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# The Impact on the IFRS 4 Profit Pattern from Locking in the Interest Rate Yield Curve

By Henry Qi and Emily Zhang

*The views expressed herein are those of the authors and do not necessarily reflect the views of their employers.*

The OCI-Solution of IASB's IFRS 4 Phase II requires that interest expense for the Profit and Loss (P&L) calculation be based on a yield curve instead of a flat rate locked-in at policy issue. This requirement is different from the approaches used by the other accounting standards. For example, a flat earned rate is used to measure interest expense under US GAAP SFAS 60. Below is a discussion of analysis of the impact from locking in the yield curve on the IFRS 4 profit pattern as well as general conclusions reached.

## LOCKED-IN RATE FOR IFRS 4 PROFIT CALCULATION

In order to mitigate the profit volatility caused by interest rate changes, the IASB's IFRS 4 Phase II 2013 Exposure Draft (the 2013 ED) proposed an OCI-Solution:

- the interest expense used to calculate the IFRS 4 P&L is based on the locked-in rate at policy inception; and
- the change in the liability due to interest rate movement flows through Other Comprehensive Income (OCI).

Paragraph 60 in the 2013 ED says: "An entity shall recognise in profit or loss: interest expense on insurance contract liabilities determined using the discount rates specified in paragraph 25 that applied at the date that the contract was initially recognised." The discount rate specified in paragraph 25 is an illiquid risk free interest rate curve.<sup>1</sup> Therefore the discount rate curve derived from the bond market at policy inception must be used for all financial reporting dates to calculate interest expense.

At the IASB March 2014 meeting it was tentatively decided that the option to present the changes in insurance liabilities due to interest rate movements in OCI or P&L is an accounting policy choice. All discussion in this article is for non-participating contracts with an OCI accounting policy; correspondingly, the bonds

backing the contracts are classified as Fair Value through OCI (FVOCI in IFRS 9).

## POTENTIAL IMPACT ON IFRS 4 PROFIT EMERGENCE

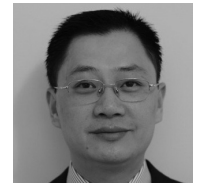
The IFRS 4 P&L is composed of underwriting gain or loss and investment gain or loss. Investment gain or loss equals investment income less interest expense. If the OCI-Solution is adopted for IFRS 4 liability accounting, the backing assets can be classified as FVOCI in order to have consistent accounting bases for liabilities and assets. The book yields of FVOCI assets become investment income, and the changes in asset market values due to interest rate changes flow through OCI. The FVOCI classification is similar to the Available-For-Sale classification under IAS 39. Both the book values and market values of bonds are tracked. The market values are used for the balance sheet, while the book values are used for the income statement P&L calculation.

Likewise, the liability carrying amount on the balance sheet is measured using the current discount rate curve (Mark-To-Market), and the interest expense for the IFRS 4 P&L is measured using the discount rate curve locked-in at policy inception.

The following is the formula for the IFRS 4 investment gain or loss calculation:

$$\text{Investment Gain } (t) = \text{Bond book value } (t-1) \times \text{Book Yield Rate} + \text{Book Return on Reinvestment this period } (t) - [\text{Liability book value } (t-1) + \text{Time-Weighted Insurance Cash Flow } (t)] \times \text{Locked-in One-Year Forward Rate } (t)$$

Investment gain comes from the spread between the bonds book yield rate and the liability locked-in rate. The bond book yield rate is a flat effective yield, and the typical liability locked-in forward rate is low in the early years and higher in the later years. Therefore, compared to the investment gain measured based on the use of a flat discount rate for interest expense, the IFRS 4 investment gain is expected to be higher in the early years and lower in the later years.



Henry (Xiaodong) Qi, FSA, FCIA, is an actuary with a Canadian life insurance company. He can be contacted at [HenryQi2000@gmail.com](mailto:HenryQi2000@gmail.com).



Emily (Yao) Zhang, FSA, FCIA, is an actuary with a Canadian regulator. She can be contacted at [EmilyYaoZhang@gmail.com](mailto:EmilyYaoZhang@gmail.com).

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### PROFIT PATTERN STUDY ON A SINGLE PREMIUM IMMEDIATE ANNUITY (SPIA)

In this example, a SPIA product was launched in Dec. 2012. The modified duration of its liability cash flows at issue was 14 years. Corporate single A bonds with a 4 percent effective return rate and 14 years duration were used to back the liability. To simplify the analysis, illiquidity premium was ignored and the risk-free yield curve was used to derive the forward yield curve, i.e., the Locked-in One-Year Forward Rate (t) in the investment gain formula above.

Derived from the risk-free spot curve of Dec. 2012, the one-year forward rate increases from 1.1 percent for the first year to 3.71 percent for the 20th year. Therefore, the spread between the bond book yield rate and the liability locked-in discount rate decreases from 2.9 percent in the first year to 0.29 percent in the 20th year. Graph 1 illustrates that the IFRS 4 investment gain is measured based on the decreasing spread.

