Implied Volatility in Perpetual Preferreds

The following article was written for Canadian Moneysaver but not accepted for publication on the grounds it was "too esoteric". It has been altered for publication in PrefLetter only through the addition of footnotes.

A major Canadian dealer told its clients that PerpetualDiscounts with a higher coupon are less sensitive to interest rate changes than those with lower coupons 'similar to bonds.'

This statement is incorrect, but mathematical inaccuracy has never worried the sell-side! This essay will discuss the pricing of PerpetualDiscount preferred shares in terms of the two component parts: the dividend stream and the embedded call.

Readers of these columns will remember what is meant by "PerpetualDiscount" (PD) in the Hymas Investment Management taxonomy[1] of preferred shares. A PD has the following characteristics:

- The investor has no guarantee that the issuer will ever return the invested principal – the issue may continue trading forever (this makes it a "Perpetual" issue)
- The dividends are fixed throughout the entire life of the issue (this, with the above characteristic makes it a "Straight" issue).
- The issue is trading at a price less than the original issue price, which is always equal to its lowest call price (together with the above two characteristics, this makes it a PD issue).

For a discussion of the difference between Perpetuals and Retractibles[2], see the June, 2006, edition of *Canadian Moneysaver (CMS)*; for a discussion of the importance of the third point[3], see the March/April, 2007, edition. One class of perpetual preferred shares that is not Straight is the FixedResets, discussed[4] in May 2008.

A PD may be modelled as a perpetual annuity with an embedded short call option that the shareholder has granted to the issuer.

Pricing the Annuity

The price of a perpetual annuity is simply the dividend multiplied by the inverse of the yield – such an annuity, paying $1.20 annually and priced to yield 5% will be valued at $1.20 x (1 / 0.05) = $24.00.

The fundamental equation of fixed income expresses the price change of a fixed income instrument as a multiple of its change in yield, as discussed[5] in the May 2007 CMS:

$$\Delta P = - D_{MOD} \bullet \Delta I$$

Where: ΔP is the percentage change in price
ΔI is the change in percentage yield
D_{MOD} is the Modified Duration

D_{MOD} expresses the sensitivity of the price of a fixed income instrument to changes in yield. If yields change by 0.1%, say, from 5% to 5.1%, the price of a bond with a D_{MOD} of five will change by five times that change, or 0.5%. As shown in the May, 2007, CMS, the D_{MOD} of a par bond with a fixed coupon will increase gradually as the term increases, but only to a limit; this limit is 1/r, where r is the yield (see http://www.prefblog.com/?p=2582) and thus a perpetual annuity with a yield of 5% has a D_{MOD} of 20. It is not infinite, like the term, because each regular cash flow contributes to the yield and to the yield sensitivity.

Say, for instance, that yields increase from 5% to 5.1%. The price of the annuity will then be $1.20 x (1 / 0.051) = $23.53, a decline of nearly 2%, almost equal to the factor or twenty times the change in yield predicted. The slight difference is due to our having applied too great a change to the yield: ten basis points is a small, but not infinitesimally small amount! At a yield of exactly 5%, the D_{MOD} is exactly 20; but as the yield increases the D_{MOD} decreases, so at a yield of 5.05%, the D_{MOD} is 1 / 0.0505 = 19.8.

If we wish, we can elaborate on the fundamental equation by adding a term for "convexity" (see[6] CMS, November 2007) but for small changes in yield the errors due to the assumption of a constant D_{MOD} will be correspondingly small. It should also be noted that all the above assumes that we are pricing the annuity at the very beginning of a payment period – when we price it halfway through a period, for instance, the formula becomes a little more complex.

Some investors will blithely purchase long term strip bonds with no cash flows prior to maturity and with D_{MOD} = 30 while simultaneously deprecating perpetual preferred shares for their price volatility. There are many reasons why a rational investor might prefer the long term strip bond – but a reduction in yield sensitivity is not one of them!

Pricing the Embedded Call

In order to price the embedded call, we may use the Black-Scholes option pricing model, a complex mathematical formula based on sometimes dubious assumptions. A good overview of the technique is available at http://hilltop.bradley.edu/~arr/bsm/model.html

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1 See http://www.prefletter.com/whatPrefLetter.php for a complete description

2 *Perpetual and Retractible Preferred Shares*, available on-line at http://www.himivest.com/media/moneysaver_0606.pdf

3 *Perpetual Hockey Sticks*, available on-line at http://www.himivest.com/media/moneysaver_0703.pdf

4 *Analysis of Perpetual Resets*, available on-line at http://www.himivest.com/media/moneysaver_0805.pdf

5 *Modified Duration*, available on-line at http://www.himivest.com/media/moneysaver_0705.pdf

6 *Convexity*, available on-line at http://www.himivest.com/media/moneysaver_0711.pdf

Briefly, the Black-Scholes model assumes that the best estimate of a financial instrument's future price is its current price, but that the actual future price will vary around this estimate in a well-defined way – a bell curve. The price of an option will be determined by the chance that it will be valuable at the time of its expiry: if you have an option with a 10% chance of being worth a dollar and a 90% chance of being worthless; the option's price should be ten cents (ignoring adjustments for the time value of money).

