



# Use of OCI – Options and Guarantees

## *Addendum to the technical position of the HUB Group on Insurance Contracts*

This paper provides additional detail on the use of OCI for changes in the value of options and guarantees due to interest rate movements that was presented in the HUB Group's paper 4 on OCI. It complements Agenda Paper 5 (Other comprehensive income) that was prepared for the Insurance Working Group meeting on 16 May 2011.

The treatment of O&G proposed in this draft paper does not preempt what could be the treatment of O&G under the alternative locked-in approach described in the HUB Group's technical position – paper 5 that was provided to the IWG on 23 March 2011.

As with all our documents, comments from the public are welcome.

### **I. Objective**

The objective of this paper is to demonstrate that the current-current through OCI approach can be used for the entire insurance liability, including options and guarantees.

The current-current through OCI approach would enable insurers to report the current value of insurance liabilities in the statement of financial position while at the same time excluding artificial volatility from profit or loss (P&L). To achieve this goal, the use of OCI provides a suitable solution. Under the current-current through OCI approach, an insurer would record changes in the market value of assets and changes in the liability due to interest rate movements in OCI.

This paper does not address features that are not closely related to the insurance contract, which are bifurcated and accounted for separately under IAS 39 and IFRS 9, respectively. This paper does not address variable annuity and unit-linked guarantees.

### **II. Overview about and behavior of interest-sensitive options and guarantees**

Most options and guarantees included within the cash flows of an insurance liability materially consist of one or more of the following features: guaranteed interest rates and minimum maturity values, guaranteed minimum surrender values, annuity conversion options, and extension options.

**Guaranteed interest rates and minimum maturity values** usually provide policyholders with a guaranteed investment return, independent from actual performance from investments (essentially, a written long put). In a perfectly asset-liability matched scenario where assets would have the same duration as the insurance liabilities, assuming that investment performance is sufficient to cover the minimum guarantee, the guarantee would have a value of zero. In any other scenario, e.g. where there's a duration mismatch between assets and liabilities, the risk exists that assets could be reinvested upon maturity at rates below the minimum guarantee and correspondingly, the minimum guarantee would have a value that would have to be recognized on the balance sheet. See label (a) in

the diagram below for a visual depiction of the time in the life of the policy covered by this and the other options and guarantees described below.

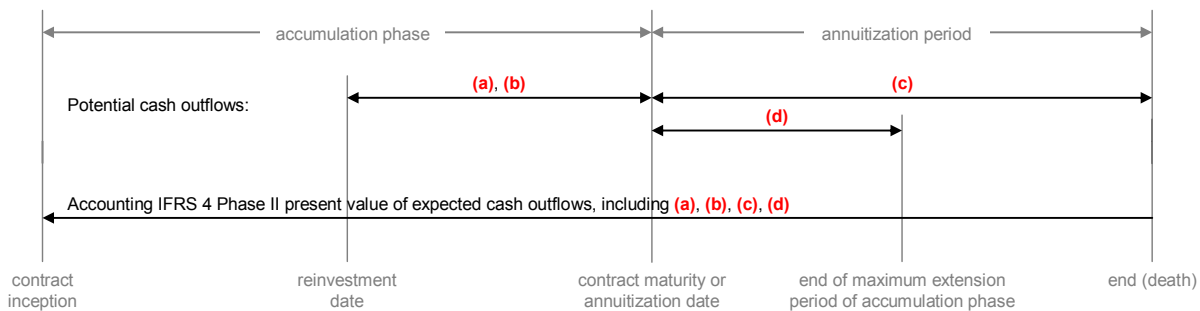
**Guaranteed minimum surrender values** usually provide policyholders with the greater of the current or the minimum guaranteed account value of the insurance contract less a surrender penalty in case of early cancellation during the accumulation phase. Guaranteed surrender values do not behave differently from the guaranteed minimums discussed above, rather they simply change any duration mismatch that exists either increasing or decreasing it. See label (b) in diagram below.

**Annuity conversion options** usually provide policyholders at maturity of an insurance contract with a guaranteed life-contingent (sometimes partially life-contingent and partially guaranteed) annuity whose terms and conditions have been set at contract inception. This option is in the end similar to a minimum investment return guarantee because under the option the insurer prolongs policyholder life-contingent minimum investment return guarantees. Thus, the option simply extends the liability duration and any duration mismatch that exists will be longer or shorter than initial expectations. See label (c) in diagram below.

**Extension options** are in the end similar to annuity conversion options because under the option the insurer prolongs the accumulation phase and minimum investment return guarantees. Thus, the option simply changes any duration mismatch that exists. See label (d) in diagram below.

