] Atlantic Power Corporation, *Atlantic Power Provides Update on Outcome of Strategic Review Process; Announces Revised Dividend Rate of Cdn$0.12 Annually; Announces President and CEO Transition*, Press Release, 2014-9-16, available on-line at http://www.snl.com/irweblinkx/file.aspx?IID=4098671&FID=25295256 (accessed 2014-10-11)

[112] Royal Bank of Canada, *Royal Bank of Canada to redeem Non-Cumulative 5-Year Rate Reset First Preferred Shares Series AN, AP & AR*, Press Release, 2013-12-13, available on-line at http://www.rbc.com/newsroom/2013/1213-shares-series.html (accessed 2013-12-14)

[113] Royal Bank of Canada, *Royal Bank of Canada announces conversion privileges of Non-Cumulative 5-Year Rate Reset First Preferred Shares Series AJ and AL*, Press release, 2014-1-20, available on-line at http://www.rbc.com/newsroom/2014/01-20-series-AJ.html (accessed 2014-2-15)

Table FR-4: Royal Bank Issues Callable 2014-2-24			
Ticker	Initial Dividend	Issue Reset Spread	Disposition[114 115]
RY.PR.I	1.25	193	Extended
RY.PR.L	1.40	267	Extended
RY.PR.N	1.5625	350	Called
RY.PR.P	1.5625	419	Called
RY.PR.R	1.5625	450	Called

What a difference two years makes! In March, 2016, Royal Bank closed[116] a massive issue of FixedResets with an Issue Reset Spread of +480bp.[117]

The dependence of call- (or extension-) risk on the Issue Reset Spread, rather than the absolute level of the reset yield means that the price of any given issue is of much less value in determining the YTW Scenario than it is for Straight Perpetuals. While there are occasionally odd effects due to the "accumulated dividend" for Straight Perpetuals, by and large it is reasonable to assume that a Straight Perpetual trading above par (a PerpetualPremium) is more likely to be called than one trading below par (a PerpetualDiscount). If, however, we imagine a FixedReset with a low current dividend and a high Issue Reset Spread, we may reason:

- The issue is likely to be called, as the Issue Reset Spread is high
- The issue is likely to be trading at a discount to par, since the current dividend is low.

Similarly, an issue with a high current dividend and a low Issue Reset Spread may quite rationally trade above par.

There are two examples this month of an issue trading above par with its YTW scenario being perpetuity (EFN.PR.C, bid at 25.19; EFN.PR.G, bid at 25.39) but I will repeat the June, 2015, example: PWF.PR.T had its YTW scenario calculated to perpetuity, despite its June 12 bid price of 25.35, because its initial dividend rate of 4.20% was then forecast to fall to 3.37% in January, 2019, given the contemporary GOC5 rate of 1.00% and the 237bp Issue Reset Spread. This, together with the projected end-price of 23.40 in thirty years[118], provided the projected yield to perpetuity of 3.36%, well below the yield to 2019 call of 3.95%.

Digression Regarding End-Prices for Yield-to-Perpetuity Calculations

I always have to explain this, because it's decidedly non-standard.

HIMIPref does not, in fact, calculate yields to perpetuity – it calculates yields to a thirty-year term. Assigning an end-point makes the programming easier and ensures that calculations of convexity and present value (to name but two attributes) are all performed identically, with a consistently prepared schedule of cash flows. Thirty years was chosen as the term equivalent to perpetuity as that was the term of the longest available Canadian Government Bonds. The long-anticipated[119] issuance of fifty-year bonds came to fruition in 2014[120] and was very successful[121]; this increased pressure for a Treasury fifty[122] which has been resisted;[123] but it will be some time before one can sketch a fifty-year yield curve with any confidence. Canada

[114] Royal Bank of Canada, *Royal Bank of Canada announces conversion privileges of Non-Cumulative 5-Year Rate Reset First Preferred Shares Series AJ and AL*, Press Release, 2014-1-20, available on-line at http://www.rbc.com/newsroom/2014/01-20-series-AJ.html (accessed 2014-2-15)

[115] Royal Bank of Canada, *Royal Bank of Canada to redeem Non-Cumulative 5-Year Rate Reset First Preferred Shares Series AN, AP & AR*, Press Release, 2013-12-13, available on-line at http://www.rbc.com/newsroom/2013/1213-shares-series.html (accessed 2013-12-14)

[116] Royal Bank of Canada, *Royal Bank of Canada announces closing of $750 million NVCC Preferred Share Offering*, Press Release, 2016-3-7, available on-line at http://www.rbc.com/newsroom/news/2016/20160307-nvcc-prefshs.html (accessed 2016-3-13)

[117] Royal Bank of Canada, *Royal Bank of Canada announces NVCC Preferred Share Issue*, Press Release, 2016-2-25, available on-line at http://www.rbc.com/newsroom/news/2016/20160225-nvcc-prefshs.html (accessed 2016-3-13)

[118] The reduction in end-price is discussed in the next section

[119] Cecile Gutscher, *Canada Seen Selling First 50-Year Bond This Year, RBC Says (1)*, Bloomberg News, 2014-2-14, available on-line at http://www.businessweek.com/news/2014-02-14/canada-likely-to-issue-first-50-year-bond-this-year-rbc-says (accessed 2014-2-15)

[120] Department of Finance, *Canada Launches Its First Ultra-Long Bond Issue*, Press Release, 2014-4-28, available on-line at http://www.fin.gc.ca/n14/14-065-eng.asp (accessed 2014-5-10)

[121] Theophilos Argitis and Cecile Gutscher, *Canada Sells 50-Year Bond Amid Low Interest Rates*, Bloomberg, 2014-4-28, available on-line at http://www.bloomberg.com/news/2014-04-28/canada-considers-50-year-bond-sale-soon-through-syndication.html (accessed 2014-5-10)

[122] Barry Ritholtz, *Do We Need a 50-Year Bond?*, Bloomberg, 2014-5-5, available on-line at http://www.bloombergview.com/articles/2014-05-05/do-the-math-on-funding-the-u-s (accessed 2014-5-10); Randall W. Forsyth, *50 Years Isn't Too Long – To Borrow Cheaply*, Barron's, 2015-10-21, available on-line at http://www.barrons.com/articles/50-years-isnt-too-longto-borrow-cheaply-1445402394 (accessed 2016-4-10)

[123] Eliza Ronalds-Hannon & Liz McCormick, *Boring is Beautiful to U.S. Treasury Shunning Latest Bond Craze*, Bloomberg, 2016-5-22, available on-line at http://www.bloomberg.com/news/articles/2016-05-22/boring-is-beautiful-to-u-s-treasury-shunning-latest-bond-craze (accessed 2016-5-22)

does not have another fifty-year auction scheduled at present,[124] but Ireland recently made headlines with a century bond issue[125] while the UK issued a 50-year gilt in October 2015.[126] Italy issued a 50-year bond in October, 2016,[127] shortly after South Korea's issue[128] Japan is considering issuing 50-year bonds.[129] These and related government actions have fueled fears that index investors "a potentially toxic combination is in the making."[130]

When there is an appreciable chance of an interim call, I will reduce the end-price of an instrument on the grounds that the yield-to-call will only be effective in good times of falling yields and rising prices; therefore, in order that the examined universe be complete, the yield-to-perpetuity scenario should be more heavily weighted towards bad times of rising yields and falling prices.

This adjustment is somewhat akin to the Monty-Hall Problem, which I am gratified to learn has its own website at http://montyhallproblem.com/.

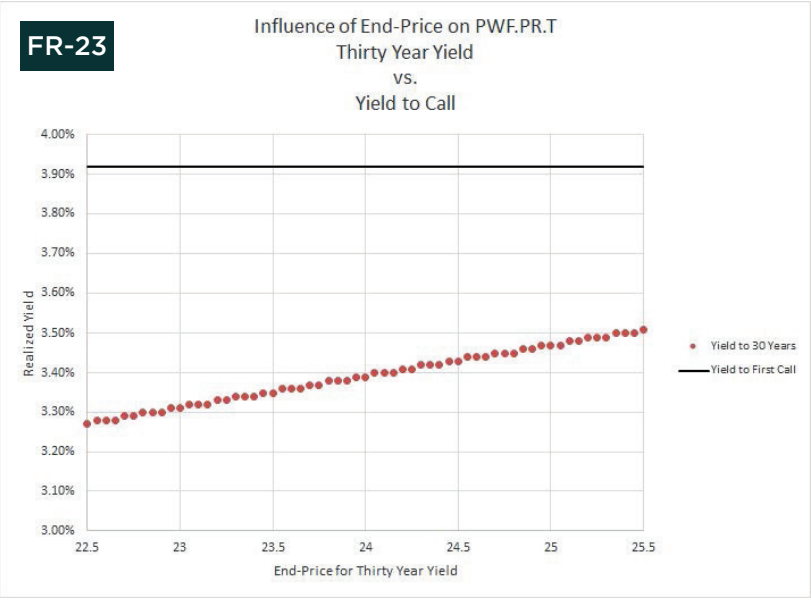
It is clear that in the case of issues trading at a premium that there must be some adjustment in the end price. If, in the case of PWF.PR.T we were to use the June 12 market bid of 25.35 as the end-price, we are then saying that in thirty years the package of cash-flows represented by this instrument will be worth 25.35 to the marketplace … but less than 25.00 to the company, since otherwise they would have called it. Internal contradictions should be avoided! In addition, using 25.35 as the end-price implies that the expected change in dividend rate has no effect on current price, which is inherently ridiculous.[131]

However, the adjustment has only a minor effect on the calculated yield to 'perpetuity'. Devotees of the 'Rule of 72'[132] will know that 'at five per cent, money doubles in fifteen years!'[133] Therefore, for practical purposes, money invested 5% will quadruple in about 30 years and reducing the thirty-year end-price of a preferred share by four cents will have about the same effect on yield as an increase of one cent in the current price.

One cent on the current price is about 1/2500, or 0.04%, of the total current price. Given a Modified Duration of about 18.0 for PWF.PR.T[134], this implies a yield change of about 0.24bp in the yield. With all these rough approximations, we can estimate that changing the thirty-year end-price by sixteen cents results in a yield change of about 1bp in the calculated yield.

A more detailed illustration of the effect of changing the end-price (with a twenty-five year term) is shown in Chart FR-23; changing this price by $2.00 changes the calculated yield by 16bp. These figures were calculated using the publicly available YTC-Resets Calculator.[135]

FR-23



[124] Bank of Canada, *Quarterly Bond Schedule*, 2016-3-24, available on-line at http://www.bankofcanada.ca/stats/cars/results/bd_auction_schedule.html (accessed 2016-4-10)

[125] Dara Doyle, *Ireland Sells First 100-Year Bond, Staying on Comeback Trail*, Bloomberg, 2016-3-30, available on-line at http://www.bloomberg.com/news/articles/2016-03-30/ireland-sells-first-100-year-bond-to-complete-comeback-trail (accessed 2016-4-10)

[126] Ana Nicolaci da Costa, *UPDATE 2-UK sees record demand for new 50-year government bond*, Reuters, 2015-10-20, available on-line at http://www.reuters.com/article/britain-gilts-orders-idUSL8N12K2B820151020 (accessed 2016-4-10)

[127] Elaine Moore, *Italy joins 50-year bond club with €5bn sale*, Financial Times, 2016-10-4, available on-line at https://www.ft.com/content/7fd8c130-7346-11e6-b60a-de4532d5ea35 (accessed 2016-10-16)

[128] Cynthia Kim, *Update 1-High demand for S.Korea's first 50-year bond pushes down yield*, Reuters, 2016-9-30, available on-line at http://www.reuters.com/article/southkorea-bonds-50year-idUSL3N1C625W (accessed 2016-10-16)

[129] http://www.ft.com/cms/s/0/c6ed0af4-de97-11d9-92cd-00000e2511c8.html#axzz4FaEMb6XO

[130] Kommer van Trigt & Olaf Penninga, *Rising benchmark durations threaten index-focused bond investors*, Robeco, 2016-9-28, available on-line at https://www.robeco.com/en/professionals/insights/markets/2016/09/rising-benchmark-durations-threaten-index-focused-bond-investors.jsp (accessed 2016-10-16)

[131] See Table FR-6 and the discussion of its construction for a demonstration that a future change does matter.

[132] See http://en.wikipedia.org/wiki/Rule_of_72 (accessed 2014-2-15)

[133] According to Ukridge in one of the P.G. Wodehouse books. Was it Ukridge? I can't find the reference and it's driving me mad.

[134] Remember that the calculation is only performed out to thirty years, with an artificial end-price. The Modified Duration of a perpetual is the inverse of its yield (see http://prefblog.com/?p=2582)

[135] New and improved version available via http://prefblog.com/?p=28403

[136] James Hymas, *Break Even Rate Shock*, available on-line at http://www.himivest.com/media/moneysaver_0910.pdf and the June, 2009, edition of this newsletter.

Break Even Rate Shock

The recent market declines and consequent reappearance of a good variety of discounted Straight Perpetuals – together with significant issuance over the past month – allows us to dust off the concept of Break Even Rate Shock,[136] (BERS) in which an attempt is made to determine how much of a parallel shift in the yield curve in all markets is required in order for the Present Value of a FixedReset and a PerpetualDiscount to be the same.

Chart FR-24 shows the evolution of BERS throughout the credit crisis: it may be seen that the peak level of the BERS was high even by Credit Crisis standards but this collapsed to approximately zero commencing in the fall of 2015. This indicates that investors were willing to pay a very high premium for insurance against increases in interest rates, but now seem to have decided that current very low levels are a permanent phenomenon.

Table FR-5: (Relatively) Recent BERS Calculations

FixedReset Issue	Terms	Announcement Day	Contemporary PerpetualDiscount Yield	Break Even Rate Shock
MFC.PR.K	3.80%+222	2013-6-17	4.95%*	158bp
FTS.PR.K	4.00%+205	2013-7-9	5.03%	147bp
PWF.PR.T	4.20%+237	2013-12-2	5.45%	179bp
RY.PR.Z	4.00%+221	2014-1-21	4.97%**	135bp
MFC.PR.L	3.90%+216	2014-2-18	5.25%***	196bp
BAM.PF.F	4.50%+286	2014-5-27	5.55%	140bp
MFC.PR.M	3.90%+236	2014-8-11	4.95%*	148bp
FTS.PR.M	4.10%+248	2014-9-3	4.96%	118bp
BAM.PF.G	4.50%+284	2014-10-1	5.70%	182bp
MFC.PR.N	3.80%+230	2014-11-26	4.84%*	144bp
CU.PR.I	4.50%+369M450	2015-9-14	5.50%	143bp
BAM.PF.H	5.00%+417M500	2015-9-24	5.90%	130bp
W.PR.K	5.25%+426M525	2015-11-24	5.94%	96bp
RY.PR.Q	5.50%+453	2015-11-8	5.56%	8bp
MFC.PR.O	5.60%+497	2016-2-16	5.61%*	-1bp
RY.PR.R	5.50%+480	2016-2-25	5.54%	1bp

**The MFC Straight Perpetuals, MFC.PR.B and MFC.PR.C, are actually DeemedRetractibles, but they were trading like PerpetualDiscounts at the time. The Current Yield was used for the calculation.*

***This is the yield to perpetuity of RY.PR.W, a PerpetualDiscount which is unfortunately trading similarly to a DeemedRetractible. This increases its price from what it should be, reduces its yield and hence reduces the BERS which would otherwise be calculated. The calculated BERS of 135bp should therefore be regarded as a minimal estimate. RY.PR.W was trading above par on 2015-1-26, the date of the recent RY.PR.J announcement with a negative yield-to-worst and was completely unsuitable for BERS calculations.*

****This is the Current Yield on MFC.PR.C, 10bp lower than that of MFC.PR.B*

It seems to me that there should be a way of expressing this cost in terms of option theory, which will allow more tools to be used in the analysis of the relationship between FixedReset yields and PerpetualDiscount yields; I will think further on this and possibly discuss the matter in detail in a future issue.