The width of the bell curve of possible future prices is dependent upon two factors: the time to expiry of the option (naturally, the longer to expiry, the wider the distribution) and the volatility – a measure of how much change in the price may be expected in a standard period of time (usually a year).

Volatilities do not have to be expressed in terms of price; it is entirely admissible to perform the calculation in terms of yields, which then provides results in terms of yields. These yields can be converted to prices by multiplying by D_{MOD}.

Good agreement with data can usually be obtained by assuming a yield volatility of 15% per year and a term of three years.

Theoretical Price of a PerpetualDiscount Preferred Share

Table 1 analyzes a preferred share paying $1.25 per year, (5% of its issue price of $25) in terms of the above discussion. The option will be "in the money" if the market yield of a pure annuity declines below 5%.

Table 1: Pricing a PD Issue from its Components

Pure Yield	Annuity Value	Option Value	Net PD Fair Price	PD Yield at Fair Price
6.3%	19.84	-0.10	19.74	6.33%
6.1%	20.49	-0.18	20.31	6.15%
5.9%	21.19	-0.29	20.90	5.98%
5.7%	21.93	-0.45	21.48	5.82%
5.5%	22.73	-0.67	22.06	5.67%
5.3%	23.58	-0.97	22.61	5.53%
5.1%	24.51	-1.35	23.16	5.40%

The PD issue is assumed to pay $1.25 p.a. and be callable at $25.00. The option value is determined with a yield volatility of 15% and a term of 3 years.

An examination of Table 1 allows us to draw some interesting conclusions:

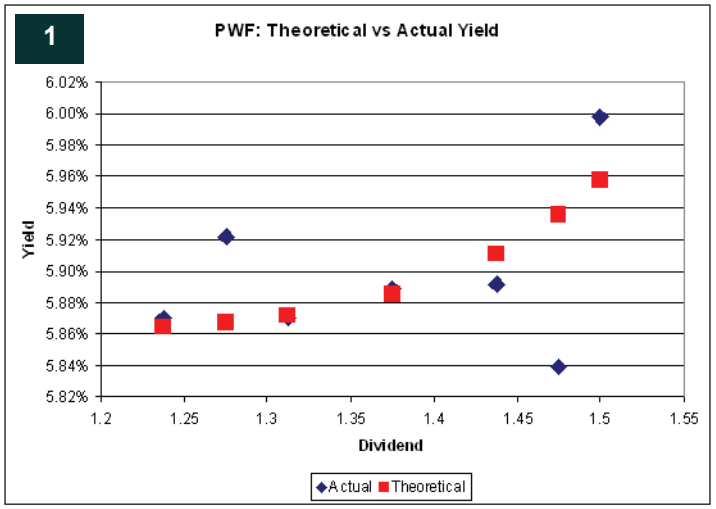
- The sensitivity of higher coupon issues to changes in market yields will indeed be lower than that of lower coupon issues, since the option value and the annuity value will change in opposite directions in response to changes in market yields
- New issues of straight preferreds should only be purchased if they yield significantly more than discounted preferreds from the same issuer, since the option value can be substantial
- June 2008 was an extremely strange month, as discussed[7] in the September, 2008, CMS

The fact that the reduction of sensitivity for higher-coupon (but still below-market) issues is due to the option effect, rather than anything to do with bonds is important!

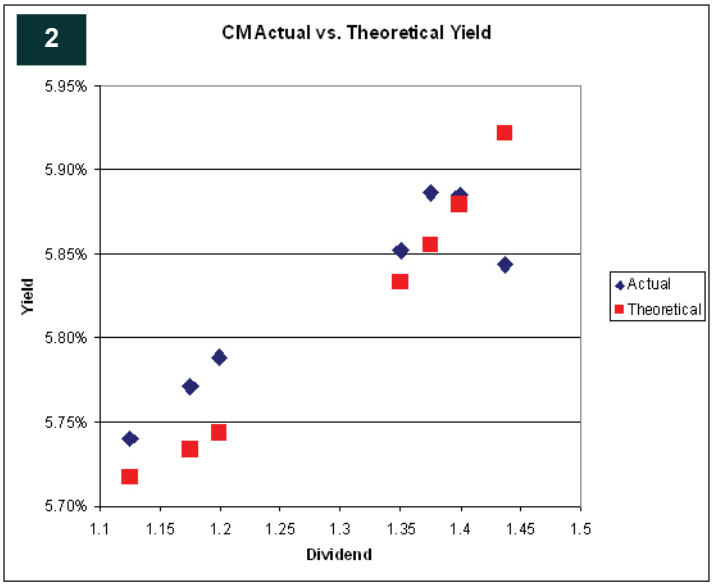
- The mechanism is only effective if the options are priced in a rational manner; that is, if higher coupon issues yield substantially more than lower-coupon issues
- Even if properly priced, the effect rapidly declines with declining coupon. The difference in option value between a $24 issue and a $23 issue is far greater than the difference between issues priced at $20 and $19.