The following are the discount rates used for the liabilities and the interest expense measurements:

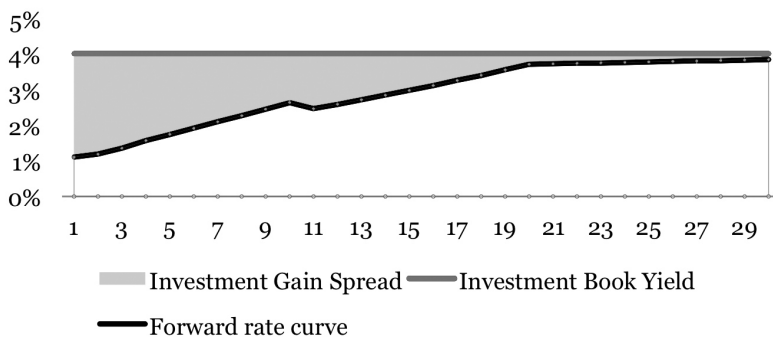
- IFRS 4 liabilities were measured using this one-year forward rate vector (Valuation interest rate or VIR) for each financial reporting date (valuation day): 1.10 percent, 1.19 percent, 1.36 percent, 1.57 percent, 1.75 percent, 1.92 percent, ... 3.85 percent. The discount rate for the year immediately after the valuation day was 1.10 percent, 1.19 percent was the discount rate for the 2nd year after the valuation day, and 3.85 percent was the ultimate discount rate.
- Interest expense was based on a locked-in yield curve, 1.10 percent for the 2013 financial year, 1.19 percent for 2014, 1.36 percent for 2015, etc. with the ultimate discount rate of 3.85 percent for 2042 and later.
- For purposes of comparison, interest expense was also calculated based on a locked-in flat yield, 2.26 percent through all the financial years.<sup>2</sup>

The interest rate assumptions and the modeling are illustrated in Graph 2. The liability modeling and the financial projections were conducted using AXIS software. The investment income was calculated as the book return (4 percent yield rate) earned on the IFRS 4 liability and the liability cash flow.

Graph 3 illustrates the profits of the SPIA product assumed in this example. Two sets of profits were projected with the interest expense calculated based on the locked-in yield curve and the effective flat rate.

The difference between these two profit patterns is substantial. In the early years, the profits based on the locked-in yield curve are observed to be 40 percent to 60 percent higher than the profits based on the effective flat rate for the interest expense calculation. The profits accelerated to the early years account for 46 percent of the total profits.<sup>3</sup>

**Graph 1**  
Forward rate curve, bond effective yield and the gap between them (December 31, 2012)





Using a locked-in yield curve instead of a flat rate accelerates the SPIA IFRS 4 profit emergence. Correspondingly, the OCI resulting from the liability side is negative in the early years and then becomes positive, even if the interest rate environment is unchanged.

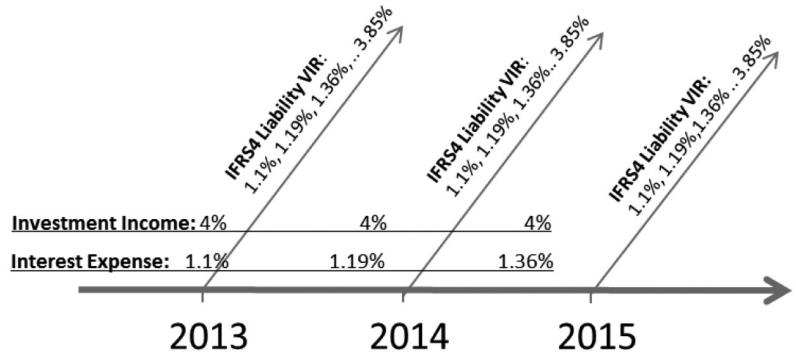
## IMPACTS ON OTHER LIFE INSURANCE PRODUCTS AND ANALYSIS

The significance of the profit acceleration effect from the IFRS 4 interest expense approach can be very different for other insurance products. A similar test was conducted on a 20-Year Term policy (Male, issue age 60 and no renewal, issued in Dec. 2012). All the interest rate assumptions were the same as the SPIA study above except that the equivalent discount rate for the liability cash flow was 2.5 percent. The profit pattern of this Term 20 policy is displayed in Graph 4. The difference between the two profit patterns is trivial. The profit accelerated to the early years is only 6 percent of the total profit.

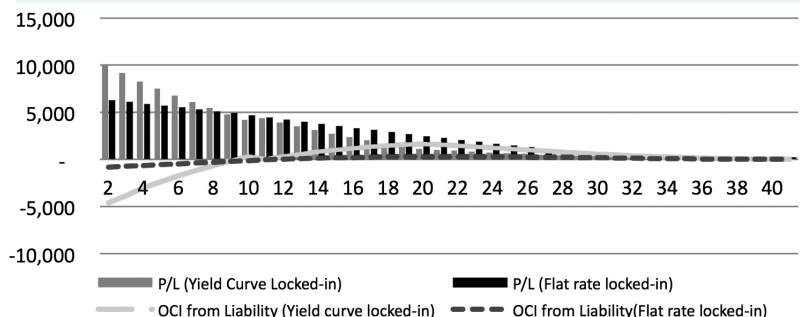
Why are the impacts from the IFRS 4 investment expense approach so different for the different insurance products?