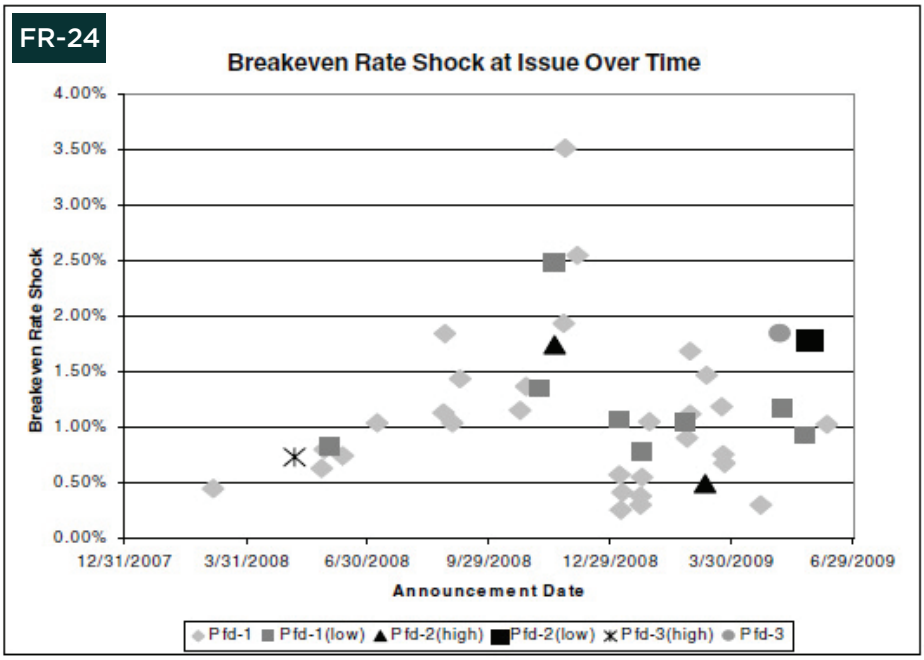
Importance of the Issue Reset Spread

As noted in the appendix to the January, 2012, edition of this newsletter, the Issue Reset Spread is a very important determinant of long-term expected yield for issues for which this spread is sufficiently low as to make a reset, rather than a call, the more likely scenario on the Reset Date. Chart FR-25 quantifies the relative influence of the Initial Rate and the Future Rate on fair value in terms of the time to reset, assuming that an issue will not be called:[137] even when an issue has five years to go until its next reset, the Future Rate is four times as important as the Initial Rate, assuming that the issue will not be called.

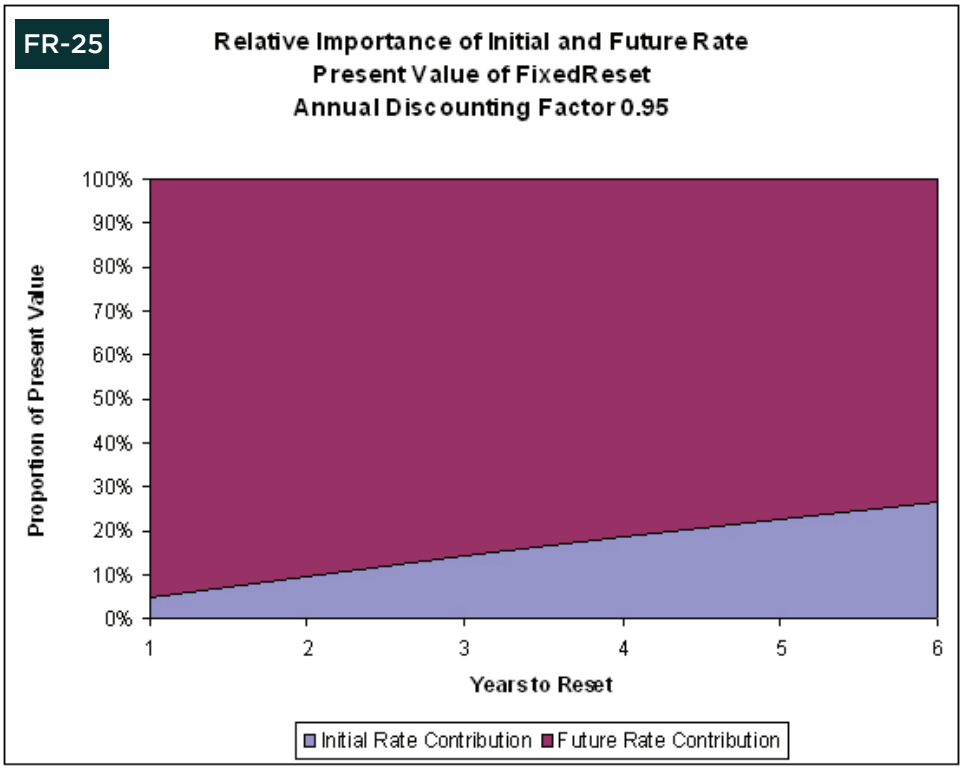
[136] James Hymas, *Break Even Rate Shock*, available on-line at http://www.himivest.com/media/moneysaver_0910.pdf and the June, 2009, edition of this newsletter.

[137] Clearly, if we can assume that the issue will be called, only the value of the Initial Rate is important. If the question of whether the issue is called is uncertain, then there are a wide variety of possible proportions of the importance of the two figures, which will be dependent upon issue precise terms and the analyst's views.

FR-24


Breakeven Rate Shock at Issue Over Time
4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
Breakeven Rate Shock
12/31/2007
3/31/2008
6/30/2008
9/29/2008
12/29/2008
3/30/2009
6/29/2009
Announcement Date
Pfd-1
Pfd-1(low)
Pfd-2(high)
Pfd-2(low)
Pfd-3(high)
Pfd-3

FR-25


Relative Importance of Initial and Future Rate
Present Value of FixedReset
Annual Discounting Factor 0.95
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Proportion of Present Value
1
2
3
4
5
6
Years to Reset
Initial Rate Contribution
Future Rate Contribution

Term Extension Risk and Lower Quality Credits

There is some feeling in the marketplace that the current depressed level of Canada yields is a relatively temporary phenomenon that will correct itself in the near-term; this opinion was buttressed by the Bank of Canada's prognostication that it *continues to expect that core and total CPI inflation will be at 2 per cent on a sustainable basis around the end of 2016 as the economy reaches full capacity*.[138] This opinion was repeated by Bank of Canada governor Stephen Poluz on May 19, 2015:[139] *By the second half of the year, we expect those positive forces to dominate the picture and have us back on track to reach full capacity around the end of 2016*. However, the press release announcing the July 15 cut in the overnight policy rate stated:[140] *The Bank anticipates that the economy will return to full capacity and inflation to 2 per cent on a sustained basis in the first half of 2017* and the gloom continued with the October rate announcement:[141] *the Canadian economy can be expected to return to full capacity, and inflation sustainably to target, around mid-2017*, getting even worse with the January, 2016, statement:[142] *The Bank's current base case projection shows the output gap closing later than was anticipated in October, around the end of 2017;"*[143] this was reiterated at the April meeting to *the second half of 2017*[144] and adjusted again at the July meeting to *towards the end of 2017*.[145]

It is also significant the Governor Poluz has stated:[146] *Take yields on 5-year Canadian government bonds, for example. These are a key benchmark for our mortgage market. On average over the past 30 years, when U.S. 5-year bond yields rose, about three-quarters of the increase was reflected in Canadian 5-year bonds. If a significant term premium decompression were to occur in the current context in Canada, it could introduce a downside risk into our inflation outlook.*

Thus, those among us who are not only market timers but are willing to trust Bank of Canada predictions regarding their economic projections have focused their concern regarding abnormally low reset rates on relatively near term instruments. In the February, 2014, edition very good correlation were made for the lesser credits relating only the term-to-reset with one-month performance (48% for Pfd-2; 54% for Pfd-3) but this effect was not observed in March, 2014 (correlations of 3% and -1% for Pfd-2 and Pfd-3, respectively); correlations have been generally low since then, and are currently negligible, as shown in Chart FR-26.

Correlation analysis is futile for the 'high quality' issues (see Chart FR-27), due to the heterogeneity of the data.

I have also heard the claim that YTW is correlated with term to reset but, while undoubtedly true for some specific instances, this claim does not withstand scrutiny with a large data set, as shown in Chart FR-28 (correlations are negligible), indicating that by and large the market is not anticipating major movement in the GOC-5 yield in the short term.

There is certainly some confounding with these relationships, although Issue Reset Spread is no longer correlated with Term To Reset for lower credits, as shown in Chart FR-29 (correlations are negligible). The effect of the steep decline in five-year Canada yields over the past five years (Chart FR-2), leads to a remarkable correlation between the severity of expected dividend decreases and term to reset, as shown in Chart FR-30 (59% for Pfd-2; 42% for Pfd-3). Over time correlations of this nature will increase (at least, as far as currently extant issues are concerned, and only when the time of measurement is at an equivalent point in the high-spread/low-spread cycle), since the current degrees of dividend change is affected by the initial dividend rate which (as noted in the discussion above regarding BAM.PF.E and BCE.PR.K) are often subject to distortions; when these issues reset a second time, their prior rate will be better correlated with the five-year Canada rate five years previously; on the other hand, there will not necessarily be much similarity in spreads between issues which reset and contemporary new issues.

While market noise and differences due to market perceptions of issuer credit quality will always be a problem in these fits, correlation between Issue Reset Spread and Yield to Perpetuity is expected (at least, over longer periods), due to their relationship described by Implied Volatility theory. We can construct Chart FR-31, which shows the yields to perpetuity of those issues with credit ratings of greater than Pfd-3(low) for which the YTW scenario is in fact for the issue to remain outstanding to perpetuity (correlations are 19% and 13% for Pfd-2 and Pfd-3, respectively; this is an example of the bond market truism that higher-quality issues generally reflect economic conditions better than lower-quality ones, which exhibit more specific risk.).

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138 Bank of Canada, *Monetary Policy Report, April 2015*, available on-line at http://www.bankofcanada.ca/wp-content/uploads/2015/04/mpr-2015-04-15.pdf (accessed 2015-6-13)

139 Stephen S. Poloz, *The Way Home: Reading the Economic Signs*, Speech, Bank of Canada, 2015-5-19, available on-line at http://www.bankofcanada.ca/2015/05/way-home-reading-economic-signs/ (accessed 2015-6-13)

140 Bank of Canada, *Bank of Canada lowers overnight rate target to ½ per cent*, Press Release, Bank of Canada, available on-line at http://www.bankofcanada.ca/2015/07/fad-press-release-2015-07-15/ (accessed 2015-8-15)

141 Bank of Canada, *Bank of Canada maintains overnight rate target at ½ per cent*, Press Release, 2015-10-21, available on-line at http://www.bankofcanada.ca/2015/10/fad-press-release-2015-10-21/ (accessed 2015-11-15)

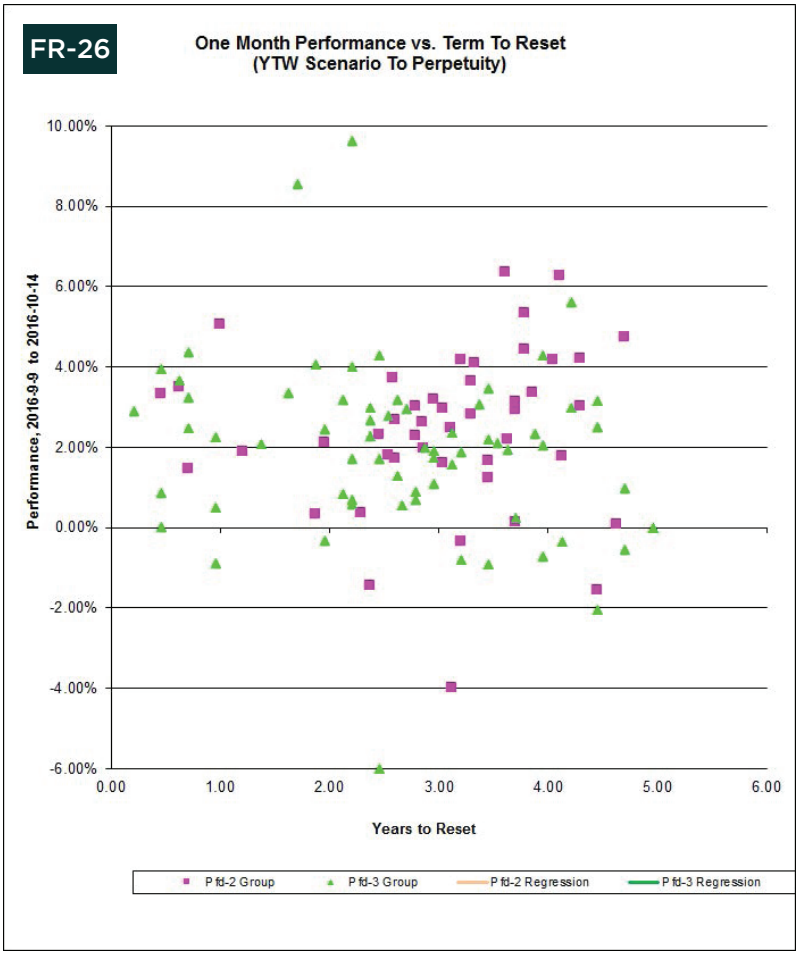
142 Bank of Canada, *Bank of Canada maintains overnight rate target at ½ per cent*, Press Release, 2016-1-20, available on-line at http://www.bankofcanada.ca/2016/01/fad-press-release-2016-01-20/ (accessed 2016-2-14)