Implied Volatility

When deriving the option prices for Table 1, I used estimates of the volatility of pure yields, but there is nothing magical about the estimate. There is no "correct" way to calculate historical volatility, there is no guarantee that historical volatility is applicable to future volatility, and for various reasons investors may take views on the market that are inconsistent with the assumptions regarding future probability distributions and fair value. A speculator might be convinced that the future price of gold will be $1,500/oz., and buy call options irregardless of cost, for example.



[7] *The Swoon in June*, available on-line at http://www.himivest.com/media/moneysaver_0809.pdf



Current prices to estimate the degree of volatility being priced by the market; this is referred to as the implied volatility. Charts 1 and 2 show the result of fitting market data to the theory for CM and PWF issues, respectively, using a spreadsheet that I have made available at http://www.prefblog.com/xls/PDTheoreticalPricing.xls.

The implied volatility for PWF is 8%, but this value is 14% for CM. This is an enormous difference, implying that holders of high-coupon CM issues are being paid a lot more compensation for the option than are holders of high-coupon PWF issues. Given such a situation, a holder of a portfolio comprised of high-coupon PWF and low-coupon CM should consider trades resulting in a low-coupon PWF and high-coupon CM portfolio since – whatever one's views on the "true" value of volatility – the new portfolio is better.

Portfolio Management Implications of Implied Volatility in Perpetual Preferreds

That article was pretty hot stuff, eh? "Too esoteric", hah! Just wait until it wins the Nobel Prize in Literature – or at least a Pulitzer – then they'll look pretty silly! However, publishing it as part of PrefLetter means that I can discuss the further implications of the technique without worrying about the word-count and reach new peaks of propellor-head bond-geekery!

The prior article presented a model for generating self-consistent theoretical prices from market data. As with any other model, it must be examined critically to determine its weaknesses; these should be listed explicitly in order that a Portfolio Manager may take a view on how likely it is to be useful when executing trades. Therefore, problems with the model will be examined first.

Enormous Changes in Attributes

Table 1 shows market data for CM issues on 2008-12-31 and on 2009-1-9, while Table 2 shows the results of the analysis via the spreadsheet. For greater clarity, I will emphasize that this example has been chosen using data from just over a year ago, when the markets were much more volatile than they are now. I suspect that I will be mining this period for illustrative data for some time to come!

Table 1: Quotes and Bid Current Yields for CM Issues, 2008-12-31 and 2009-1-9

Ticker	Annual Dividend	Quote 2008-12-31	Current Yield at Bid 2008-12-31	Quote 2009-1-9	Current Yield at Bid 2009-1-9
CM.PR.D	1.4375	19.26-69	7.46%	20.26-39	7.10%
CM.PR.E	1.40	18.95-24	7.39%	19.89-95	7.04%
CM.PR.G	1.35	18.35-39	7.36	16.91-09	7.05%
CM.PR.H	1.20	16.48-67	7.28%	19.16-36	7.10%
CM.PR.I	1.175	16.53-59	7.11%	16.88-90	6.96%
CM.PR.J	1.125	15.75-90	7.14%	16.20-24	6.94%
CM.PR.P	1.375	18.41-69	7.47%	19.60-64	7.02%

Table 2: Implied Volatility Calculation Results for CM Issues, 2008-12-31 and 2009-1-9

Attribute	Value 2008-12-31	Value 2009-1-9
Pure Yield	3.70%	6.70%
Volatility	85%	35%
Error	0.14	0.13*
Mean Yield	7.32%	7.03%
Min Yield	7.11%	6.94%
Std. Dev. Of Yield	0.15%	0.06%

** When the outlier, CM.PR.H is removed from the analytical data, the error declines to 0.01 with Pure Yield 6.83% and Volatility 30%*