This is not an exhaustive list of options and guarantees. There are also variations and combinations of the above-listed options and guarantees that could lengthen or shorten a duration mismatch.

The following diagram provides a comparative overview about the period of time covered by each of these options. This diagram is not intended to depict the timing of recognition of the option, which would have a value in any scenario other than a perfectly matched situation.



Legend:

- Guaranteed interest rates and minimum maturity values = (a)
- Guaranteed minimum surrender values = (b)
- Annuity conversion options = (c)
- Extension options = (d)

In summary, guaranteed interest rates and minimum maturity values can be seen from an insurer’s perspective either as a written long put or together with the ‘core’ insurance liability as an issued debt instrument with fixed interest payable equal to the minimum guarantee plus additional discretionary interest. Guaranteed minimum surrender values, annuity conversion options and extension options modify the minimum guarantee as they increase or decrease the duration of the insurance liability and correspondingly increase or decrease an asset-liability duration mismatch.

We will elaborate later in the paper why we believe the changes in the value of these options and guarantees should be reflected in OCI rather than P&L, and specifically how interest rate shifts impact duration matched and mismatched portfolios.

### III. Interest-sensitive options and guarantees – the function of surrender

Interest rate risk is broadly defined as one of four major factors in solvency or financial performance risk of an insurer (Society of Actuaries, 1979, et al.). Besides fixed-income portfolio gains and losses related to interest rate changes on insurers' investments, many life insurance liabilities are interest rate sensitive.

In addition, insurers also face the risk of disintermediation, which often becomes acute when interest rates are high. Disintermediation is the flow of funds out of one financial instrument, whose interest rates are low, into another financial instrument, whose interest rates are higher (Dictionary of Insurance Terms, 2008).

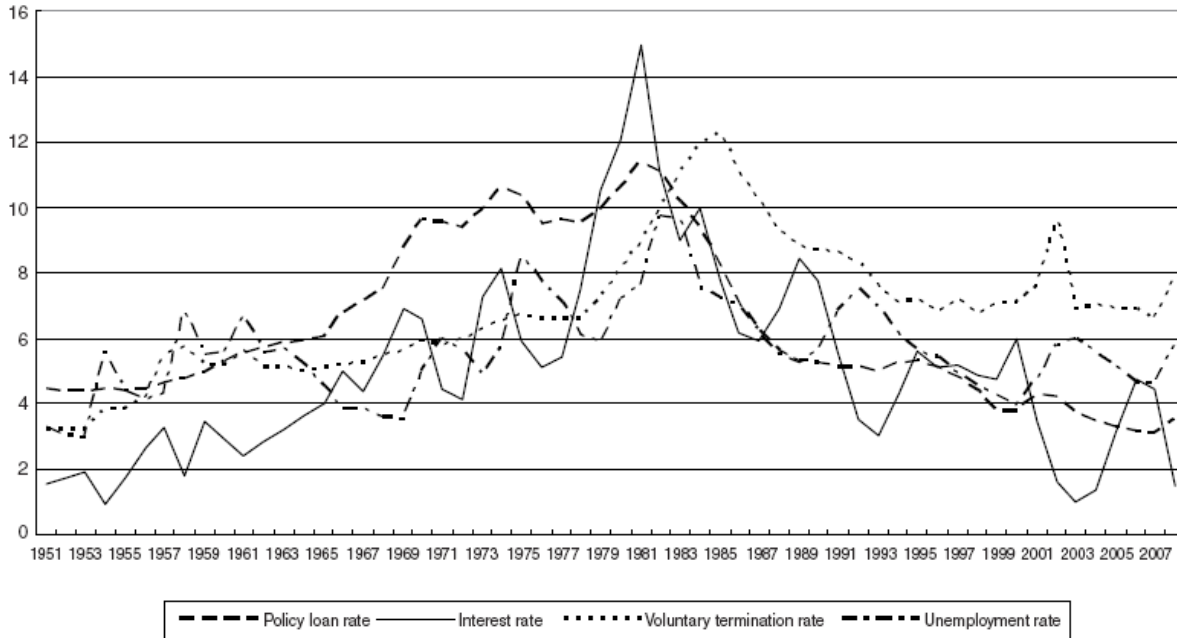
In a period of rising interest rates, disintermediation (surrenders)<sup>1</sup> can lead to or increase a mismatch between the duration of an insurer's assets and liabilities where the assets duration exceeds that of the insurance liabilities. In extreme scenarios, the insurer may need to sell assets at a realized loss to meet liquidity needs.