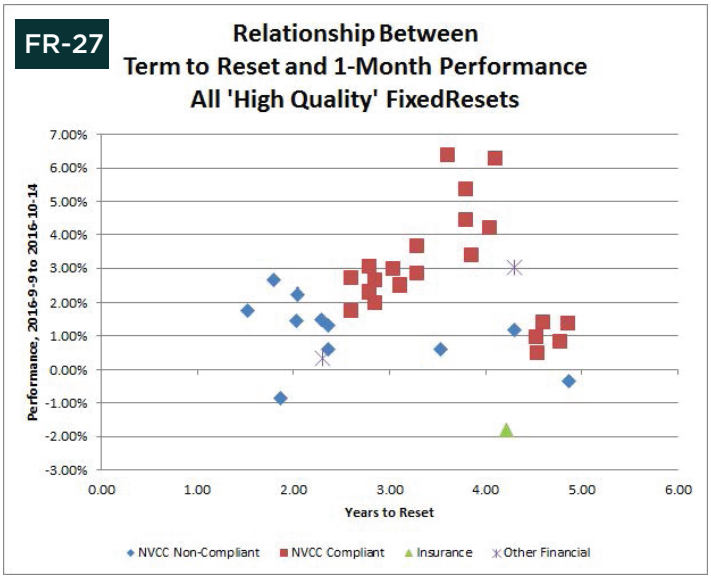
143 Bank of Canada, *Bank of Canada maintains overnight rate target at ½ per cent*, Press Release, 2016-1-20, available on-line at http://www.bankofcanada.ca/2016/01/fad-press-release-2016-01-20/ (accessed 2016-2-13)

144 Bank of Canada, *Bank of Canada maintains overnight rate target at ½ per cent*, Press Release, 2016-4-13, available on-line at http://www.bankofcanada.ca/2016/04/fad-press-release-2016-04-13/ (accessed 2016-5-21)

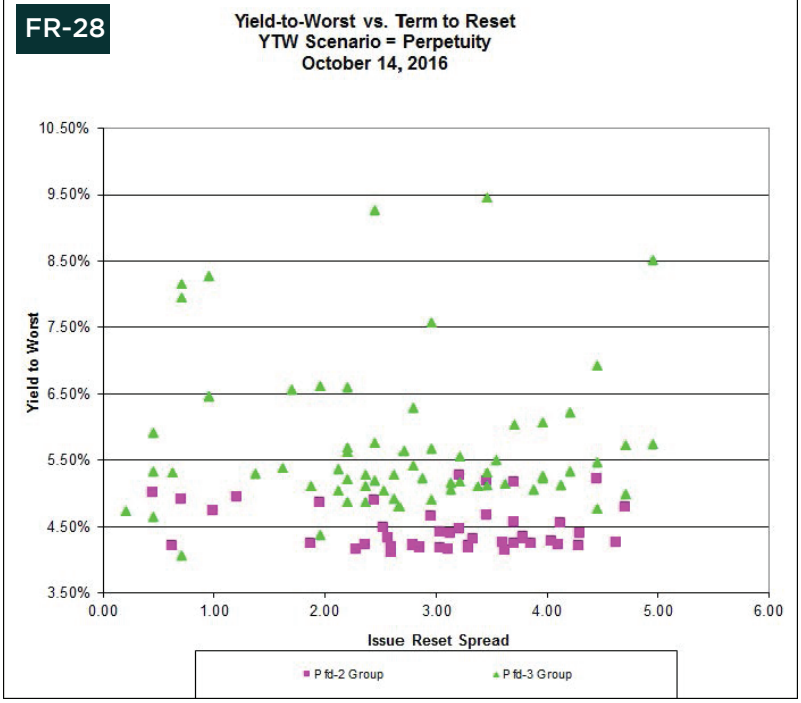
145 Bank of Canada, *Bank of Canada maintains overnight rate target at ½ per cent*, Press Release, 2016-07-13, available on-line at http://www.bankofcanada.ca/2016/07/fad-press-release-2016-07-13/ (accessed 2016-8-14)

146 Stephen S. Poloz, *Life After Liftoff: Divergence and U.S. Monetary Policy Normalization*, Speech, 2016-1-7, available on-line at http://www.bankofcanada.ca/2016/01/life-after-liftoff-divergence-u-s-monetary/ (accessed 2016-1-8)

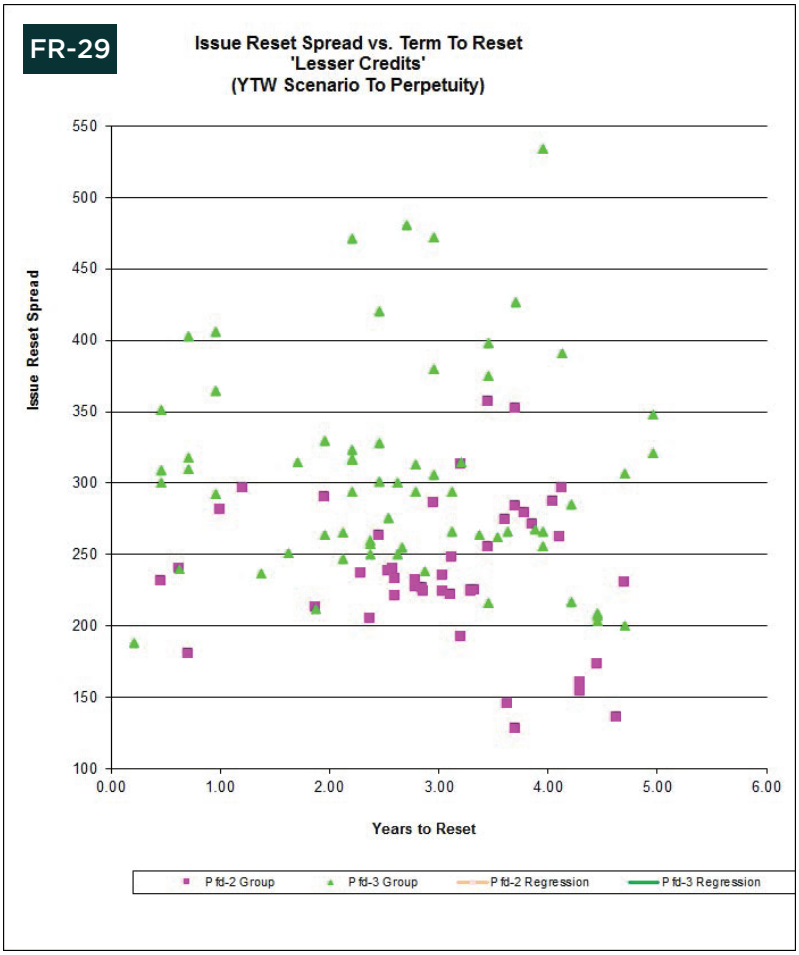

FR-26
One Month Performance vs. Term To Reset
(YTW Scenario To Perpetuity)
Performance, 2016-9-9 to 2016-10-14
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
-2.00%
-4.00%
-6.00%
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Years to Reset
Pfd-2 Group
Pfd-3 Group
Pfd-2 Regression
Pfd-3 Regression


FR-27
Relationship Between
Term to Reset and 1-Month Performance
All 'High Quality' FixedResets
Performance, 2016-9-9 to 2016-10-14
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
-1.00%
-2.00%
-3.00%
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Years to Reset
NVCC Non-Compliant
NVCC Compliant
Insurance
Other Financial

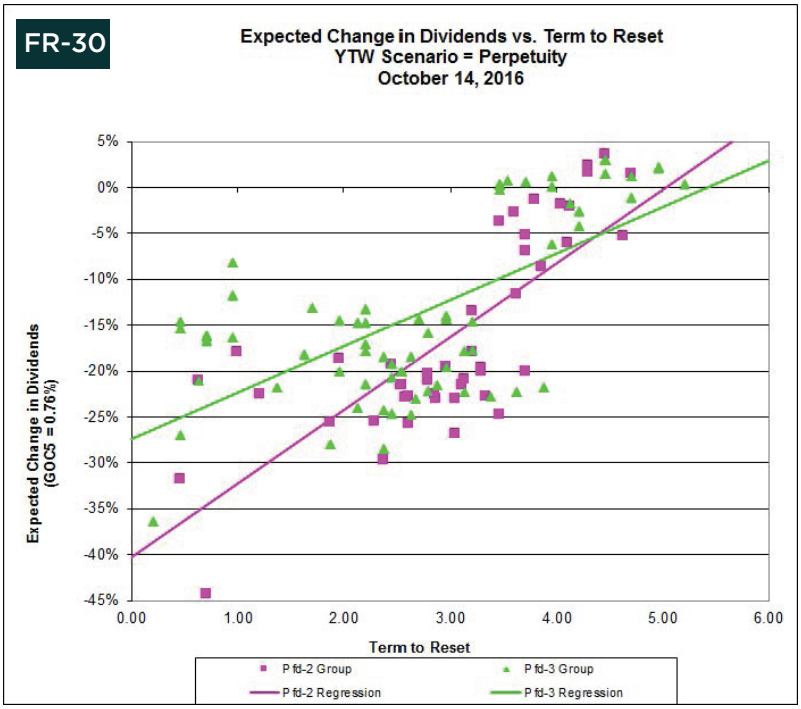
FR-28


Yield-to-Worst vs. Term to Reset
YTW Scenario = Perpetuity
October 14, 2016
10.50%
9.50%
8.50%
7.50%
6.50%
5.50%
4.50%
3.50%
Yield to Worst
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Issue Reset Spread
Pfd-2 Group
Pfd-3 Group

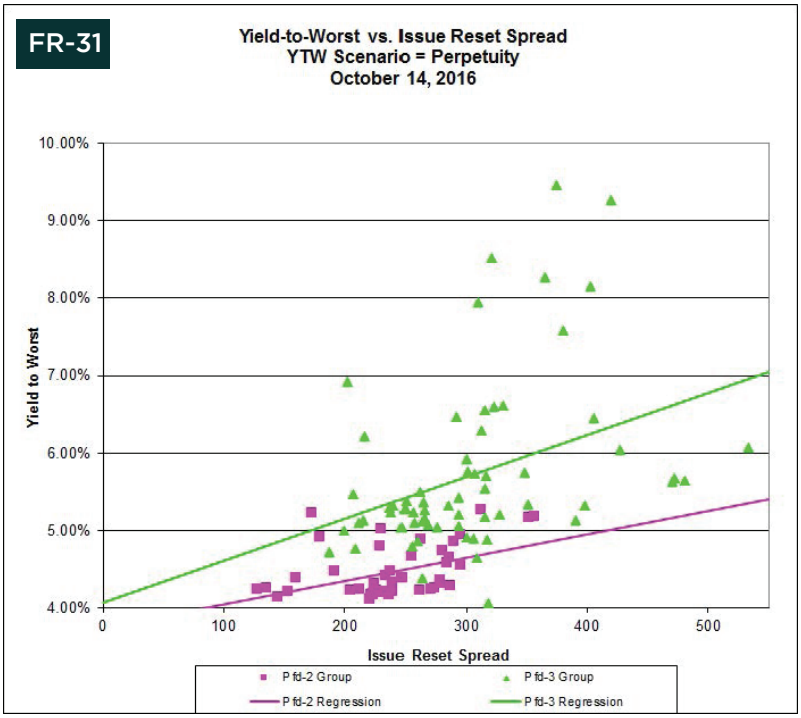
FR-29


Issue Reset Spread vs. Term To Reset
'Lesser Credits'
(YTW Scenario To Perpetuity)
550
500
450
400
350
300
250
200
150
100
Issue Reset Spread
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Years to Reset
Pfd-2 Group
Pfd-3 Group
Pfd-2 Regression
Pfd-3 Regression

FR-30


Expected Change in Dividends vs. Term to Reset
YTW Scenario = Perpetuity
October 14, 2016
Expected Change in Dividends (GOC5 = 0.76%)
5%
0%
-5%
-10%
-15%
-20%
-25%
-30%
-35%
-40%
-45%
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Term to Reset
Pfd-2 Group
Pfd-3 Group
Pfd-2 Regression
Pfd-3 Regression

FR-31

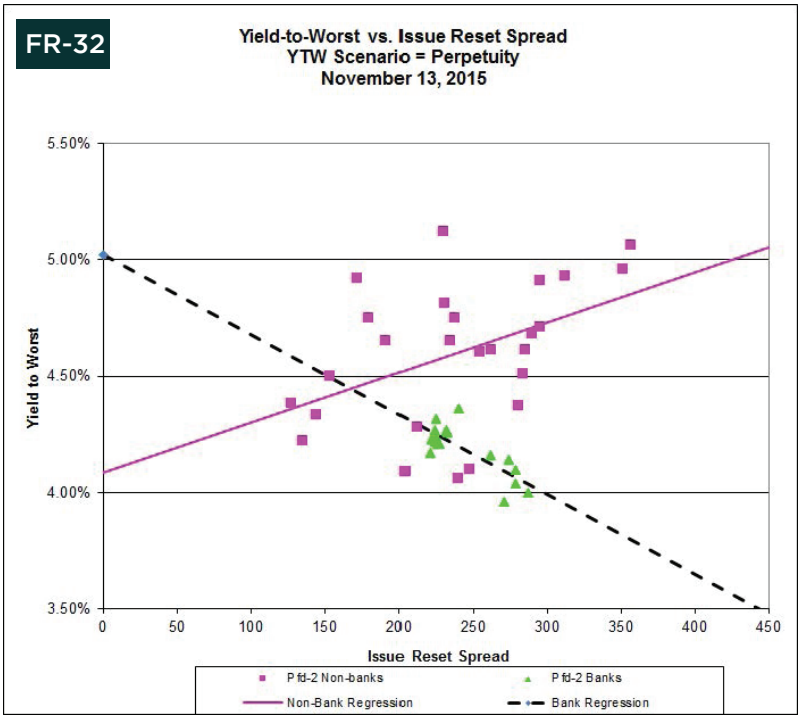

Yield-to-Worst vs. Issue Reset Spread
YTW Scenario = Perpetuity
October 14, 2016
Yield to Worst
10.00%
9.00%
8.00%
7.00%
6.00%
5.00%
4.00%
0
100
200
300
400
500
Issue Reset Spread
Pfd-2 Group
Pfd-3 Group
Pfd-2 Regression
Pfd-3 Regression

Bank Financing Loses Some Allure

In November, 2015, I asserted that it was still a good time to be a banker in Canada! Chart FR-32 examines the "Pfd-2 Group" of Chart FR-31 more closely, disaggregating banks from non-banks, using data for November 13. The correlation of IRS with YTW was 59% for the banks (compared to 17% for the non-banks) in November and it is very notable that bank issues yield significantly less than non-banks.

A portion of this lower yield might have been taken as legitimate according to standard credit analysis, since the bank issues are almost all rated Pfd-2 by DBRS, while the non-banks are almost all rated Pfd-2(low). However, it is notable that inclusion of all three subgroups of the "Pfd-3 Group" did not render correlation analysis ineffective.

Whether one may say that there is a yield advantage to being a bank, as distinct from being a non-bank of comparable credit quality is a question I will leave to better statisticians than myself; I will also leave open the question of whether the DBRS ratings are a better or worse indicator of actual credit quality than public perception implies. However, I will point out that a study by João A. C. Santos of the New York Fed using bond market data from 1985–2009 concluded:[147] *The evidence presented in this article – demonstrating the additional discount that bond investors offer the largest banks compared with the return they demand from the largest non-banks and nonfinancial corporations – is novel and consistent with the idea that investors perceive the largest U.S. banks to be too big to fail.*



The market was shocked on December 8, 2015, when Royal Bank announced[148] the issuance of a FixedReset, 5.50%+453, while the Bank of Nova Scotia came out[149] with a FixedReset, 5.50%+451. By way of illustration, Chart FR-33 shows an Implied Volatility calculation using the bank's extant NVCC FixedResets with bid prices taken from December 7, while Chart FR-34 shows the same calculation (with a change in the GOC-5 rate) using December 8 prices for the same four issues; Chart FR-35 uses December 11 prices and Chart FR-36 repeats the calculation with current October 14 prices. These calculations are summarized in Table FR-6.