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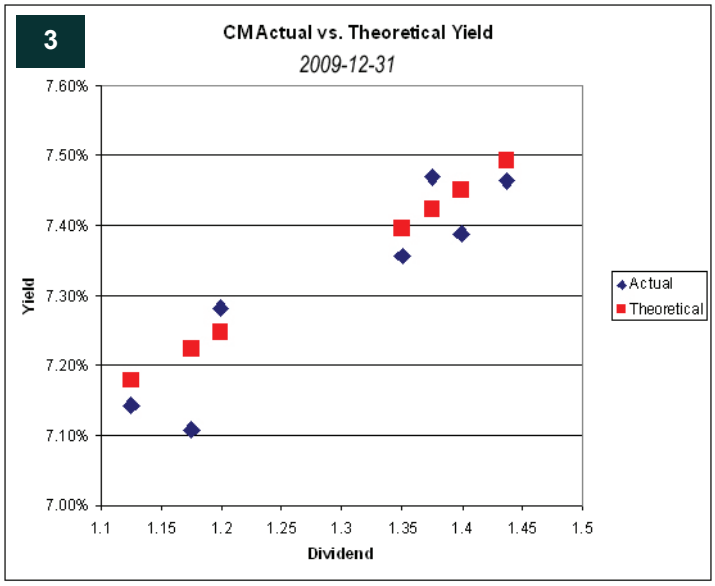

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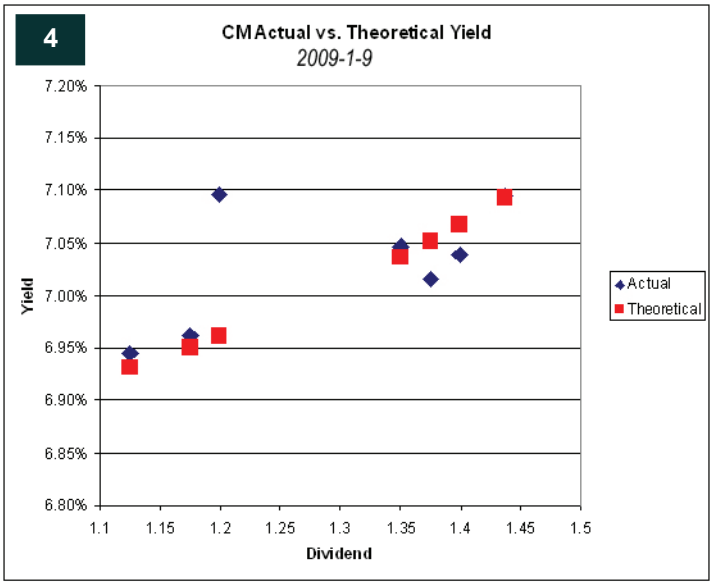

It will be noted that the two attributes of interest, Pure Yield and Volatility, changed dramatically in a span of less than two weeks. I will show later that this is ultimately a good thing for portfolio managers seeking to extract excess returns from the market who were in a position to take advantage of the change, but it does imply that very few, if any, market participants are paying attention to these data; changes may be a great deal more random than one would like and extreme values may similarly be more persistent than ideal.

One effect of these observations has been highlighted in my essay *The Swoon in June*[8]: having positioned the portfolio of Malachite Aggressive Preferred Fund to take advantage of relatively low levels of volatility (i.e., the yield give-up for holding PerpetualDiscounts far below their call price was minimal), the volatility promptly became negative (towards the end of June, there was actually a yield pick-up for holding low-coupon issues). This astonishing display of mathematical ignorance in the marketplace not only made June 2008's results rather horrible, but completely wrecked what had been looking like a pretty good quarter.

Additionally, the fact that my ability to take advantage of the situation was negligible (having already executed all feasible trades of this nature) meant that the inevitable rebound merely brought me back to the starting position, rather than resulting in outperformance. This caused a great deal of mental stress.

Influence of Outliers

While the outlier in the 2009-1-9 analysis did not have a great effect on the calculated Pure Yield and Volatility, it should be clear that this will not always be the case. A possible refinement to the spreadsheet would test the fitted data for outliers, possibly rejecting some or assigning them a lower weight in the analysis.

Influence of Persistent Outliers

The model considers the valuation of the PerpetualDiscounts solely in terms of the annuity value and option value, but there are many other influences on securities prices that the model ignores and that are not addressed by restricting the valuation to a single credit; one important element of fixed income pricing, for instance, is liquidity.[9] If any given issue is persistently more or less liquid than its peers, we will normally expect a yield discount or premium, respectively, to be applied to this issue, introducing a bias in the observed data that is not accounted for in the model.

Any quantitative model must be tested – both by machine and by eye – for persistent outliers or patterns of outliers in an effort to determine the nature of unaccounted differences. Any significant distorting factors may then be incorporated into the model to improve its predictive power; but the model discussed in this essay has simply sought to minimize the distortion by making the data set as homogenous as possible (like instruments issued by a single name) and has not progressed to such levels of sophistication.

The process of refinement is, by the way, what separates quants from pseudo-quants. I have seen many investment strategies fail completely due largely to the designers' view that their first effort was perfect and did not require adjustment.