First, the impact is more significant on products with a large interest rate margin component in the present value of profit at policy inception. If the actual experience is the same as the expected assumptions, the IFRS 4 profit is composed of the interest rate margin, the release of risk adjustment, and the release of contractual service margin (CSM). The CSM was ignored in the

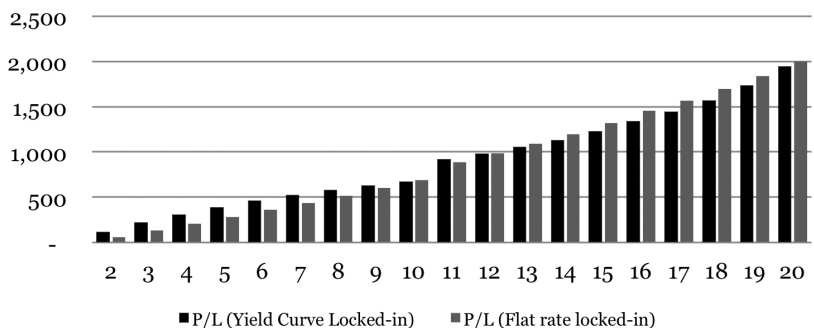
### Graph 2 Interest Rates Assumptions for SPIA Financial Projection



### Graph 3 SPIA P&L and OCI



### Graph 4 T20 P&L

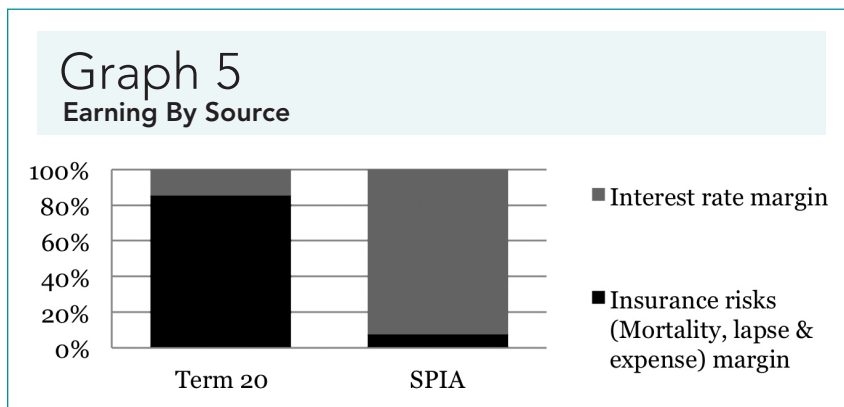


studies as it relies on the premium charged. Therefore the PV of the profit in the studies is made up of interest rate margin and the release of risk adjustment. As illustrated in Graph 5, the interest rate margin dominates the SPIA product's profit while the mortality margin is more prominent for the Term 20 product. As such, the change in the timing of the interest margin release has a more significant impact on the SPIA P&L pattern.

early years and decreases gradually. The SPIA's IFRS 4 liability has a similar shape. In contrast, a Term 20 product's liability has a bell shape (small at the beginning and increases gradually, then decreases). The investment gain is the product of the spread and the liability. The synchrony between the SPIA's liability and the interest rate spread enhances the profit acceleration in the early years.

## CONCLUSION

The IFRS 4 interest expense presentation approach can accelerate profit emergence, because the locked-in discount rate curve is low in early years and high in later years. The impact differs by product. A product with profit mainly from the interest rate margin and with a large liability in early years will have a noteworthy profit acceleration. ■



Second, the impact is more significant on products with a large liability at the early policy years. As shown in Graph 1, the spread between the asset book return rate and the locked-in yield curve is large in the

## ENDNOTES

- <sup>1</sup> This is not true for participating policies. This paper is only for policies without participating features.
- <sup>2</sup> The present values of the fulfillment cash flows at policy inception, calculated using the forward rate curve and the flat 2.26 percent rate are the same.
- <sup>3</sup> Calculated as  $\text{Sum}[\max(\text{P\&L from locking in yield curve} - \text{P\&L from locking in flat rate}, 0)] / \text{Sum}[\text{P\&L for all the coverage periods}]$

## On the Research Front

### VBT RECOMMENDATION RELEASED ON MORTALITY IMPROVEMENT RATES

The SOA released a recommendation from the Preferred Mortality Project Oversight Group's Valuation Basic Table (VBT) Team for a set of improvement factors that vary by gender and attained age to be used in conjunction with the 2008 VBT for AG-38 purposes for year-end 2014. Excel files are available on the smoothed rates and the mortality improvement rates smoothed and rounded.