147 Joao A. C. Santos, *Evidence from the Bond Market on Banks' "Too-Big-to-Fail" Subsidy*, FRBNY Economic Policy Review, December 2014, available on-line at http://www.ny.frb.org/research/epr/2014/1412sant.pdf (accessed 2015-9-12)

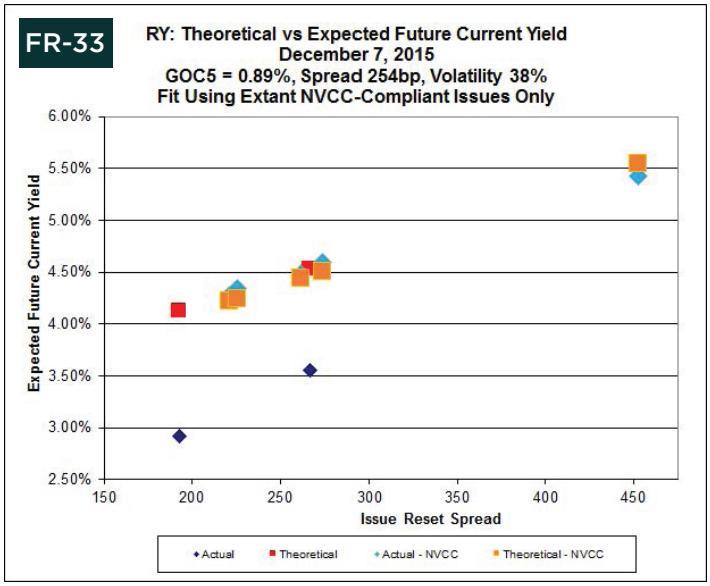
148 Royal Bank, *Royal Bank of Canada announces NVCC Preferred Share Issue*, Press Release, 2015-12-8, available on-line at http://www.rbc.com/newsroom/news/2015/20151208-nvcc-pref-shs.html (accessed 2015-12-12) and Royal Bank, *Royal Bank of Canada announces increase to NVCC Preferred Share Issue*, Press Release, 2015-12-8, available on-line at http://www.rbc.com/newsroom/news/2015/20151208-nvcc-prefshs-inc.html (accessed 2015-12-13)

149 The Bank of Nova Scotia, *Scotiabank Announces NVCC Preferred Shares Offering*, Press Release, 2015-12-8, available on-line at http://scotiabank.mwnewsroom.com/press-releases/scotiabank-announces-nvcc-preferred-shares-offerin-tsx-bns--11g074939-001 (accessed 2015-12-13)

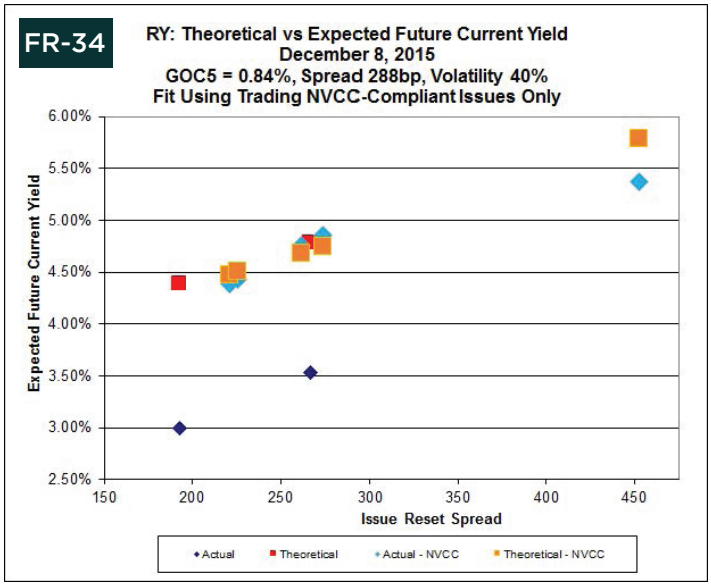
Table FR-6: Summary of RY FixedReset Implied Volatility Calculations			
Calculation Date	Issues Included	Spread	Implied Volatility
December 7	4	254bp	38%
December 8	4	288bp	40%
December 8	5	355bp	24%
December 11, 2015	5	357bp	24%
January 8, 2016	5	325bp	25%
February 12	5	384bp	19%
March 11	6	359bp	22%
April 8	6	285bp	27%
May 20	6	343bp	20%
June 10	6	308bp	24%
August 12	6	300bp	21%
October 14, 2016	6	307bp	20%

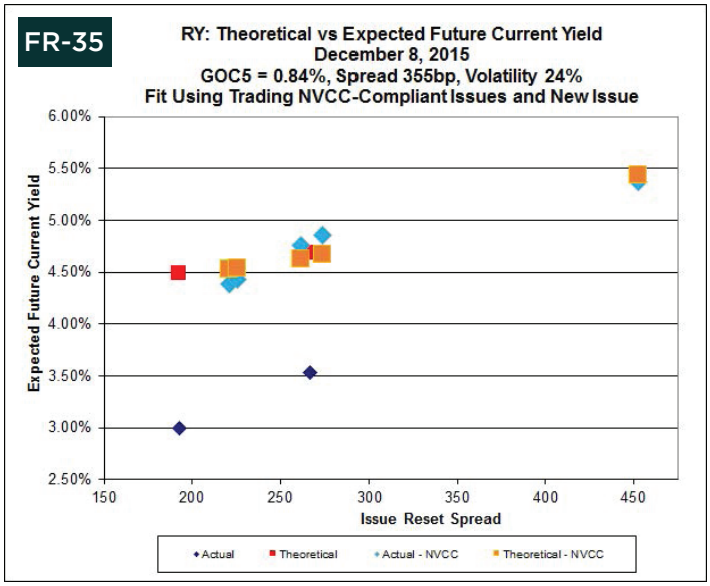
Table FR-7: Price Changes of RY FixedReset NVCC Issues On Day Of New Issue				
Ticker	Description	Bid Price 2015-12-7	Bid Price 2015-12-8	Price Change
RY.PR.H	3.52%+193	18.15	17.52	-3.47%
RY.PR.Z	4.00%+221	18.14	17.40	-4.08%
RY.PR.M	3.60%+262	19.55	18.20	-6.91%
RY.PR.J	3.60%+274	19.75	18.45	-6.58%

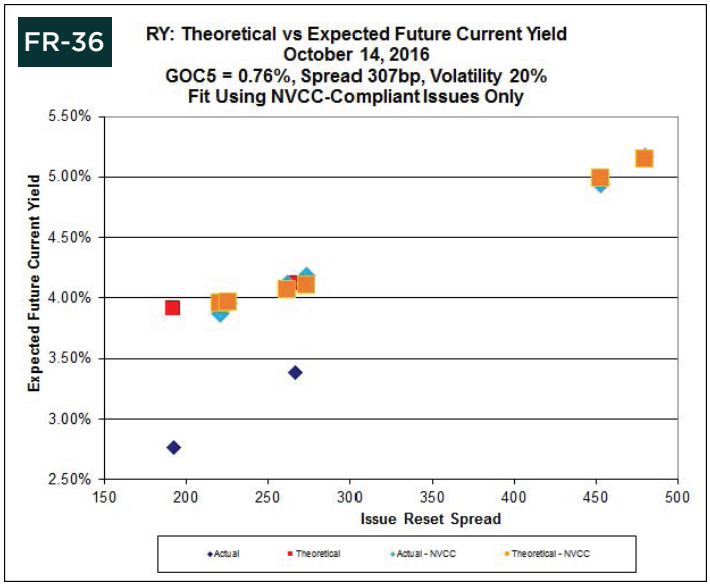
FR-33



FR-34







The Implied Volatility of these early calculations is unreasonably high at 40% – I suggest a proper figure for the Implied Volatility of FixedResets is in the high single-digits.

The Implied Volatility is still ridiculously high at 20% but this is consistent with other series of issues. I believe that this unreasonably high result is due to investor preference for lower-spread issues due to a directional forecast of both lower spreads and GOC-5 rates (lower-priced issues are more highly levered to GOC-5 and should outperform as this yield increases); that is to say, there is significant degree of confounding between the Implied Volatility effect, which suggests that issues with a lower spread will trade at a lower yield due to their lower call risk, and a leverage effect, which suggests that issues with a lower spread will trade at a lower yield as investors are willing to pay extra for issues more highly levered to the GOC-5 yield.

Be that as it may, it is clear that the market repriced itself on December 8 and it is reasonable to ascribe the drop to the high yield on this FixedReset and on the one issued by BNS: another way to justify characterizing the yield as high is to refer to the extremely low Break Even Rate Shock on the RY issue discussed above. The broad effect of the repricing is illustrated by the 1.64% drop on announcement day for the now defunct[150] TXPL index and the 2.61% drop recorded by my FixedReset index (which is based on the bid prices of investment grade issues only; it is therefore not directly comparable). Still, these broader losses are far less than the losses seen on the RY issues reported in Table FR-7.

Having discussed the epicenter of the shock, we can now update Chart FR-32 using current prices; the results of this exercise are shown in Chart FR-37. The correlation of IRS with YTW is now 41% for the banks (compared to 33% for the non-banks) and it is very notable that bank issues yield significantly less than non-banks; the yield is still significantly lower and the rationalization of the two series of data allow greater confidence when drawing the conclusion that although being a Canadian banker isn't as much fun as it used to be, it's still pretty enjoyable!

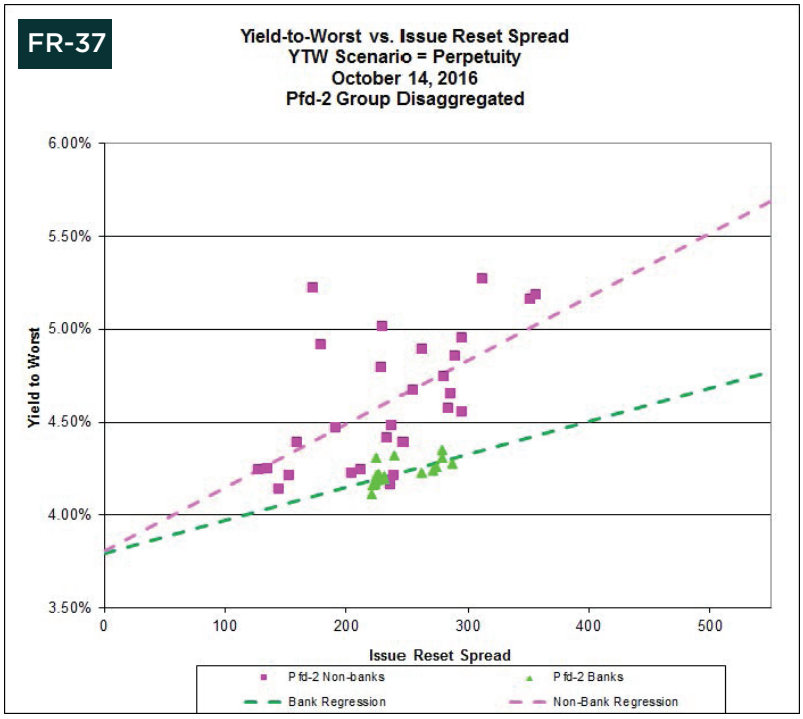
There have in recent times been worries that negative policy yields will hurt bank profit by flattening the yield curve[151] and this has been blamed for exacerbating the recent panic in equities.[152] Deutsche Bank, particularly, has seen spreads on its sub-debt and CoCos soar.[153] However, we have seen no major problems such as this in Canada.

150 See http://prefblog.com/?p=33040

151 Claudio Borio, Leonardo Gabacorta and Boris Hofmann, *The influence of monetary policy on bank profitability*, BIS Working Papers No 514, October 2015, available on-line at http://www.bis.org/publ/work514.pdf (accessed 2016-2-14)

152 Ye Xie, Lu Wang and Eshe Nelson, *Racked Markets Hand Verdict to Central Banks on Sub-Zero Rates*, Bloomberg, 2016-2-11, available on-line at http://www.bloomberg.com/news/articles/2016-02-11/racked-markets-hand-verdict-to-central-banks-on-sub-zero-rates (accessed 2016-2-14)

153 John Glover, *Deutsche Bank's Woes Threaten CoCo Coupons, CreditSights Says*, Bloomberg, 2016-2-8, available on-line at http://www.bloomberg.com/news/articles/2016-02-08/deutsche-bank-s-woes-threaten-coco-coupons-creditsights-says (accessed 2016-2-14)



Implied Volatility of Market Spreads

Those who have managed to stay awake and alert throughout this essay will be struck by the (fairly vague, this month!) resemblance of Chart FR-31 to the implied volatility graphs for Straight Perpetuals that are published in the section on DeemedRetractibles – that is to say, increasing coupon results in an increasing yield, even when market prices are used.

This is no accident, as the mechanisms are precisely the same: Increasing the Issue Reset Spread (with all else held constant) of an instrument for which a call is unlikely means an increasing price which

i) Reduces the potential for capital gain

ii) Increases the uncertainty regarding the term of the issue and therefore

iii) Should result in an increased yield to compensate for these factors.

To this end, an algorithm for determining the Implied Volatility of a series of FixedResets has been developed, as explained in an appendix to the September, 2013, edition of this newsletter which has been made public and recently updated.[154] The calculator that gives effect to this algorithm has been made public via http://www.prefblog.com/xls/ImpliedVolatility.xls. It will be noted that the "Expected Future Current Yield" is the Current Yield that will result if each issue resets at its spread over the presumed GOC-5 level of 0.76% (or any other user input) and the price remains constant.

Implied Volatility calculations for the entire set of Royal Bank (RY) FixedResets do not produce a reasonable result, as shown in Chart FR-38; but while the fit is much better when the fitting is restricted to the four NVCC-compliant issues (Chart FR-36), Implied Volatility remains at an unreasonably high level. Thus, while it is clear that the NVCC-compliant issues, RY.PR.Z, RY.PR.H, RY.PR.J, RY.PR.M, RY.PR.Q and RY.PR.R, have become differentiated from the NVCC-non-compliant issues, RY.PR.I and RY.PR.L, the NVCC-compliant issues suggest an unreasonably high value of Implied Volatility, which I interpret as an assumption by the market that the future prices of these issues have a directional component (see the section *Effects of Proximity to Par Value*).