Influence of Bid/Offer Spread

Another objection that may be raised is that the technique uses only the closing bid price. It is not unknown for either the bid or the offer of any given issue to change dramatically in the last few minutes of a trading day as market players who have been unable to obtain fills at their desired prices change their orders to obtain execution. In a thinly traded, little watched market such as Canadian Preferred Shares, the market depth is often insufficient to avoid a dramatic change in the reported quote for each issue, which may thus fail to reflect the actual market.

The methodology for calculating implied volatility could be improved by redefining the error – the error could be defined as zero if the fitted value is inside the market and be based on the difference from the closes side of the quotation when outside.

Influence of ex-Dividend Date Proximity

The model as presented in the spreadsheet uses current yield, rather than a precisely calculated yield.[10] While this does not result in significant error when examining a set of issues from the same issuer (which have the same ex-Dividend date or, at least, there are no current exceptions in the HIMIPref™ PerpetualDiscount index), it does complicate matters considerably when comparing results from two different issuers.

Say, for instance, we have an issue paying $1.60 annually (issue yield of 6.4%) or $0.40 per quarter, trading at a price of $20.00 for a current yield of 8.00% (obviously, I have selected these numbers for simplicity of calculation, rather than as representative of current conditions!). According to the earlier discussion, $D_{MOD} = 1/0.08 = 12.5$ (on each ex-Date). Therefore, we expect a 1% change in yield to result from a 12.5% change in price. Therefore – and to a first approximation only! – the 2% drop in price such as that which results from accrual of the dividend on the ex-Date will be equivalent to a 16bp change in yield when yield is properly calculated.

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8 *The Swoon in June*, available on-line via http://www.prefblog.com/?p=3126

9 Federal Reserve Bank of New York Staff Report #414, Michael J. Fleming & Neel Krishnan, *"The Microstructure of the TIPS Market"*, December 2009, available on-line at http://www.newyorkfed.org/research/staff_reports/sr414.pdf

10 Precise yields which do include ex-Date proximity may be calculated on the spreadsheet available at http://www.telusplanet.net/public/kbetty/ytc.xls as discussed on-line at http://www.prefblog.com/?p=1227 and http://www.prefblog.com/?p=864. See also the article *Yield Ahead*, available on-line at http://www.himivest.com/media/moneysaver_0607.pdf

Since there is very little practical difference between the issue on the day prior to the ex-date and the same issue + the accrual on the day after, we can say as a rule of thumb that the difference between Current Yield and a properly calculated yield can be anywhere between zero (on the ex-Date) and 16bp (on the day immediately prior to the ex-Date), given an issue with the characteristics cited – a significant difference that must be borne in mind before blindly comparing the current yields of two issues with different ex-Dates.

Fitting Error

With so few data points available for any given credit, it is apparent that relatively minor changes in a critical value may result in dramatic changes in the derived values for Pure Yield and Volatility. Ideally, an analysis would indicate the ranges of possible values for these results, perhaps by repeating the analysis with a Monte Carlo technique used to change the quotations slightly.

Given the lack of data, I would not trust the results of a statistically inspired regression.

Co-Dependence of Output Attributes

A minimal amount of experimentation with the spreadsheet will serve to show readers that the Pure Yield and Implied Volatility attributes are not independent; an increase in Implied Volatility will generally have a non-negligible effect on the calculated value of Pure Yield.

This causes difficulty in constructing meaningful time series and, particularly, in comparing the values of the attributes between two different credits.

Arbitrary Assignment of Option Term

The model assigns a constant term to the potential calls at par of each instrument, which may not necessarily be the case; additionally, the option is presented as being European-style (exercisable only on the expiration date) whereas the options are, in fact, exercisable in perpetuity on and after a given date and are not separable from the PerpetualDiscount issues (which are modelled as perpetual annuities).

I have not tackled the problem of expressing these nuances in a mathematically satisfying manner; as far as I can tell such mathematics would have to incorporate assumptions regarding the covenants to be attached to potential new issues.

Pure Yield is not an Observable Parameter

The Black-Scholes model assumes that the option is written in terms of an underlying traded instrument, which is not the case in this formulation. To the best of my knowledge, there are no perpetual annuities traded in Canadian dollars: Perpetual Government bonds are no longer available in Canada – there was an issue in 1936 (at 3%), but these were redeemed in 1996 after a twenty-year warning period[11]. The United Kingdom still has many such issues outstanding with a total face value of £2,885-million; the oldest of which carries a 2.5% coupon and was issued in 1853[12].

Given the long history of corporate finance, it's probable that some company at some time offered truly perpetual issues, but I certainly don't know of any!

The Tone of the New Issue Market is not Considered

Since corporations do not issue perpetual annuities, the most reasonable analytic approach for a complete model would evaluate the option not in terms of cash value and Pure Yield, but in terms of the coupon rate required on a new issue, with an appropriate allowance for issue costs, which can be in excess of 3% of principal value.