In contrast, when guaranteed returns from the insurance policy would be at market returns in the current and possibly in future years, fewer policyholders would take the surrender option but would continue to fulfill the contract.

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<sup>1</sup> We recognize that there are also some cases not having the high positive correlation between the surrender rate and the interest rate, depending on the characteristics of products or markets. However, the purpose of this section is to further explain to the reader how surrenders generally impact duration mismatch in a rising interest rate environment. Each entity would need to take product facts and circumstances into consideration in determining the value of options in their portfolios.

Figure 1  
**Time Series (1951–2008) of Voluntary Termination Rates, Policy Loan Rate, Interest Rate, and Unemployment Rate**



For example in the US, on four occasions in the past 40 years, inflation and high interest rates have forced life insurers to take measures to accommodate extraordinary cash outflows.<sup>2</sup>

One type of disintermediation occurs when interest rates are high and insurers face the risk that policyholders will surrender their cash value life insurance policies for their accumulated cash values, in order to reinvest the proceeds at a higher interest rate.

Another type of disintermediation occurs when policyholders borrow against the accumulated cash value in insurance products such as whole life insurance. US life insurers experienced extraordinary disintermediation in the early 1980s as interest rates reached record high levels during that period and policyholders took advantage of the option to borrow some or all of the accumulated cash value in their policies at the below-market policy loan rates that were contractually defined in their insurance policies.

In summary, surrender options depend on the same underlying variable as minimum guarantee options, i.e. interest rates. When an insurer’s asset duration exceeds the insurance liability’s duration, disintermediation extends the existing mismatch. In case an insurance liability's duration exceeds the asset duration, disintermediation narrows the existing mismatch. In extreme scenarios, existing mismatch is extended when the insurance liability duration becomes smaller than the asset duration.

**IV. Current accounting**

<sup>2</sup> Figure 1: US market (Shi-jie Jiang, 2010)

**a. IFRS 4 Insurance Contracts**

The current IFRS 4 does not specify how to account for embedded derivatives that are clearly and closely related to host insurance contracts (options and guarantees), but treats them in accordance with the local GAAP. However, the current IFRS 4 does require an adequate reserve level for options and guarantees, which is ensured by a liability adequacy test.

**b. ED 2010/8 Insurance Contracts**

The ED Insurance Contracts requires recognizing and measuring the expected present value of future cash outflows less future cash inflows that will arise as the insurer fulfills the insurance contract.

According to ED paragraph B61e, those include cash flows that will result from options and guarantees embedded in the contract, to the extent those options and guarantees are not unbundled.

ED paragraph B38 explains: “The starting point for an estimate of cash flows is a range of scenarios that reflects the full range of possible outcomes. Each scenario specifies the amount and timing of the cash flows for a particular outcome, and the estimated probability of that outcome. ...”

ED paragraph B39 further specifies: “... in some cases, the cash flows may be driven by complex underlying factors and respond in a highly non-linear fashion to changes in economic conditions (e.g. if the cash flows reflect a series of interrelated implicit or explicit options). In such cases, more sophisticated stochastic modeling is likely to be needed, including the identification of scenarios that specify the amount and timing of the cash flows for particular outcomes and the estimated probability of those outcomes.”

Furthermore, ED paragraph 28 specifies as follows: “Many insurance contracts have features that enable policyholders to take actions that change the amount, timing, nature or uncertainty of the benefits they will receive. Such features include surrender options, conversion options and options to cease paying premiums but still receive some benefits. The measurement of insurance contracts shall reflect the future behavior of policyholders on an expected value basis, with an adjustment for the risk that the actual behavior of the policyholder may differ from the expected behavior. For example, the measurement of an insurance contract: (a) shall not assume that all policyholders surrender their contracts only because surrender would be unfavorable to the insurer, (b) shall not assume that all policyholders continue their contracts only because continuation would be unfavorable to the insurer. ...”

**V. Proposal****a. Current-current through OCI – Guiding principles for Options & Guarantees**

The main points that we believe must be covered in any model with regard to the treatment of options and guarantees are as follows:

- Entities must carry an adequate reserve on the balance sheet for the entire BEL including options and guarantees, reflecting obligations to policyholders under the fulfillment approach.
- Estimates should assume expected policyholder behavior rather than worst case behavior (in other words, not all policyholders behave rationally) under the general principle of the current fulfillment model.
- The change in the value of options and guarantees should be recognized and measured on a basis consistent with the change in the value of the core cash flows. That is changes in value arising as a result of interest

rate movements should be reflected in OCI rather than P&L while changes arising from changes in other assumptions (e.g. lapsation) would be reflected in P&L.