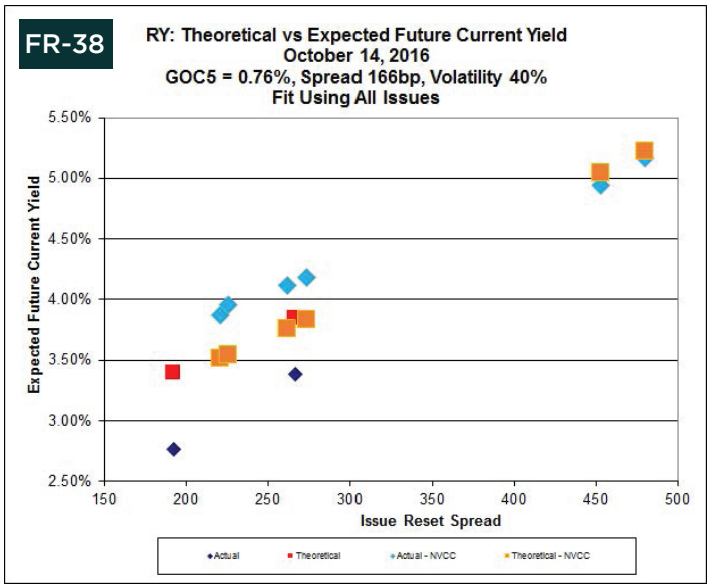
However, there is another possible explanation for unreasonably high levels of Implied Volatility, albeit one that is probably only applicable to series with a significant number of low-spread issues. It is possible that there is a degree of preferential buying of low-spread issues due to speculators attempting to take advantage of these issues' high sensitivity to changes in the GOC-5 yield (see the sections *Term Extension Risk and Lower Quality Credits*, above, and *An Experimental Data Series*, below). This would cause the lower-spread issues in such series to increase in price relative to their higher-spread siblings, hence, lower the Expected Future Current Yield of these issues preferentially, hence increase the slope of the fitted curve, hence result in a higher calculated value of Implied Volatility. We will have to see how this all turns out, but I confess to being taken aback by a comment that said,[155] in part, *The implication for me of this is that currently longer dated resets with lower reset spreads … are very much a "coiled spring"*.

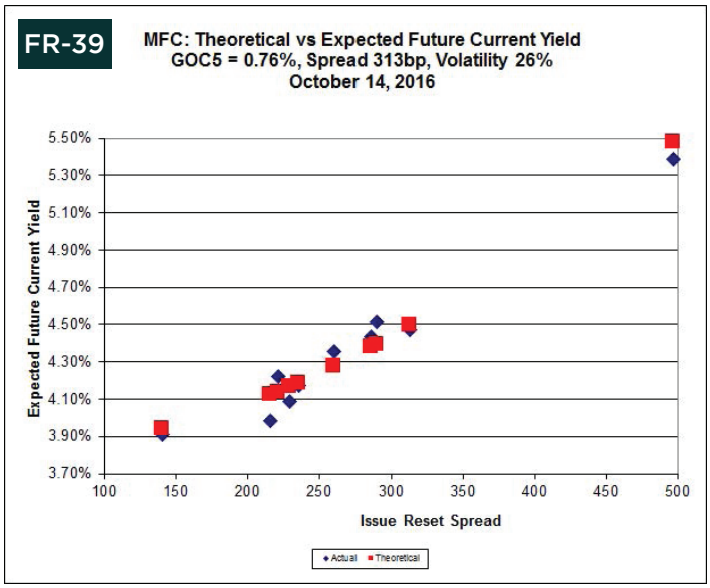
[154] See http://www.himivest.com/media/impliedVolatilityFixedResets.pdf, http://www.himivest.com/media/impliedVolatilityFixedResets_2016.pdf and http://prefblog.com/?p=27674

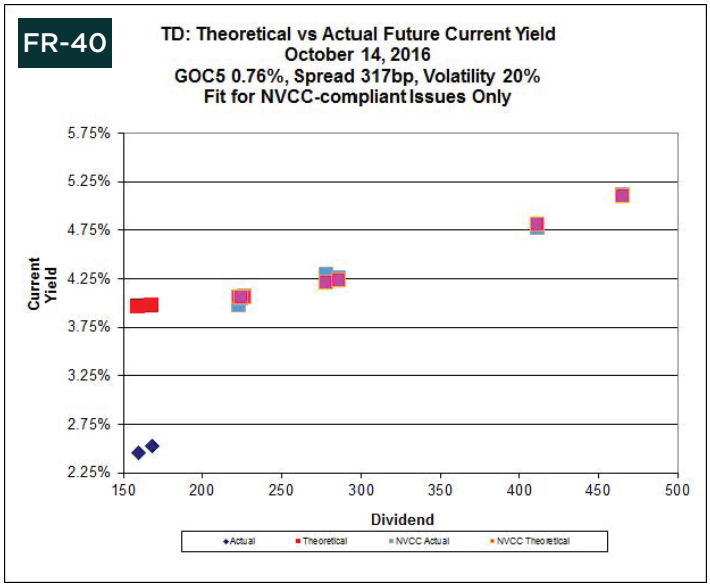
[155] See http://prefblog.com/?p=29994#comment-193387

The Implied Volatility calculated for MFC issues (Chart FR-39) has remained fairly constant over the month at 26%. The current level is still too low if MFC issues are assumed to be subject (eventually!) to the NVCC rules (as discussed in the appendix dealing with DeemedRetractibles) but far too high for a series assumed not to be subject to these rules.

It will also be noted that the calculation for the TD series of NVCC-compliant FixedResets (Chart FR-40) also shows an unreasonably high level of Implied Volatility.

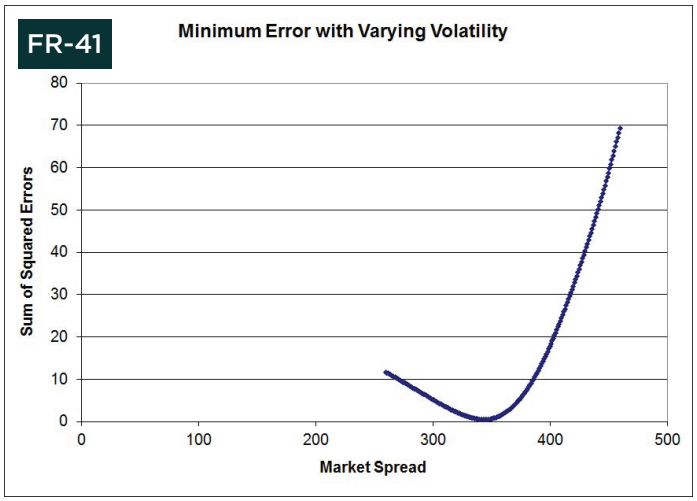




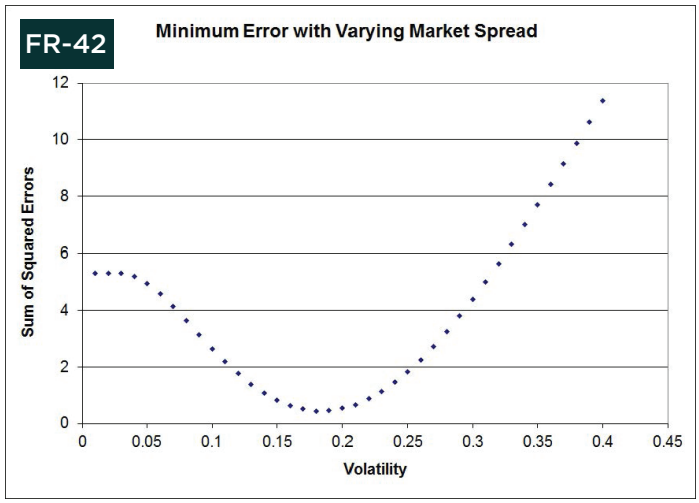


To my great relief, the local minimum that was apparent in early 2014 for the TRP issues has disappeared, as displayed in Charts FR-41 and FR-42 – it is clear that the fit, shown in Chart FR-43, is a true global minimum.

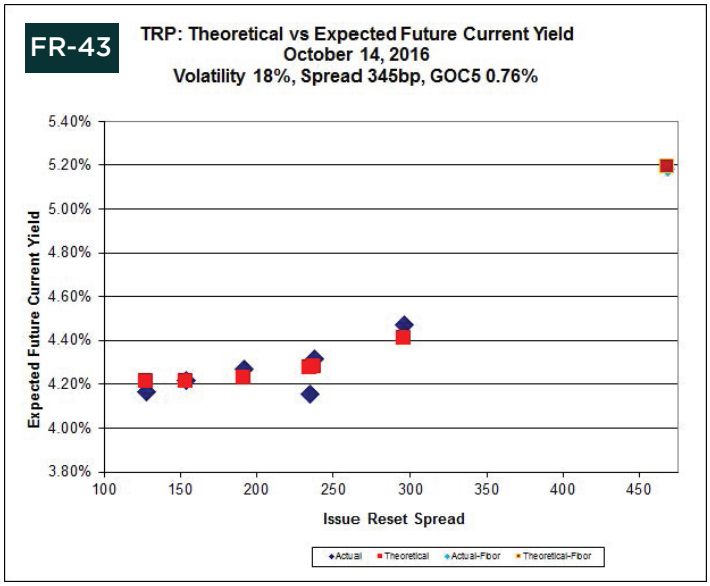
FR-41



FR-42



FR-43



The calculated Implied Volatility for the TRP FixedResets of 18% is higher than expected, although consistent with the other series examined in this section. The value of N(d2), the Risk Adjusted Exercise Probability (see the section The Implications of *High Volatility: Black-Scholes Option Pricing and N(d2)*, below) is about 5% for both TRP.PR.D (resetting at +238bp, bid at 18.20) and TRP.PR.E (resetting at +235bp, bid at 18.72) and about 16% for TRP.PR.G (resetting at +296, bid at 20.80).

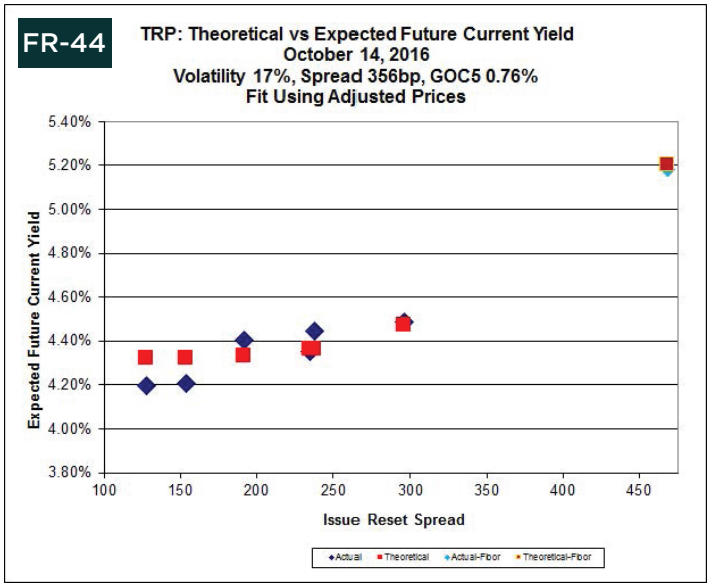
Some of the pricing differences may be ascribed to the fact that these calculations are performed using the expected long-term dividend rate, given a constant five-year Canada yield of 0.76%, when in fact the dividends will be paid at some other rate until the next reset. For instance, TRP.PR.E currently pays $1.0625 (4.25% of par), which is expected to reset to (0.76% + 235bp) * 25 = 3.11% * 25 = $0.7775 on its reset date, 2019-10-30. The difference is $0.285 p.a. and there are twelve dividend payments left before reset, so the total excess payment is $0.855. We could therefore subtract $0.855 from the market bid price of TRP.PR.E for analytical purposes, treating the instrument as a package of a callable perpetual annuity of $0.7775 p.a. and a short term cash receipt of 0.855 (undiscounted). This calculation is summarized for each of the TRP issues in Table FR-9.

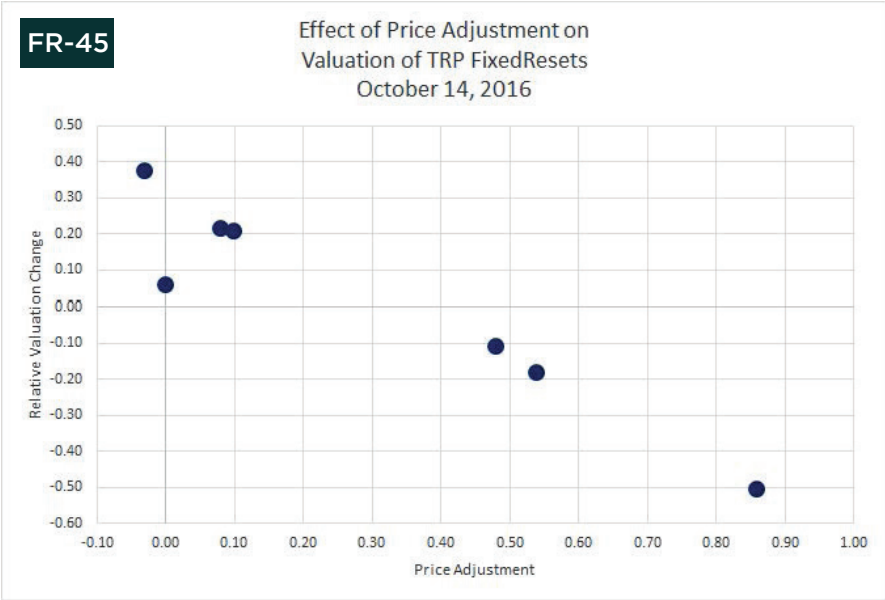
Table FR-9: Price Reductions of TRP FixedResets To Reflect Excess of Short-Term Dividend Rate over Long-Term Rate

Issue	Current Rate	Issue Reset Spread	Next Reset Date	Expected Future Rate	Gross Difference per Annum	Number of payments before reset	Total Excess Payments
TRP.PR.A	$0.8165	192bp	2019-12-31	0.67	0.1465	13	0.48
TRP.PR.B	$0.538	128bp	2020-6-30	0.51	0.028	15	0.10
TRP.PR.C	$0.56575	154bp	2021-1-30	0.575	-0.0075	17	-0.03
TRP.PR.D	$1.00	238bp	2019-4-30	0.785	0.215	10	0.54
TRP.PR.E	$1.0625	235bp	2019-10-30	0.7775	0.285	12	0.86
TRP.PR.G	$0.95	296bp	2020-11-30	0.93	0.02	17	0.08
TRP.PR.J	$1.375	469bp	2021-5-31	1.375	0.00	19	0.00

**The future rate of TRP.PR.J is set to its minimum of 5.50%.*

When current prices have been adjusted by the indicated amounts, we derive Chart FR-44, which is slightly different from Chart FR-43, which used unadjusted prices. Thus, we conclude that while the approximation made in the 'normal' calculation is imprecise, it does not appear – in this case, at any rate – to be significant in an overall sense; the fits show equivalent precision. It will be noted, however, that the change in rich/cheap analysis does not vary 1:1 with the size of the adjustment, as shown in Chart FR-45.