Such a model would have to make assumptions regarding an option black-out period, since most issuers are forbidden by regulatory edict to issue perpetuals that are callable within five years of issue and, in practice, straight perpetuals are not callable at par until nine years following date of issue (readers may remember that one of my objections to the FixedReset structure[13] is that they are callable at par sooner than this).

On the Other Hand …

The various problems with the model noted above will have many readers wondering if it has any value at all. This is a good thing! One should always bear the faults of a model firmly in mind prior to executing trades; in fact, I consider the most important personality trait of a good fixed income investor to be a constant mental state of confusion, hopelessness and despair.[14]

But not all is lost! Having enumerated the main weaknesses of the model, we may examine its good points; with any luck at all, we may be able to squeeze a little more performance out of our portfolios while retaining the ability to evaluate the applicability of its output.

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[11] Serge Joyal, Commons Debate May 2, 1975, available online at http://www.sen.parl.gc.ca/sjoyal/e/debates/bonds_government_perpetual.html (accessed 2009-4-9)

[12] UK Debt Management Office, *Annual Review 2007–08*, available on-line at http://www.dmo.gov.uk/documentview.aspx?docname=publications/annualreviews/gar0708.pdf&page=Annual_Review

[13] See *Analysis of Perpetual Resets*, available on-line at http://www.himivest.com/media/moneysaver_0805.pdf

[14] I rarely get invited to parties.

The Model is Well-Founded in Theory

Option theory has been extensively used in portfolio management for a long time and the modern ability to calculate implied volatilities from market prices in a quick and convenient manner has embedded the concept deeply in the financial markets. While there are certainly areas of academic dispute regarding the details and implications of the basic theory – for instance, the volatility smile[15] – there is very little doubt that the Black-Scholes option valuation formula is basically correct in the same manner (though not to the same degree) that Newtonian Mechanics is basically correct but breaks down under extreme conditions.

Additionally, it is not necessary to understand the mathematics to grasp the basic idea. It should be apparent that, given identical expected yields for similar PerpetualDiscounts, a rational investor should prefer the one with the greater potential for capital gain. This preference will manifest itself in market prices, resulting in some kind of trade-off between yield and potential capital gain. The application of the Black-Scholes model to PerpetualDiscount preferred shares is merely a method of quantifying that trade-off.

The Model is Well-Founded in Practice

The inverse relationship between the potential capital gain and the yield is normal in the markets; one does not have to study preferred shares for very long before this is apparent.

Since this observation is normal – and not in accordance with theories related to bonds of fixed term, except under regimes of highly differential taxation between income and capital gain, which is not the case for dividends and capital gain – intellectual honesty demands some kind of explanation. The only point of dispute can be whether the pricing model presented in this essay represents the best possible combination of intellectual rigour, explanatory power and potential benefit to portfolio managers, or whether some other theory encompasses these desirable traits.

The Model is Amenable to Alternative Formulations

HIMIPref™, my firm's preferred share analytical software, does not explicitly calculate and value implied volatility. Instead, it applies a penalty to the trading valuation of each instrument through the concept of Option Doubt[16]:

- A schedule of significant call dates and the probability of a call on such dates is prepared using the Black-Scholes model and a constant implied volatility
- OptionDoubt is calculated as the weighted standard deviation of the potential terms-to-call (with the term of a limitMaturity set to 30 years)
- OptionDoubt is multiplied by the optimizable parameter optionDoubtPenalty to result in the penalty component PENALTY_COMPONENT_OPTIONDOUBT
- This value eventually finds its way into the tradingValuationBid and tradingValuationAsk attributes for each instrument

A future iteration of the software may include an explicit evaluation of implied volatility, but the current methodology has the advantage of simplicity of assumptions, consistency of output and the ability to be generalized for all types of preferred shares while easily accounting for a declining call price on the instrument's redemption schedule.

While the mapping to the model presented in this essay may not be 1:1, the methodology provides consistent, optimizable and intuitive valuation adjustments.

Practical Applications of the Model

The model may be used by all investors, regardless of trading frequency. Even an investor with a buy-and-hold philosophy has an interest in choosing the best available issue when implementing the "buy" part of the strategy. A few practical uses of the model are presented in this section.

Valuation of New Issues

New issues of Straight Perpetuals are often sold to clients on the basis that their yields are comparable with extant issues trading at a discount. It should be apparent that the yield of an issue trading at par value should be more – sometimes significantly more – than the yields of these lower coupon, discounted issues. The model may be used to determine whether or not the new issue is, in fact, cheap.

On October 1, 2009, Power Financial Corporation announced a new issue of a 5.80% Straight Perpetual. Chart 5 shows the evaluation as of the date of the new issue,[17] using a Pure Yield of 5.70% and Implied Volatility of 10%: using this methodology, we see that the new issue is actually yielding about 5bp less than it should and therefore should have been considered expensive.

