**MOODY'S**
**ANALYTICS**

## Author

**Steven Morrison**
*Senior Director-Research*

## Contact Us

Americas
+1.212.553.1653

Europe
+44.20.7772.5454

Asia-Pacific
+852.3551.3077

Japan
+81.3.5408.4100

# Profit emergence under IFRS 17: The Variable Fee Approach

## Introduction

With the introduction of the IFRS 17 accounting standard, it is important that insurers understand the patterns of profit emergence that arise for their business under the standard, and how business and methodology decisions available to the insurer affect such patterns. As a principles-based standard, insurers have several immediate decisions to make in their specific implementation, and such decisions can have a major impact on the timing of reported profit and loss.

In a previous paper[1], we considered some aspects of profit emergence under IFRS 17, focusing on the impact of non-financial (longevity) risk on the IFRS 17 balance sheet and income statement for a group of annuity contracts. In this paper, we turn our attention to financial risk and its impact on contracts with participation features. We focus on two aspects in particular: (1) differences in profit emergence between the Variable Fee Approach (VFA) and General Measurement Model (GMM), and (2) the impact of risk mitigation. We explore these themes using an illustrative example contract group.

---

1    Profit emergence under IFRS 17: Gaining business insight through projection models (Moody's Analytics whitepaper).

# CONTENTS

## Example product and introduction to the VFA

The illustrative contract group considered here consists of 100 contracts, with a coverage period of 10 years and single premium of CU (Currency Unit) 150 per policy received immediately when the contracts are issued. In return, the contract provides the following benefits:

» On death during the coverage period: CU 170 or the account balance if it is higher.

» On survival until the end of the coverage period: the account balance.

At inception, the account balance is equal to premiums paid, and subsequently evolves each year based on returns on an equity fund, subject to an annual charge of 1% to reflect investment services provided[2].

We assume that this contract group qualifies as a contract with 'direct participation features'. The basic idea of the VFA is that the liability value for such contracts can be considered to be the sum of two components:

1. The fair value of the 'underlying items'[3], minus

2. The value of the entity's share in the underlying items. In IFRS 17, this component is termed the 'variable fee'. In the illustrative example the variable fee can be broken down as:

   a. The value of future charges, minus

   b. The cost of guarantees

Under the VFA, the impact of financial risk on changes in the value of liabilities is recognized differently between these different components. Changes in fair value of underlying items are realized immediately in P&L (Insurance Finance Income or Expense). In contrast, changes in the variable fee due to financial risk adjust the CSM (Contractual Service Margin)[4], which is subsequently released (as Insurance Service Result) as services are provided. This is motivated by the argument that contracts with direct participation features substantially offer investment services, and the variable fee is the entity's compensation for providing such services.

## Illustration of the impact of financial risk on P&L over one year

To illustrate the mechanics of the VFA, and how it compares to the GMM (General Measurement Model), we consider the impact of changes in the underlying items on the IFRS 17 balance sheet and P&L. We quantify the impact of such changes on the illustrative contract group over the first year since the contracts were written.

Figure 1 shows the change in fair value of assets less the change in fair value of liabilities, as a function of the return on underlying items[5]. The solid line corresponds to the case where assets are invested in the underlying items. In this case, the change in value of assets minus liabilities represents the entity's share in the underlying items i.e. the 'variable fee'. The dashed line corresponds to the case of assets being invested in the underlying items plus hedge assets. The hedge assets here are designed to delta hedge the entire variable fee i.e. Cost of Guarantees (COG) and the value of future charges. This delta hedge does not provide a perfect hedge of the cost of guarantees, with hedge performance deteriorating at extreme (positive or negative) returns on the underlying items.

Figure 1: Impact of change in underlying items on fair value of assets minus liabilities
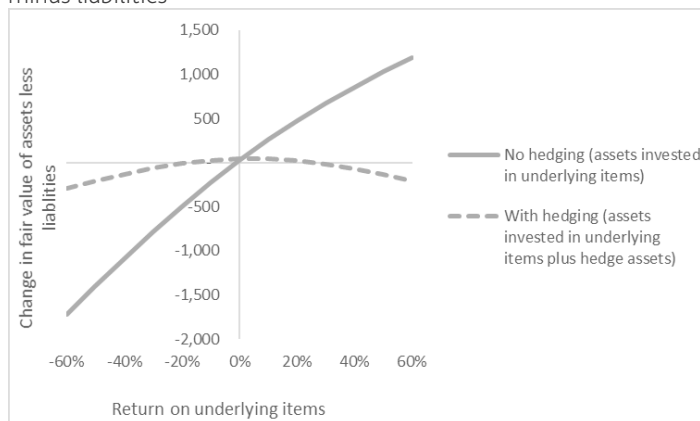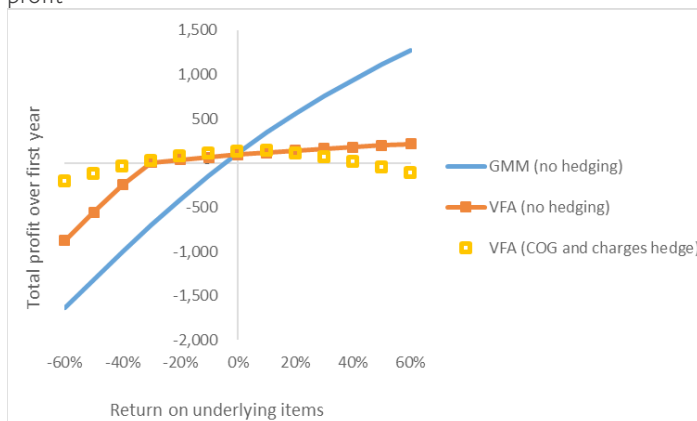