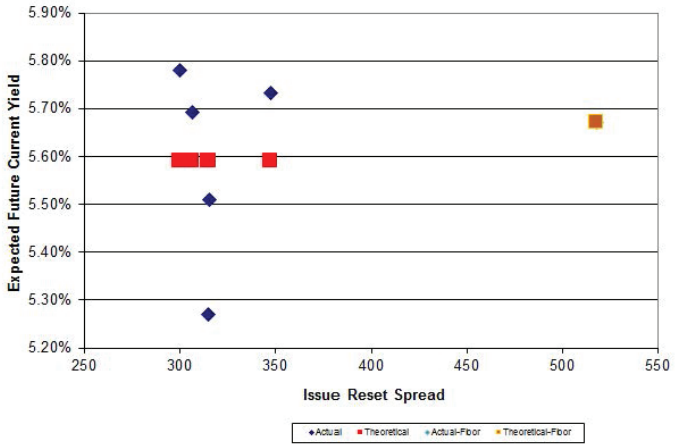




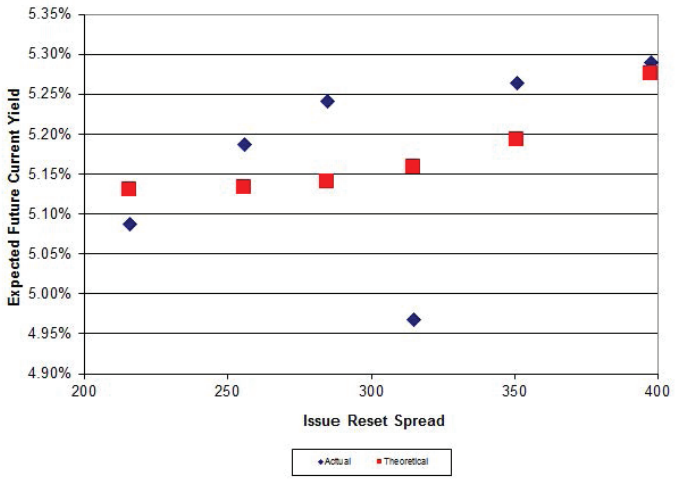
The calculation for the BPO issues showed a good recovery from the depths reached last month (see Chart FR-46), as did the FFH issues (see Chart FR-47).

These changes are summarized in Table FR-10.

FR-46



FR-47



Given that the FixedReset structure largely removes the volatility of GOC5 from consideration, I would expect volatilities in the single digit range (compared to normal expectations of 15–20% for Straight Perpetuals).

Table FR-10: Implied Volatility Calculation Results For BPO and FFH

Series	Spread	Implied Volatility
BPO	483bp (+39)	6% (-9)
FFH	437bp (+11)	14% (-4)

Bracketted figures are the changes from the August 12 calculation.

Table FR-11: Changes in Relationship Between YTW and IRS for "Pfd-2 Group" FixedResets Expected To Be Perpetul

Date	Slope (x 10^5)	Correlation
2014-8-8	4.76	60%
2014-9-12	3.20	48%
2014-10-10	3.84	41%
2014-11-14	3.04	40%
2014-12-12	3.17	13%
2015-1-9	4.24	28%
2015-2-13	2.75	7%
2015-3-13	3.78	14%
2015-4-10	4.58	14%
2015-5-8	2.91	8%
2015-6-12	2.34	2%
2015-7-10	5.00	15%
2015-8-14	4.66	10%
2015-9-11	2.52	9%
2015-10-9	0.90	1%
2015-11-13	1.48	3%
2015-12-11	2.45	12%
2016-1-8	3.61	30%
2016-2-12	1.56	1%
2016-3-11	1.24	1%
2016-4-8	3.72	15%
2016-5-20	3.32	20%
2016-6-10	3.94	35%
2016-8-12	3.72	25%
2016-10-14	3.02	19%

A slope of 10.0 indicates that a 1bp increase in Issue Reset Spread leads to a 1bp increase in yield.

Changes in Implied Volatility Over Time

Single series of preferred shares are too idiosyncratic for the purposes of long-term analysis, but as noted, the graphs which have been prepared showing YTW vs. Issue Reset Spread for the 'lesser credits' show the expected behaviour (See Chart FR-31), with the advantage of being fairly comprehensive. Table FR-11 shows the changes in the slope of the regression line over time.

As Table FR-11 shows, the correlation between IRS and YTW (Chart FR-31) has not been very good throughout the downdraft commencing in December 2014; it is interesting that correlation tends to improve with greater slope.

Understanding the "Spread"

A reader of PrefBlog asked[156] me to clarify what the "Spread" is.

The "Spread" is the spread which the company would have to offer – according to the data – in order to sell a true annuity, that is to say, a perpetual non-callable instrument paying the specified spread over five year Canadas.

This can get a little silly at times – in July, 2015, the indicated spread for RY was 88bp (and lower figures have been observed) which, given the contemporary GOC-5 yield of 1.00%, implied that they could have issued a true perpetual annuity at 1.88% (with resets at +88) … I don't think they could have sold such an issue! However, the unreasonableness of the answer implies that an inherent assumption in the calculation is wrong, which is useful information in itself. Many of the calculations of Implied Volatility, above, have been above 20%; unreasonably high, and I believe that in turn the reason for that is that the market is implicitly pricing in some directionality in the pricing, which contradicts the assumptions of the Black-Scholes model used in the calculation – an expected result for the NVCC non-compliant issues, but surprising for the compliant ones.

Generally speaking, Implied Volatility rises with price … which is to say that when the entire series is priced in the range of 24.00 to 26.00 (say), the market will assume a high probability that the end price for everything will be about 25.00. However, when market yields change and everything is priced in the range of 21.00 to 23.00, the market gets depressed and assumes that nothing will ever get better and nothing will ever be called and the current price impairment for each instrument is permanent. This makes no sense, but that's the way it is! See the section Effects of Proximity to Par Value for more discussion.

The fact that we are seeing high levels of Implied Volatility even among series of FixedResets trading at low prices is suggestive that there is another factor at play; that the influence that causes instruments with different prices to trade at different yield is not just fear of a call (Implied Volatility) but there is also a certain amount of desire for the increased leverage against the GOC-5 yield and this desire is causing yield differentiation as well (see the sections Term Extension Risk and Lower Quality Credits and Implied Volatility of Market Spreads, above, and An Experimental Data Series, below, for more discussion).

Another way of putting it is that the difference between the "Spread" and the actual Expected Future Current Yield is the price of the options; for example, with RY.PR.M the Expected Future Current Yield is currently 4.12% compared to the (0.76 + 3.07)% = 3.83% currently calculated for a non-callable perpetual annuity (using current figures from Chart FR-36), so the market is saying that RY's right to call RY.PR.M at $25.00 is worth 29bp of yield, each and every year.

Sometimes the market says silly things – in a perfect world, the Spread for any given issuer would be fairly constant (as it depends mainly on the credit quality of the issuer, although there will be a significant component due to the term premium and liquidity difference between a Five-Year Canada and a corporate perpetual annuity), while the Implied Volatility would vary somewhat with market conditions.

The Implications of High Volatility: Black-Scholes Option Pricing and N(d2)

We will also remember that in the Black-Scholes equation used to estimate these volatilities, the term N(d2) is the risk-adjusted probability of exercise, that is, they are the probabilities taking the expected return on the stock to be the risk-free rate.

To illustrate some results I consider reasonable, we can examine the figures for the BAM series of FixedResets (Chart FR-48) compared to MFC FixedResets, but given the extremely poor fit visible in Chart FR-48, we will first repeat the exercise of adjusting the bid prices by the excess payments prior to reset, as was done with the TRP series above. This calculation is shown in Table FR-12 and the resultant Implied Volatility calculation illustrated in Chart FR-49.

The fit using unadjusted prices is clearly better than that using adjusted prices. The rest of this section will discuss analytical results using unadjusted prices.

Table FR-12: Price Reductions of BAM FixedResets To Reflect Excess of Short-Term Dividend Rate over Long-Term Rate

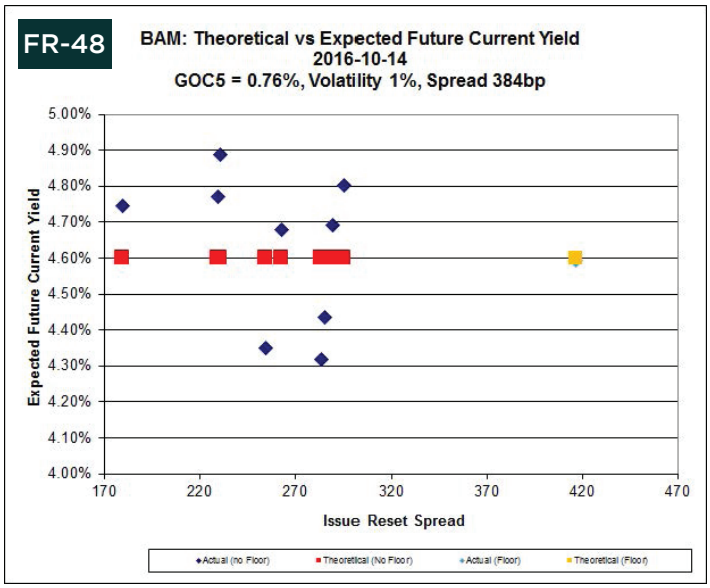
Issue	Current Rate	Issue Reset Spread	Next Reset Date	Expected Future Rate	Gross Difference per Annum	Number of payments before reset	Total Excess Payments
BAM.PR.X	1.15	180	2017-6-30	0.64	0.51	3	0.38
BAM.PR.R	0.7535	230	2021-6-30	0.765	-0.0115	19	-0.05
BAM.PR.T	1.125	231	2017-3-31	0.7675	0.3575	2	0.18
BAM.PF.E	1.10	255	2020-3-31	0.8275	0.2725	14	0.95
BAM.PF.B	1.05	263	2019-3-31	0.8475	0.2025	10	0.51
BAM.PF.G	1.125	284	2020-6-30	0.90	0.225	15	0.84
BAM.PF.F	1.125	286	2019-9-30	0.905	0.22	12	0.66
BAM.PF.A	1.125	290	2018-9-30	0.915	0.21	8	0.42
BAM.PR.Z	1.20	296	2017-12-31	0.93	0.27	5	0.34
BAM.PF.H	1.25	417	2020-12-31	1.25	0.00	17	0.00

The calculation applies the reset floor rate of 5.00% applicable to BAM.PF.H.

[156] See http://prefblog.com/?p=27145#comment-193111

The Implied Volatility is low and Table FR-13 will allow the reader to become more familiar with the probabilities of future option exercise under these conditions.

The high level of the spread means that all issues will have to see some reduction in this hurdle before they can be considered for a call; the low level of Implied Volatility means that the hurdle will not change very much. It is clear that at some point, some consideration must be given to changing the model to account for the effect of the minimum reset rate on call probability – but at this point I consider it a greater virtue to keep the model simple.



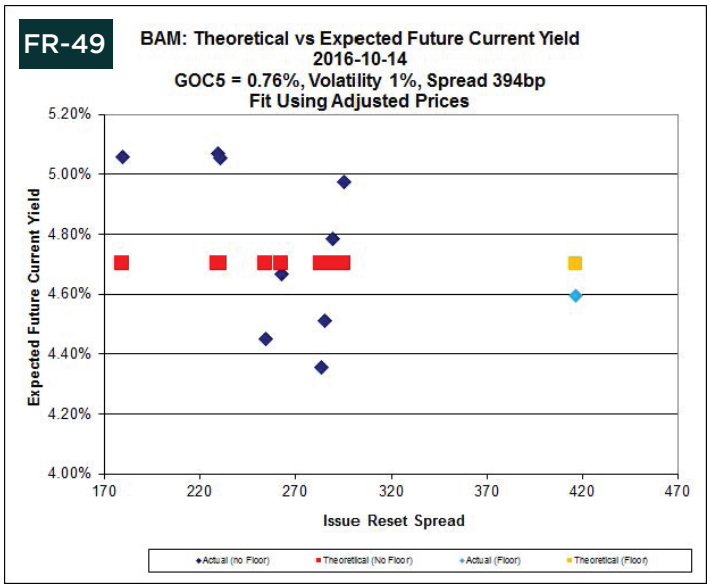


Table FR-13: Risk-Adjusted Option Exercise Probabilities for BAM FixedResets (Implied Volatility 1%, Spread 384bp)

Ticker	Description	Price	N(d2) (Risk Adjusted Exercise Probability)
BAM.PR.X	4.60%+180	13.49	0.0%
BAM.PR.R	5.60%+230	16.04	0.0%
BAM.PR.T	4.50%+231	15.70	0.0%
BAM.PF.E	4.40%+255	19.02	0.0%
BAM.PF.B	4.20%+263	18.11	0.0%
BAM.PF.G	4.50%+284	20.85	0.0%
BAM.PF.F	4.50%+286	20.40	0.0%
BAM.PF.A	4.50%+290	19.50	0.0%
BAM.PR.Z	4.80%+296	19.36	0.0%
BAM.PF.H	5.00%+417M500	27.21	2.9%

The situation is very different when we repeat the exercise for the Manulife Financial (MFC) FixedResets (see Chart FR-39).

The fit is quite good – but we derive an Implied Volatility of 26% for MFC, which, as discussed, is unreasonably high. The implications of this difference with respect to exercise probability are shown in Table FR-14.

So, if we are to take the Implied Volatilities and related calculations at face value, we are required to believe that MFC.PR.G, with an Issue Reset Spread of 290bp, has a 26.0% chance of being called for redemption. This can be compared, for instance with BAM.PF.A, which also has a spread of 290bp but has an internally consistent exercise probability of 0.0%.

These results cannot be taken seriously. It is clear that at some point either the Implied Volatility for the MFC series will decline substantially, which implies that the slope of the Expected Future Current Yield (EFCY) vs. Issue Reset Spread relationship will become more shallow, which implies that the EFCY of the lower-spread issues will increase more than than the EFCY of the higher-spread issues, which allows us to conclude that the lower-spread MFC FixedResets are over-priced relative to their higher-spread siblings, or (and this is the alternative I favour!) that the NVCC rules will in fact be applied to MFC (which should lead to a steepening of the curve and an opposite conclusion regarding relative valuation).

Table FR-14: Risk-Adjusted Option Exercise Probabilities for MFC FixedResets (Implied Volatility 26%, Spread 313bp)			
Ticker	Description	Price	N(d2) (Risk Adjusted Exercise Probability)
MFC.PR.F	4.20%+141	13.87	1.4%
MFC.PR.L	3.90%+216	18.33	10.3%
MFC.PR.K	3.80%+222	17.65	11.2%
MFC.PR.N	3.80%+230	18.71	12.9%
MFC.PR.M	3.90%+236	18.70	14.0%
MFC.PR.J	4.00%+261	19.33	19.3%
MFC.PR.I	4.40%+286	20.41	25.1%
MFC.PR.G	4.40%+290	20.27	26.0%
MFC.PR.H	4.60%+313	21.75	31.8%
MFC.PR.O	5.60%+497	26.60	68.9%

The Bozo Spread

Assuming that Current Yield is a vital element of FixedReset valuation, it is reasonable to infer that retail – which is to say, the market – judges the relative valuation between FixedResets and PerpetualDiscounts by comparing their Current Yields: something only a bozo would do (this is the "Bozo Spread Hypothesis"). Hence, Charts FR-50, FR-51 and FR-52 show the historical evolution of:

- Current Yield FixedResets less actual yield FixedResets (the FixedReset Computation Spread)
- Current Yield PerpetualDiscounts less Current Yield FixedResets (the Bozo Spread)
- Actual yield PerpetualDiscounts less Current Yield PerpetualDiscounts (the PerpetualDiscount Computation Spread – an almost negligible figure)

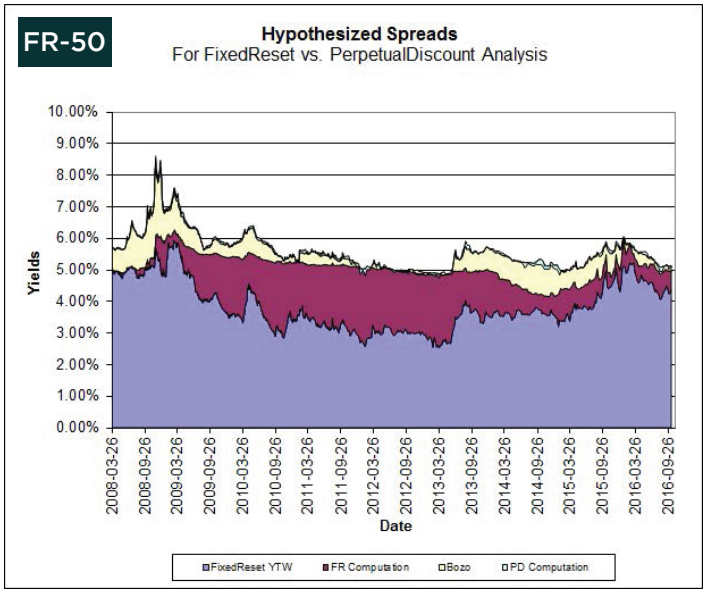
The Bozo Spread spiked during the 2013 downdraft, an effect which is also captured by Break Even Rate Shock, discussed above.