- When valuing options and guarantees, an entity should use appropriate modeling techniques that enable the identification of scenarios that specify the amount and timing of the cash flows for a particular outcome and the estimated probability of that outcome.

The above points are intended to be consistent with the ED, except for the introduction of OCI in the third bullet.

The objective is to have a P&L that reflects the business model and is free of artificial volatility. To achieve this goal, the use of OCI provides a suitable solution. Under the current-current through OCI approach, an insurer would record both changes in the market value of assets and changes in the liability due to interest rate movements in OCI.

Thus, to the extent there is a perfect asset-liability duration match, changes in the value of the BEL that arise from interest rate movements will be offset within OCI by changes in the value of the assets (ignoring the effects of changes in credit spreads). To the extent there is a duration mismatch, changes in value will be made transparent through a positive or negative change to the accumulated OCI balance. Since options and guarantees simply increase or decrease any duration mismatch that exists, the change in value due to interest rate movements should also be reflected in OCI in the same manner as the change in value of the core cash flows. This is in line with the main points above and the previous discussion about the behavior of options and guarantees. In summary:

- The balance sheet, including the value of options and guarantees, will be current
- The effect of duration mismatch will be shown in a transparent manner in OCI
- Valuation techniques will be appropriate for the types of cash flows

Changes in future estimates that are not related to interest rates should be presented in P&L.

#### **b. Current-current through OCI – Application guidance for Options & Guarantees**

The following examples are intended to demonstrate the appropriate accounting treatment of options and guarantees under realistic scenarios:

- **Scenario 1:** Comparison of current-current through OCI treatment and ED treatment of a 20 year insurance contract with perfectly matched assets and liabilities
- **Scenario 2:** Comparison of current-current through OCI treatment and ED treatment of a 20 year insurance contract with reinvestment at lower interest rates after 10 years (duration mismatch)

Please consider that the below examples are of a conceptual nature – significant simplifications have been made to present the proposed accounting treatment for options and guarantees more illustratively, transparently and reconcilably, for example:

- single policy using a continental-European product; payout at maturity
- all assets back only policyholder liabilities and not capital
- only 10 year bonds are available as investments; corresponding simplified development of yield curve
- bonds carry no credit risk
- fixed profit participation of 90% of total investment income
- residual margin amortization locked-in as per ED



because the return from assets is above the minimum guarantee (in other words: minimum guarantee that essentially is a short put with an exercise price of 2% is below the spot price of 4%).

**d. Scenario 2: Interest-sensitive options and guarantees (duration mismatch)**

Comparison of current-current through OCI treatment and ED treatment of a 20-year insurance contract with reinvestment at lower interest rates after 10 years (duration mismatch)

Model input		Input field	Model output							
<b>t=0</b>			<b>Balance sheet in t=0</b>							
<b>Assets</b>	fixed income	100%	<b>Assets</b>		<b>Liabilities</b>					
	interest rate	4,00%	Fixed Income	10.000,00	BEL (det)	9.456,39				
	duration	10	OCI	0,00	OCI	0,00				
<b>Liabilities</b>	min-gar profit participation	2,00% 90%	O&G		O&G	40,19				
			OCI		OCI	0,00				
			Residual Margin (RM)		Residual Margin (RM)	503,42				
			S/H Equity		S/H Equity	0,00				
			10.000,00		10.000,00					
<b>t=1</b>			<b>Balance sheet in t=1</b>		<b>P&amp;L in period 1</b>		<b>P&amp;L in period 1</b>			
<b>Assets</b>	fixed income		<b>Assets</b>		<b>Current-Current</b>		<b>Current-Current through OCI</b>			
	interest rate	3,50%	Fixed Income	10.400,00	income before tax	Investment income	FI	861,01		
			OCI	461,01		Investment income	FI	400,00		
			BEL (det)	9.834,64	Delta P/H Liabilities	BEL (det)	-838,68	Delta P/H Liabilities	BEL (det)	-378,26
			OCI	460,42		O&G	-44,03		O&G <sup>7)</sup>	-1,61
			O&G	41,80		RM	16,91		RM	16,91
			OCI	42,42						
			Residual Margin (RM)	486,52	Profit		-4,79	Profit		37,04
			S/H Equity	-4,79						
			10.861,01							
				10.861,01						
					Delta OCI					
					Assets		461,01			
					Liabilities		-502,85			
					BEL (det)		-460,42			
					O&G		-42,42			
					Total OCI		-41,84			
					Total Delta S/H Equity		-4,79			
<b>Notes:</b>			<p>This model is NOT intended to reflect full economic option pricing but to give educational direction.                      Residual margin amortization is locked-in as in ED.                      PH participation rate refers to total investment income as opposed to excess over guarantee.                      Loss recognition test uses interest vector aligned with ALM situation (earned rate while matched, market rate thereafter).</p>							
			<p><sup>7)</sup> One year less of discounting of future O&amp;G</p>							