Chart 6 shows the calculation when Implied Volatility is constrained to be the 'reasonable long-term average' of 15% for a three year term.[18] Examination of these results leads to the conclusion that the new issue was about 9bp expensive; the cheapest issue at that time was PWF.PR.K, bid at 21.45 on a coupon of 1.2375, yielding 5.77% (only 3bp less than the par issue) and about 10bp cheap to its theoretical level.

As of the close 2010-1-8, PWF.PR.K was bid at 21.60, while the new issue, currently trading as PWF.PR.O is bid at 24.69 having been poorly received on its opening day.[19]

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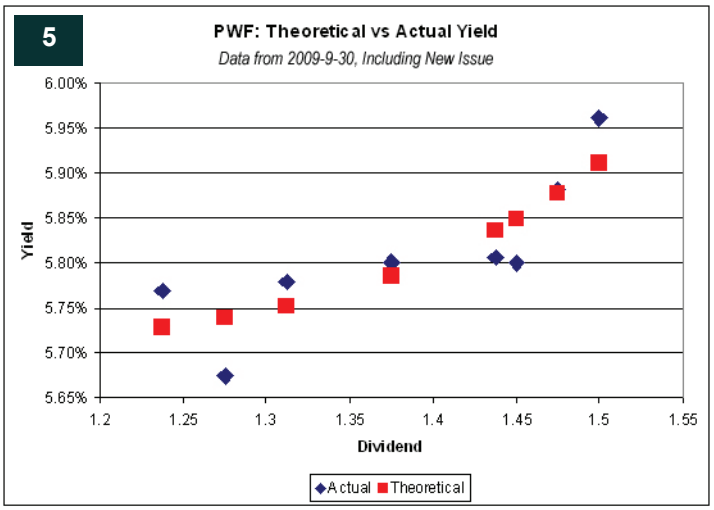
[15] See, for example, Emanuel Derman, *Modeling the Volatility Smile*, Seminar slides available on-line at http://finmath.stanford.edu/seminars/documents/Stanford.Smile.Derman.pdf (accessed 2010-1-8)

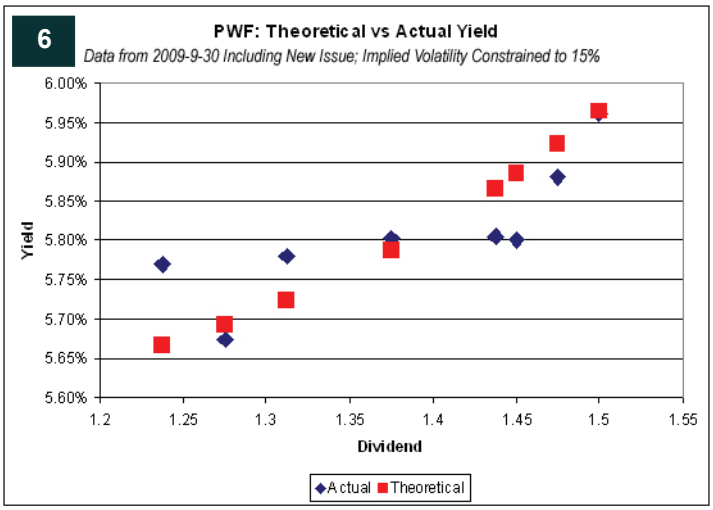
[16] For details, see http://www.prefshares.com/glossary.html#optionDoubt

[17] For details, see *New Issue: PWF 5.80% Straight*, available on-line at http://www.prefblog.com/?p=8101

[18] See the July, 2009, edition of this newsletter.

[19] *PWF.PR.O Dives on Opening; Still Expensive*, available on-line at http://www.prefblog.com/?p=8240



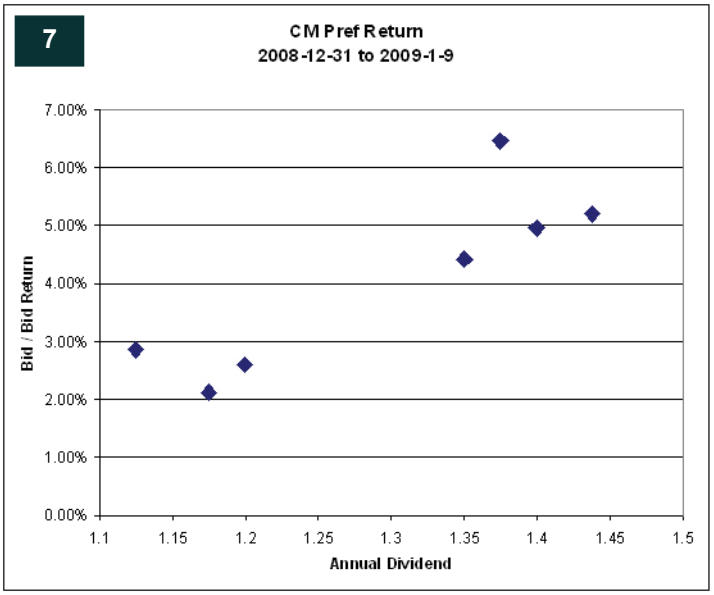


Trading Implied Volatility

In the example above regarding new issues, the best fit to the market data was found with an implied volatility of 10%, compared with the (somewhat arbitrary) benchmark of 15%. The lower volatility implies that the options had a less negative effect on market prices than should have been the case and thus that the lower-coupon-greater-discount issues were more likely to be good investments than those with higher coupon.