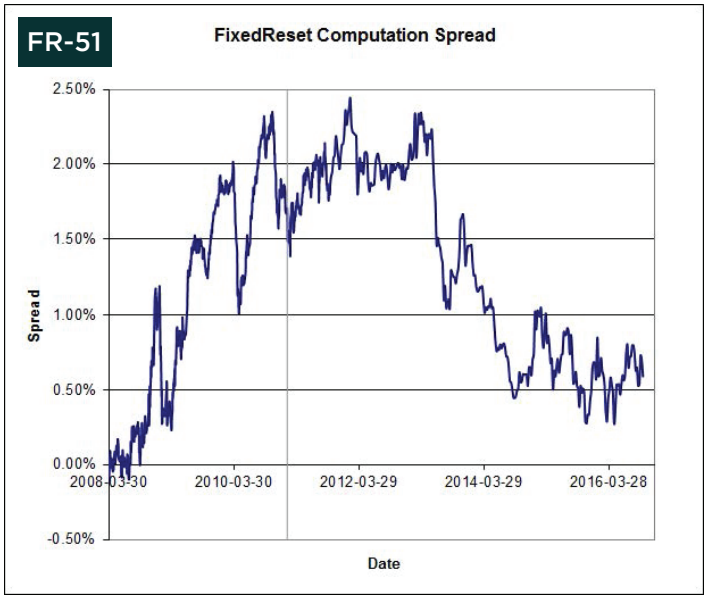
Table FR-15: Index Yield Comparisons		
HIMIPref Index	Current Yield (mean) 2016-10-14	Yield-to-Worst (median) 2016-10-14
PerpetualDiscount	5.14%	5.13%
FixedReset	4.89%	4.30%
DeemedRetractible	5.02%	3.82%

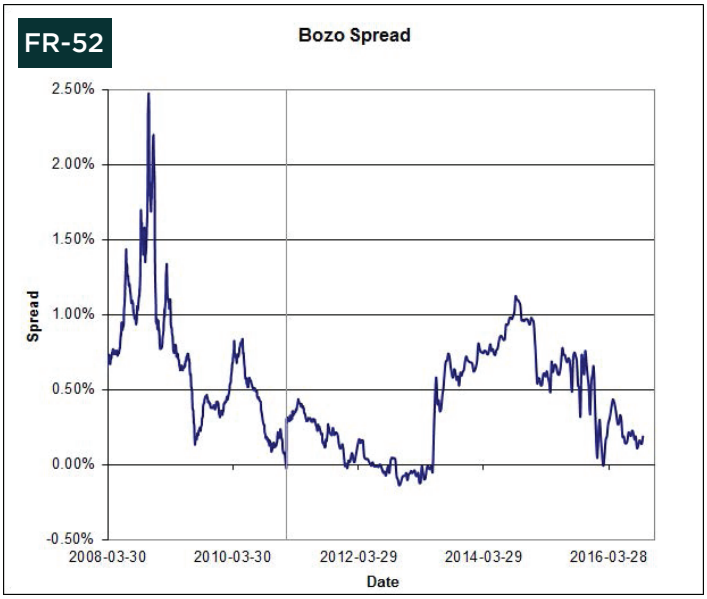
Table FR-15 compares the Current Yield and YTW for these three indices – Current Yields largely lost their comparability since early summer of 2013 as the tapering fears caused investors to reevaluate their holdings. However, it is noteworthy that on February 12, 2016, the Current Yields of the PerpetualDiscount and FixedReset indices were equal – a Bozo Spread of zero, but has since rebounded.

It will also be interesting to see what happens to the Bozo Spread as the FixedReset Computation Spread declines further – as it eventually must, when higher coupon issues are called and replaced with lower coupon issues; or when dividends are reset at the lower rate that is responsible for the lower YTW. The more recent new issues (see Table FR-5) imply a minimum Bozo Spread of 100bp although the recent Royal Bank and Manulife issues came at about zero. Eventually it will be possible to return permanently to the use of Break Even Rate Shock[157] as a gauge of value investors place on the reduced interest rate risk of FixedResets.

[157] See the June, 2009, edition of this newsletter







An Experimental Data Series

The violent reaction of FixedReset prices to changes in the GOC-5 yield since December 2014 has led me to speculate regarding the spreads that may be recognized by the marketplace. FixedResets have an inherent contradiction in their structure, as their yields are based on a short-term government bond, while their credit risk and liquidity are comparable to that of a perpetual instrument. The recent market action has led me to speculate that we are observing the same mechanism of price adjustments that was observed with Floating Rate issues during the Credit Crunch: at the same time as their dividend rate was decreasing (in tandem with Canada Prime) their required yield was increasing (in tandem with PerpetualDiscounts).[158]

To explore this idea further, I have prepared a data series which compares:

- Five Year Canada Yield
- FixedReset subindex Median Yield To Worst (interest-equivalent)
- PerpetualDiscount subindex Median Yield To Worst (interest equivalent)

These series are graphed in Charts FR-53, FR-54 and FR-55. In addition, a chart has been prepared for the proportion of the total PerpetualDiscount Interest Equivalent (PDIE) less the GOC-5 yield that is accounted for by the FixedReset spread; i.e., the second item on the bulletted list divided by the sum of the second and third items. This relationship is plotted in Chart FR-56.

[158] See my article *Some Preferreds To Float Your Boat*, on-line at http://www.himivest.com/media/moneysaver_0903.pdf

It is clearly observable that the spread between FixedResets and Five Year Canadas has been increasing; and the spike in the former series in mid-October has been exceeded by the current spike. We may observe from Chart FR-53 that FixedReset yields were relatively constant from mid-2013 to year-end 2014, when they rose above 3.50%; since then declines in prices at first served simply to offset the declines in the GOC-5 yield but the sell-off has now acquired its own momentum and yields on FixedResets are now increasing dramatically. It is odd that the market was perfectly happy with FixedReset yields of about 3.00% when GOC-5 was at 1.5%, but that 4.75% isn't enough when GOC-5 is below 1%. This makes no sense; but the Canadian preferred share market often makes little sense! See also Chart FR-57, in which the divergence of yields between GOC-5 and FixedResets is dramatically visible.

However, the 2014 observation of a more-or-less constant yield suggests that investors as a group were – until the spring of 2015 - targeting the Expected Future Current Yield (EFCY) of the index as a whole for issues that are deemed to be perpetual, in accordance with the equation:

EFCY = 25 * (GOC5 + IRS) / P

Where:
GOC5 = Government of Canada five year yield
IRS = Issue Reset Spread
P = Price

Which may be rearranged to:

P = 25 * (GOC5 + IRS) / EFCY
Which in turn implies that the derivative of Price with respect to GOC5 is

dP / dGOC5 = 25 / EFCY

which may be cast in terms akin to the fundamental fixed income equation as:

dP/P = [25 / (EFCY * P)] dGOC5

or

$\Delta P / P = (25 / P) * (1 / EFCY) * \Delta GOC5$

This hypothesis is startling for a number of reasons: first, this means that the Effective Modified Duration of these issues will be negative and second, this means that the price of these perpetual instruments is determined solely by reference to the GOC5 yield, without reference to the yield of other perpetual instruments.

It is not startling that lower-priced instruments are leveraged to changes in GOC5 by a factor of 25/P, but it is useful to bear in mind and comforting that the conclusion has been derived independently.

And finally, the factor (1 / EFCY) is expected since it is well known that the modified duration of a perpetual annuity is equal to the inverse of its yield.[159]

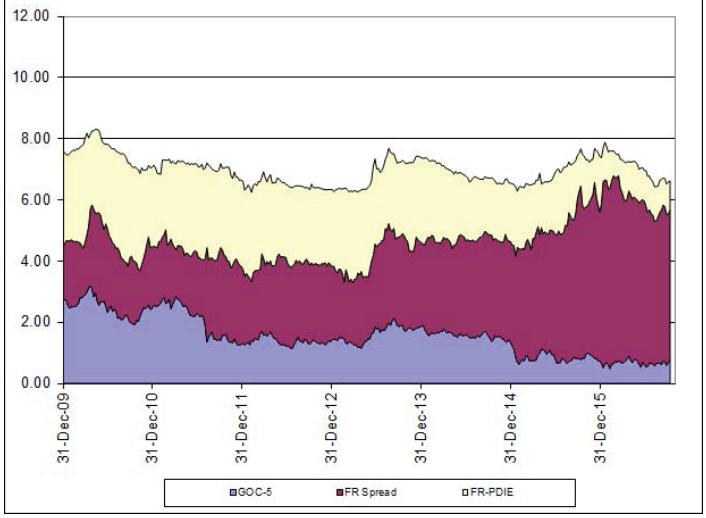
This hypothesis has been given some credence in the past by Chart FR-58, which plots EFCY against the IRS for all FixedReset issues considered to be perpetual; but this month correlations were roughly equal to those for the plot of YTW against IRS.

We may say that the interest-equivalent spread of FixedResets over five-year Canadas is near an all-time high; the yield pick-up available from swapping FixedResets for Straights is near an all time low; and the proportion of the GOC-5 / PDIE spread earned by FixedResets is near an all-time high. What's not to like?

Just how much predictive or descriptive power this data series has remains to be seen; a few years of data and at least one full interest rate cycle will be required before any firm conclusions may be draw. But it's interesting to speculate!

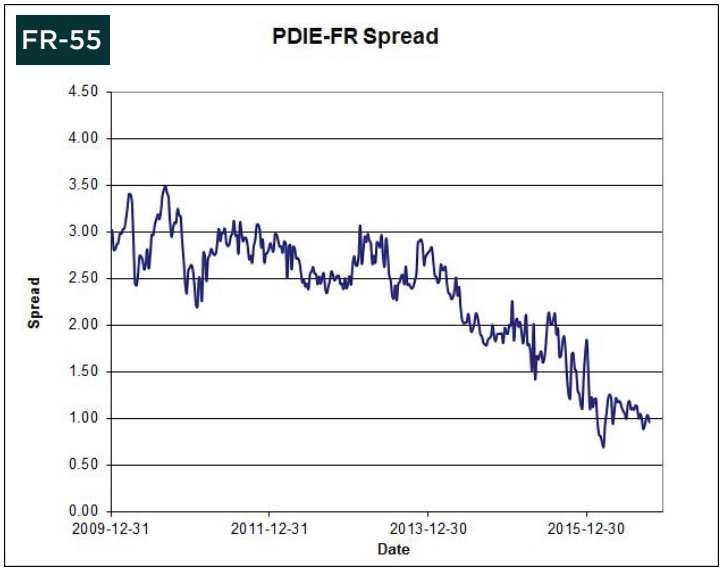
[159] See http://prefblog.com/?p=2582

FR-53 Components of PerpetualDiscount Interest Equivalent Yield

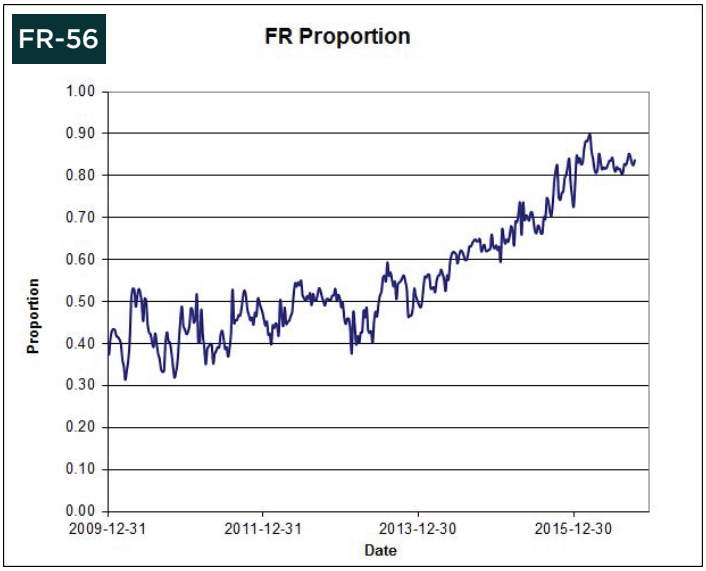


FR-54 FR-5YrCanada Spread

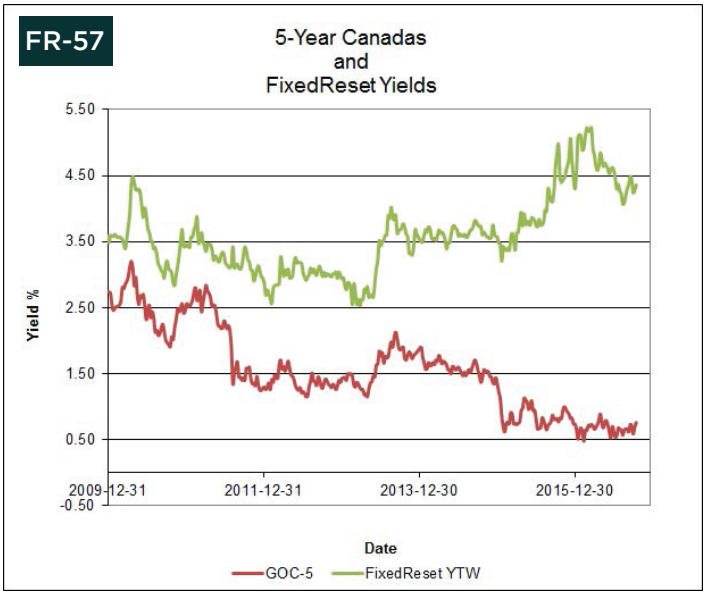
FR-55 PDIE-FR Spread

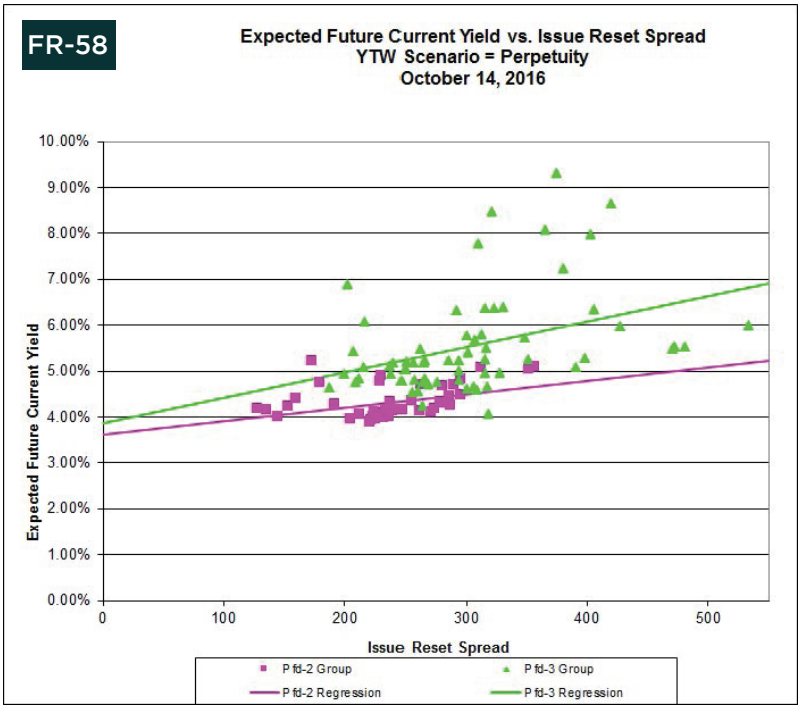


FR-56 FR Proportion



FR-57 5-Year Canadas and FixedReset Yields





Upcoming Exchange Dates

Table FR-16 shows the issues which have Exchange Dates in the next six months.

