CANNEX Payout Annuity Yield (PAY) Index™

Canada

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CANNEX Payout Annuity Yield (PAY) Index Methodology

Methodology

Starting in January 2014 the CANNEX PAY Index will be calculated weekly for the following three contracts[1]:

Premium	Tax Status	Guarantee Period	Gender	Age	Payout Frequency
$100,000	Registered	5 Years	Male	70	Monthly
$100,000	Registered	5 Years	Female	65	Monthly
$100,000	Registered	5 Years	Joint	70M/65F	Monthly

The weekly PAY values will be determined using the following methodology:

The average payout will be calculated using the quotes of all carriers listed on CANNEX. Each week these quotes will be sorted from highest to lowest for all three contracts. The minimum and maximum quotes will be removed to control for outliers and a simple linear average of the payouts will be taken of the quotes that remain.

The average payout will then be multiplied by twelve (months) and divided by one hundred thousand (premium) to derive an annualized payout yield.

Historical PAY Values

Weekly historical values will be available as far back as January 2001. For the historical period from January 2001 to December 2013 the calculation method for joint contract has been adjusted (more information available from the research group at CANNEX if needed) due to limitations in the availability of quote data.

Historical Joint Life Methodology

In the case of the joint contract, due to the absence of payout quotes for the 70M/65F contract in the historical database the PAY values were interpolated using the methodology below.

First, the weekly quotes were gathered for the following six contracts:

Premium	Tax Status	Guarantee Period	Gender	Age[2]	Payout Frequency
$100,000	Registered	5 Years	Male	65	Monthly
$100,000	Registered	5 Years	Female	65	Monthly
$100,000	Registered	5 Years	Joint	65M/65F	Monthly
$100,000	Registered	5 Years	Male	70	Monthly
$100,000	Registered	5 Years	Female	70	Monthly
$100,000	Registered	5 Years	Joint	70M/70F	Monthly

[1] All contracts, both historical and going forward, are based on values from the province of Ontario

[2] In the Joint case – values are based on last to die.

For each contract the average payout was determined in the same manner as described in the general methodology. The average payout amounts were multiplied by 12 and divided into one hundred thousand to convert them into the amount of premium or cost required to obtain $1 of income for life.

In order to calculate the interpolated PAY for the joint 70M/65F contract the implied joint first-to-die annuity factors for both the 65M/65F and 70M/70F contracts were calculated using the formula presented below.

$$Implied\ Joint\ Factor_{First\ to\ Die\ XX} = Male_X + Female_X - Joint_{Last\ to\ Die\ XX}$$

$$X\ represents\ 'Age'$$

Once these values were calculated a weighted average was then taken to calculate an implied 70M/65F annuity factor.

$$\begin{aligned} Implied\ 70M/65F\ Annuity\ Factor \\ = Weight \times Implied\ Joint\ Factor_{First\ to\ Die\ 65} + (1 - Weight) \\ \times Implied\ Joint\ Factor_{First\ to\ Die\ 70} \end{aligned}$$

$$Weight = .33$$

Finally, this value was netted against the sum of the single male 70 and single female 65 factors in order to obtain the final approximation for the 70M/65F last to die factor.

$$Final\ 70M/65F\ Annuity\ Factor_{Last\ to\ Die} = Male_{70} + Female_{65} - Implied\ 70M/65F\ Annuity\ Factor$$

This value was then inverted to obtain the PAY.

$$Final\ 70M/65F\ Yield_{Last\ to\ Die} = \frac{1}{Final\ 70M/65F\ Annuity\ Factor}$$

Numerical Example (Joint Interpolation)

The following example demonstrates the interpolation for the historical 70M/65F contract. The following data was gathered on December 25th, 2013.

Annuity Quotes Dec 25, 2013			
	M	F	J
65	$587	$531	$477
70	$679	$604	$535

First the monthly quote values were converted to annuity factors using the following formula:

$$Annuity\ Factor = \left(\frac{Quote \times \#\ of\ Months}{Premium}\right)^{-1}$$

$$Male\ 65\ Annuity\ Factor = \left(\frac{\$587 \times 12}{\$100{,}000}\right)^{-1} = \$14.20$$

Applying this formula to the table above produced the results presented below.

Annuity Quotes Dec 25, 2013			
	M	F	J
65	$14.20	$15.69	$17.46
70	$12.27	$13.80	$15.57

Once the annuity factors were gathered the Implied Joint First to Die factor was calculated using the following formula:

$$Implied\ Joint\ Factor_{First\ to\ Die\ XX} = Male_X + Female_X - Joint_{Last\ to\ Die\ XX}$$

$$Implied\ Joint\ Factor_{First\ to\ Die\ 65} = \$14.20 + \$15.69 - \$17.46 = \$12.42$$

$$Implied\ Joint\ Factor_{First\ to\ Die\ 70} = \$12.27 + \$13.80 - \$15.57 = \$10.50$$

After the Implied Joint First to Die factors was calculated for the contracts where the annuitants are the same age, a weighted average was taken in order to get an approximation for the contract where the male and female are 70 and 65 respectively.

$$Implied\ Joint\ Factor_{First\ to\ Die\ 70M/65F} = Weight \times Implied\ Joint\ Factor_{First\ to\ Die\ 65} + (1 - Weight) \times Implied\ Joint\ Factor_{First\ to\ Die\ 70}$$

$$Implied\ Joint\ Factor_{First\ to\ Die\ 70M/65F} = .33 \times \$12.42 + (1 - .33) \times \$10.50 = \$11.15$$

Finally, for consistency purposes this Implied Joint First to Die factor for the 70M/65F scenario was then used to calculate the Implied Joint Last to Die factor.

$$Final\ 70M/65F\ Annuity\ Factor_{Last\ to\ Die} = Male_{70} + Female_{65} - Implied\ 70M/65F\ Annuity\ Factor$$

$$Final\ 70M/65F\ Annuity\ Factor_{Last\ to\ Die} = \$12.27 + \$15.69 - \$11.15 = \$16.81$$

As a final step to calculate the corresponding yield the reciprocal of this Final 70M/65F factor was taken.

$$Final\ 70M/65F\ Annuity\ Yield_{Last\ to\ Die} = Final\ 70M/65F\ Annuity\ Factor_{Last\ to\ Die}{}^{-1}$$

$$Final\ 70M/65F\ Annuity\ Yield_{Last\ to\ Die} = \$16.81^{-1} = 5.95\%$$

Example

Today there is a myriad of financial products offering a plethora of options and guarantees. Generally speaking these products come at a high cost to the end client. The question then becomes: Is the elaborate product much better than an annuity? If a hybrid product provides 5% annually yet an annuity is offering 7% the two percent spread may or may not be in the best interest of the client. Perhaps the former offers a death benefit yet the latter provides longevity insurance. Ultimately, the annuity index can be used to begin a conversation in generating income while in retirement.