An extreme example of the degree to which calculated Implied Volatility can vary was discussed earlier, with the CM issues on 2008-12-31 (See Table 2 and Chart 3). The very high implied volatility implies that options are having a more negative effect on prices than they should and thus that higher-coupon-lesser-discount issues are more likely to produce good returns.

Chart 7 shows the relative returns from 2008-12-31 to 2009-1-9 as the Implied Volatility declined from the somewhat ludicrous level of 85% to the still very high level of 35%. The excess returns from the relatively high-coupon issues are quite impressive!



Box Trades

A Box Trade may be defined as a pair of related trades in different markets that preserve the overall characteristics of the portfolio while attempting to exploit differences between the two markets. The classic Canadian example is a set of trades whereby one lengthens term in the portfolio's holdings of Provincial bonds while shortening term in the Canada bond portfolio. A portfolio manager would execute such a trade if he felt that the Provincial yield curve was steeper than it should be relative to the Canada curve; hoping to achieve outperformance when the relationship returned to normal levels.

A preferred share portfolio will contain PerpetualDiscounts from a variety of issuers with a variety of dividend rates. In the last paragraph of the main article, above, I drew attention to the the relationship between the calculated implied volatilities of PWF and CM issues, (Charts #1 & 2): *The implied volatility for PWF is 8%, but this value is 14% for CM. This is an enormous difference, implying that holders of high-coupon CM issues are being paid a lot more compensation for the option than are holders of high-coupon PWF issues. Given such a situation, a holder of a portfolio comprised of high-coupon PWF and low-coupon CM should consider trades resulting in a low-coupon PWF and high-coupon CM portfolio since – whatever one's views on the "true" value of volatility – the new portfolio is better.*

This suggested trade is:

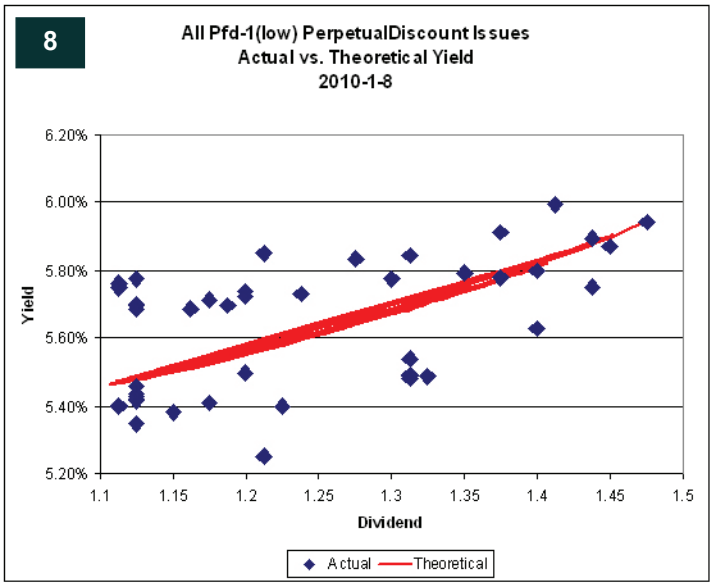
- Credit neutral, since exposure to CM and PWF does not change
- Volatility neutral, since exposure to high-coupon and low-coupon issues does not change
- Duration neutral, since exposure to higher and lower overall yields does not change

The trade is expected to be profitable as the Implied Volatilities of the two series of PerpetualDiscounts become equal – and there is no reason why they shouldn't.

Current Conditions

Chart 8 shows all Pfd-1(low) issues currently included in the HIMIPref(TM) PerpetualDiscount sub-index and plots the best fit resulting from the parameters Pure Yield = 5.12% and Volatility = 21%.The fact that the implied volatility is somewhat in excess of the rule-of-thumb 15% suggests that higher coupon issues be favoured; on the other hand, it is clear that there are many lower-coupon issues trading to yield a great deal more than the best fit.

It should also be observed that this graph is shown for general interest purposes only: there remains a great deal of credit stratification in the market[20] that means we cannot, however much we might wish to, treat all Pfd-1(low) issues as being equally creditworthy.



[20] See *Credit Stratification*, available on-line at http://www.himivest.com/media/moneysaver_0806.pdf