To date, it appears that redemption proceeds are in fact being reinvested in the preferred market, with new issuance sufficient to soak up all the redemption money.

Table FR-16: Upcoming Fixed Reset Exchange Dates

Ticker	Current Dividend	Issue Reset Spread	Next Exchange Date	Next Ex-Dividend Date (Mostly Estimated)	Yield-to-Worst	Bid Price	Ask Price	Yield-to-Worst Scenario
MFC.PR.G	1.10	290	12/19/16	2016-11-12	6.75%	20.27	20.51	To Deemed Maturity
BCE.PR.K	1.0375	188	12/30/16	2016-11-29	4.73%	14.20	14.26	To Perpetuity
SLF.PR.I	1.0625	273	12/31/16	2016-11-29	7.29%	19.30	19.47	To Deemed Maturity
MFC.PR.H	1.15	313	3/19/17	2016-11-12	6.01%	21.75	21.99	To Deemed Maturity
BAM.PR.T	1.125	231	3/31/17	2016-12-13	5.01%	15.70	15.90	To Perpetuity
BCE.PR.O	1.1375	309	3/31/17	2016-11-29	4.65%	21.00	21.13	To Perpetuity
BPO.PR.P	1.2875	300	3/31/17	2016-12-13	5.92%	16.26	16.52	To Perpetuity
FFH.PR.K	1.25	351	3/31/17	2016-12-14	5.34%	20.28	20.36	To Perpetuity

FloatingResets

A FloatingReset forms a Strong Pair[160] with a FixedReset and interconversion between the two elements is available on a given date in the future unless they are called – these Exchange Dates are part of the prospectus. We may assume that the prices of the two instruments will be identical on the Exchange Date (or, to be precise, the last day of notification for the Exchange Date) because if the prices are not equal then arbitrage is possible – which is not to say it always happens, as discussed in the May, 2012, edition of this newsletter.

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

Given that the future prices will be equal and the dividend rate for the FixedReset element of the pair until that date is known, we may therefore calculate the required average dividend rate for the FloatingReset required in order for the expected future return of each element to be equal until the next Exchange Date – this is done with the Pairs Equivalency Calculator;[161] calculation of the breakeven dividend rate allows calculation of the breakeven three-month bill rate. If one's forecast of the actual average rate is less than this figure, then the FixedReset element may be considered to be the cheaper element of the pair; if one is forecasting a higher average rate, then this forecast necessarily implies that the FloatingReset element is the cheaper of the pair. For instance, consider the pair TRP.PR.A / TRP.PR.F, bid at 15.70 and 14.20 respectively. Since each element of the pair may be converted to the other on the next exchange date in 2019, the entire difference in price may be ascribed to a difference in dividends expected to be received; i.e., given that TRP.PR.F is $1.50 less expensive, it should receive $1.50 less in dividends over the next five years if these issues are to be considered equal valued (this ignores liquidity and other considerations, which I do not feel apply in this case; a number of adjustments have been disregarded in this brief explanation).

Since TRP.PR.A pays a dividend of 3.266% of par, or $0.8165 p.a., or $2.653625 until the Exchange Date (thirteen dividends), the implication is that (15.70 / 14.20 = 1.106) shares of TRP.PR.F will pay (2.654 – 1.50) = $1.154 over the same period, or $0.355 per annum for 1.106 shares, or $0.321 per annum per share. This is 1.28% of par. Since TRP.PR.F pays 192bp over the three month bill rates, this implies that the average bill rate will be -0.64%; the "Quick Method" of calculation[162], which I have used for the chart, approximates this as -0.83% (the quick method doesn't count dividends, it assumes that dividends are received continuously, that the dividends received will be the annual rate multiplied by the fraction of a year).

It may well be that the market is correct in its relative pricing – the average three month bill rate for the next five years may well be equal to -83bp p.a.. But it if is higher, then the FloatingReset issue will have achieved greater returns between now and the next Exchange Date; if it is lower, of course, then the FixedReset will have been the better choice.

The thirty-three pairs currently trading are listed in Table FR-17 and plotted in Chart FR-58.

Table FR-17: FixedReset – FloatingReset Strong Pairs

FixedReset	FloatingReset	Next Exchange Date	Implied 3-Month Bill Rate
BNS.PR.P	BNS.PR.A	2018-4-26	-1.83%
TD.PR.S	TD.PR.T	2018-7-31	-1.21%
BMO.PR.M	BMO.PR.R	2018-8-25	-0.80%
BNS.PR.Q	BNS.PR.B	2018-10-25	-1.14%
TD.PR.Y	TD.PR.Z	2018-10-31	-1.13%
BNS.PR.R	BNS.PR.C	2019-01-25	-1.12%
RY.PR.I	RY.PR.K	2019-02-24	-1.24%
BNS.PR.Y	BNS.PR.D	2020-4-26	-0.35%
BNS.PR.Z	BNS.PR.F	2021-2-1	-0.19%
BMO.PR.Q	BMO.PR.A	2021-8-25	+1.47%
TRP.PR.A	TRP.PR.F	2019-12-31	-0.83%
FTS.PR.H	FTS.PR.I	2020-6-1	-1.00%
SLF.PR.G	SLF.PR.J	2020-6-30	-0.60%
TRP.PR.B	TRP.PR.H	2020-6-30	-1.13%
GWO.PR.N	GWO.PR.O	2020-12-31	-0.34%
TRP.PR.C	TRP.PR.I	2021-1-31	-1.38%
PWF.PR.P	PWF.PR.Q	2021-1-31	+0.17%
HSE.PR.A	HSE.PR.B	2021-3-31	-0.01%
MFC.PR.F	MFC.PR.P	2021-6-20	-0.60%
BAM.PR.R	BAM.PR.S	2021-6-30	-0.11%
SLF.PR.H	SLF.PR.K	2021-09-30	+0.64%
IFC.PR.C	IFC.PR.D	2021-09-30	+0.79%
DC.PR.B	DC.PR.D	2019-9-30	-0.75%
AZP.PR.B	AZP.PR.C	2019-12-31	-2.39%
FFH.PR.C	FFH.PR.D	2019-12-31	-1.45%
AIM.PR.A	AIM.PR.B	2020-3-31	-0.50%
FFH.PR.E	FFH.PR.F	2020-3-31	-0.95%
BRF.PR.A	BRF.PR.B	2020-4-30	-0.19%
EMA.PR.A	EMA.PR.B	2020-8-15	-0.94%
NPI.PR.A	NPI.PR.B	2020-9-30	-0.20%
ALA.PR.A	ALA.PR.B	2020-9-30	-0.16%
FFH.PR.G	FFH.PR.H	2020-9-30	-0.48%
FFH.PR.I	FFH.PR.J	2020-12-31	-0.90%
GMP.PR.B	GMP.PR.C	2021-3-31	-0.19%
FN.PR.A	FN.PR.B	2021-3-31	-0.95%
BCE.PR.M	BCE.PR.N	2021-3-31	-0.02%
RON.PR.A	RON.PR.B	2021-3-31	+0.62%
TA.PR.D	TA.PR.E	2021-3-31	+0.27%
SJR.PR.A	SJR.PR.B	2021-6-30	-0.21%
BPO.PR.R	BPO.PR.S	2021-9-30	-0.66%

[161] Available on-line via http://www.prefblog.com/?p=11288 (MS-Excel Spreadsheet)

[162] The "Quick Method" uses a daycount to calculate the total dividends received, rather than examining ex-dividend dates and determining how many coupons will become due.

The Implied Average 3-Month bill rates are, on the whole, about -0.54% for the investment grade issues. Note that these are averages – given a current bill rate of about +0.54% and assuming that the 3-month bill yield changes in a linear manner, then the ending rate in 2021 would have to be about -1.62% in order for the average rate to be met, which sounds like a very extreme economic depression to me!

While I am hesitant to make macro-economic predictions, I will go so far as to say that I consider the prospect of five years of such low rates to be very surprising and therefore consider FloatingResets, as a group to have been unduly punished for their relatively low dividend rates.

Note that any conclusions regarding relative valuation drawn from these implied yields only applies within each pair: if, say, BMO.PR.M is expensive relative to other FixedResets, then BMO.PR.R will be probably be expensive relative to other FloatingResets. However, the implied rates are in good agreement.

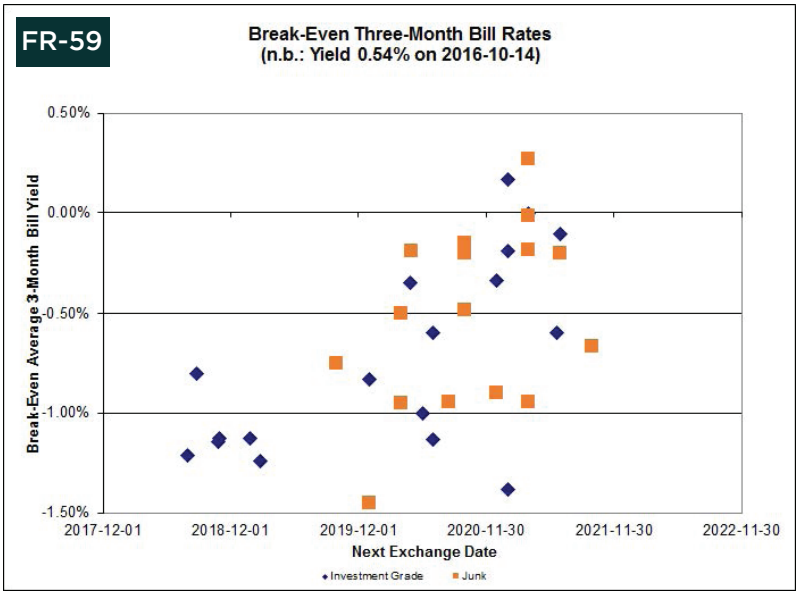
Table FR-18: FixedFloater – RatchetRate Strong Pairs

FixedFloater	RatchetRate	Next Exchange Date	Implied Average Prime*
BAM.PR.G	BAM.PR.E	2021-11-1*	3.26%
BBD.PR.D	BBD.PR.B	2017-8-1	0.17%
BCE.PR.T	BCE.PR.S	2021-11-1*	2.91%
BCE.PR.Z	BCE.PR.Y	2017-12-1	3.11%
BCE.PR.A	BCE.PR.B	2017-9-1	3.31%
BCE.PR.C	BCE.PR.D	2018-3-1	3.57%
BCE.PR.F	BCE.PR.E	2020-2-1	2.87%
BCE.PR.G	BCE.PR.H	2021-5-1	3.20%
BCE.PR.I	BCE.PR.J	2021-8-1	3.30%

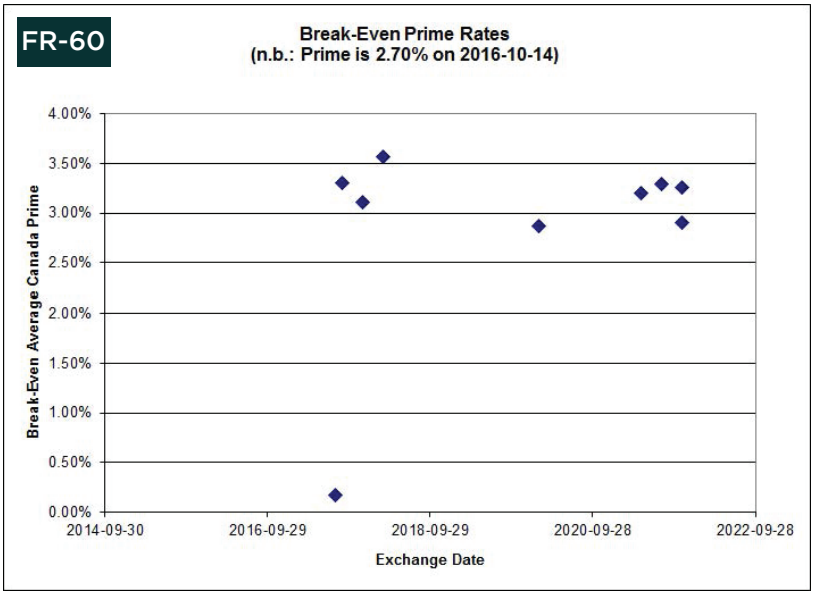
These calculations assume that all RatchetRate issues will continue to pay 100% of prime on their par value; i.e., that they will not trade above par and thereby reduce the percentage prior to their next Exchange Dates.

Figures for the pairs BAM.PR.G / BAM.PR.E and BCE.PR.T / BCE.PR.S have been derived using the dividend rates as they will be when reset 2016-11-1.

These data as predictors of future three-month bill yields are less reasonable than the predictions for average prime, as tabulated in Table FR-18 and plotted in Chart FR-60. The average is about 2.81%, implying the average will be slightly above the current value of 2.70%, in sharp contrast to the average short-rate decline implied by the FixedReset – FloatingReset pairs, but with much more dispersion and less time. This probably reflects the lower liquidity and lower credit quality of the pairs based on Prime; some uncertainty amongst retail regarding the calculation of the RatchetRate dividend yield[163] may also be to blame.



[163] See http://prefblog.com/?p=24431


FR-60
Break-Even Prime Rates
(n.b.: Prime is 2.70% on 2016-10-14)
Break-Even Average Canada Prime
4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
2014-09-30
2016-09-29
2018-09-29
2020-09-28
2022-09-28
Exchange Date