---

Figure 2 shows the impact of this change on total year one profit, under different IFRS 17 measurement models[6]. Under the GMM, the change in the variable fee due to changes in the underlying items results in immediate P&L (Insurance Finance Income or Expense). Under the VFA, in the absence of any risk mitigation, the change in the variable fee due to changes in the underlying items adjusts the CSM and is subsequently released (as Insurance Service Result) in proportion to the chosen coverage units. In this case, only around 10% of the CSM is released over the first year, resulting in far less variability in the realized P&L as a function of the return on the underlying items than under the GMM. Note however that if the underlying items fall enough, the initial CSM is not large enough to absorb all of the resulting change in the variable fee. In this case, the CSM is set to zero, any excess change in fair value is realized immediately as a loss, and the contract becomes onerous. In this example, the contract becomes onerous if the underlying items fall by 32% or more.

When a risk mitigation strategy is in place, the entity can opt to recognize the effect of changes in underlying items (on the components of the variable fee being hedged) in P&L rather than adjusting the CSM, subject to certain qualifying criteria[7]. As the hedge assets will usually be measured under IFRS 9 at Fair Value through P&L, this option prevents an accounting mismatch that would otherwise arise. The orange squares in the Figure 2 show the total P&L when the hedge is in place, under the VFA approach (assuming the hedge meets the qualifying criteria that allows the risk mitigation exception to be applied).

Figure 2: Impact of change in underlying items on total year one profit



Interestingly, for a wide range of changes in the underlying items (-30% to +30% or so) the overall variability of year one P&L is similar in size whether the returns on underlying items are hedged or not. In both cases, the variability in P&L is far lower than the corresponding variability of the entity's share of the underlying items. However, the reasons for this lower variability are different in these two cases. Hedging lowers the economic impact of changes in the risks being hedged, which translates directly into P&L. In the unhedged case, the lowering of year one P&L variability (relative to the underlying changes in economic value) is due to a large proportion of changes in economic value being attributed to change in the CSM. These differences are highlighted in Figure 3, which shows the change in CSM as a function of the return on underlying items.

Figure 3: Impact of change in underlying items on CSM
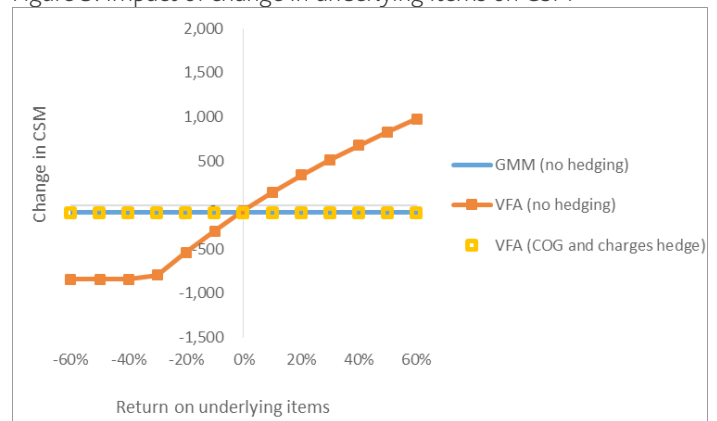


The CSM serves to hold back profits (or absorb losses) so that P&L is released over time. To understand profit emergence under IFRS 17, and in particular the impact of hedging, we must consider how profit emerges not just in year 1 but over the entire coverage period.

## Projection of P&L over the coverage period: Example scenarios

In this section, we consider projections of P&L for the illustrative contract under two example scenarios. One thousand scenarios for liability discount rates and equity fund returns were generated using the Moody's Analytics Economic Scenario Generator using a 'real world' calibration, and the IFRS 17 balance sheet and income statement calculated in each scenario at each time step[8]. The two scenarios analyzed here were selected as illustrating particular aspects of profit emergence under the VFA.

---

6   We assume that assets are measured under IFRS 9 at Fair Value through P&L. As the fair value of underlying items is also measured at fair value through P&L under IFRS 17 (under both the GMM and VFA models), these components cancel off in the calculation of net P&L, leaving the effect of the variable fee (plus any hedge assets).
7   IFRS 17 Insurance contracts (May 2017). Paragraphs B115-116
8   Note that a (risk-neutral) stochastic model is also required to calculate the Cost of Guarantees in each scenario, at each time-step. In this illustrative example, the contract is simple enough that this valuation can be carried out using Black-Scholes formulae.