In this scenario, assets and liabilities do not have the same duration (duration mismatch) but assets have a shorter duration than the insurance liability. Therefore, the insurer needs to reinvest the assets after – in this example – 10

years. The interest rate declines to 3.5% after year 1. However, the return from reinvested assets is assumed to be sufficient to cover the minimum guaranteed return. Even though it is assumed that over the full contract period returns from assets exceed the minimum guaranteed returns, there is uncertainty about the reinvestment risk, reflected in the minimum guarantee (options and guarantees) which in this scenario correspondingly has a value. If in subsequent reporting periods we expect interest rates to further decline, then the value of the option would further increase.

If we were to report a loss of 4.79 (as intended by the ED), a counter-intuitive result would occur since we expect to be able to meet our guarantees and profit on the contract. The P&L result under the OCI approach of 37.04 is more in line with the expected profit emergence and comparable to the P&L profit of 40.00 in scenario 1.

Taking this example one step further, we also thought about how other options that are discussed in the overview in section II would generally impact the duration mismatch.

For example, in the case of a low-interest environment, more policyholders could take an annuity conversion option. When guaranteed returns from the policy would be at or above market returns in the current and possibly future years, more policyholders may want to avoid market risk and would therefore continue the contract by converting to an annuity that includes the minimum return guarantee. Correspondingly, the existing duration mismatch would increase due to the increase in the insurance liability duration.

## VI. Disclosure

An entity would disclose the products or range of products for which the current-current through OCI approach is used.

## VII. Appendix A

Please find an excel file containing our above examples attached to this paper.

Model input			Input field		Model output				
<b>t=0</b>	<b>Assets</b>	fixed income	100%						
		interest rate	4.00%						
		duration	10						
<b>Liabilities</b>	min-gar	2.00%							
	profit participation	90%							
<b>t=1</b>	<b>Assets</b>	fixed income							
		interest rate	3.50%						
<b>Balance sheet in t=0</b>									
<b>Assets</b>					<b>Liabilities</b>				
Fixed Income	10,000.00	BEL (det)	9,456.39						
OCI	0.00	OCI	0.00						
		O&G	40.19						
		OCI	0.00						
		Residual Margin (RM)	503.42						
		S/H Equity	0.00						
<hr/>					<hr/>				
10,000.00					10,000.00				
<hr/>					<hr/>				
<b>Balance sheet in t=1</b>									
<b>Assets</b>					<b>Liabilities</b>				
Fixed Income	10,400.00	BEL (det)	9,834.64						
OCI	461.01	OCI	460.42						
		O&G	41.80						
		OCI	42.42						
		Residual Margin (RM)	486.52						
		S/H Equity	-4.79						
<hr/>					<hr/>				
10,861.01					10,861.01				
<hr/>					<hr/>				
<b>P&amp;L in period 1</b>					<b>P&amp;L in period 1</b>				
<b>Current-Current</b>					<b>Current-Current through OCI</b>				
<b>income before tax</b>					<b>income before tax</b>				
Investment income	FI	861.01			Investment income	FI	400.00		
Delta P/H Liabilities	BEL (det)	-838.68			Delta P/H Liabilities	BEL (det)	-378.26		
	O&G	-44.03				O&G <sup>1)</sup>	-1.61		
	RM	16.91				RM	16.91		
<hr/>					<hr/>				
Profit		-4.79			Profit		37.04		
<hr/>					<hr/>				
					Delta OCI				
					Assets				
					Liabilities				
					BEL (det)				
					O&G				
<hr/>					<hr/>				
					Total OCI				
<hr/>					<hr/>				
					Total Delta S/H Equity				
<hr/>					<hr/>				
					-4.79				
<hr/>					<hr/>				
<b>Notes:</b>									
This model is NOT intended to reflect full economic option pricing but to give educational direction.									
Residual margin amortization is locked-in as in ED.									
PH participation rate refers to total investment income as opposed to excess over guarantee.									
Loss recognition test uses interest vector aligned with ALM situation (earned rate while matched, market rate thereafter).									
					<sup>1)</sup> One year less of discounting of future O&G				