## Scenario 1: Volatile returns on underlying items

In this scenario, we assume that assets are invested in the underlying items with no hedging, and that assets are measured at fair value through P&L. The scenario was chosen as one in which the underlying items are relatively volatile over the entire coverage period.

Figure 4 shows the underlying fund returns (right axis) and the resulting total profits under the GMM and the VFA.

Figure 4: Profit pattern under scenario 1
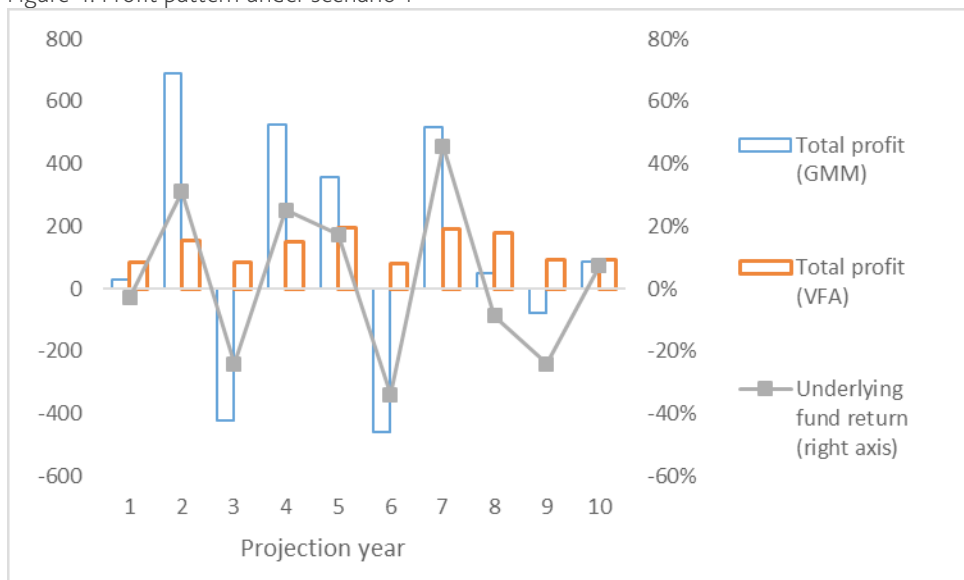


Under the GMM, all impact of financial risk is realized immediately in P&L. Volatility in the underlying items therefore translates directly into volatility in P&L. Under the VFA, changes in the variable fee are smoothed out over time via the mechanism of the CSM, rather than being realized immediately as they occur. This smoothing mechanism only operates while the CSM is positive, which it is over the entire coverage period in this particular scenario. Although there are relatively large positive and negative returns in this example, there are never enough cumulative negative returns of sufficient size to wipe out the CSM. In particular, the two large negative returns (at years 3 and 6) happen to both be followed by large positive returns. They also happen to occur at time when the CSM is relatively large due to previously large positive returns. Figure 5 shows the projected CSM over time in this scenario.

Figure 5: Projected CSM under scenario 1
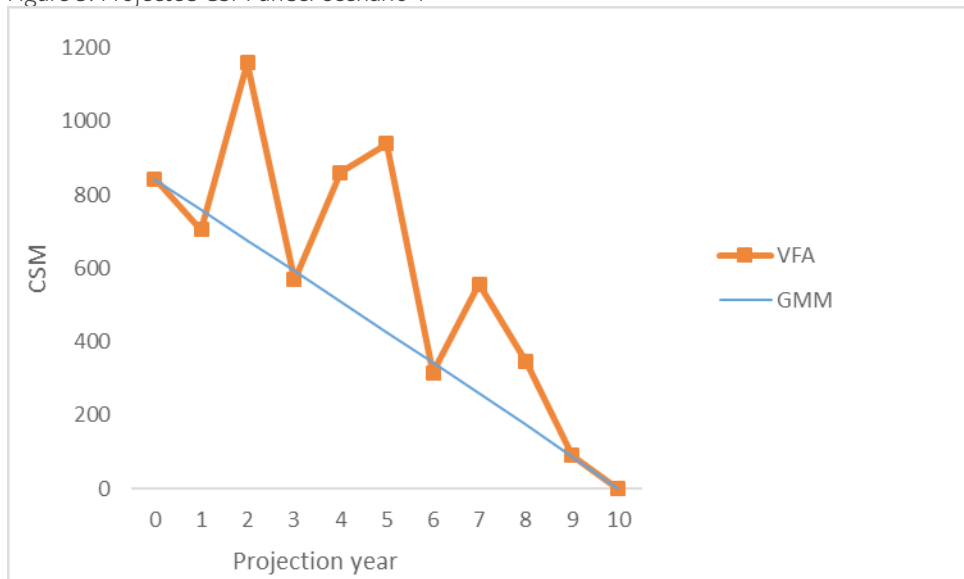
## Scenario 2: Poor returns resulting in contract becoming onerous

This scenario was chosen as one where there are large consecutive falls in the underlying items early in the projection. In this case, total profits are shown for the VFA only. We compare the case where assets are invested in the underlying items with no hedging, and the case where both the cost of guarantees and the value of future charges are hedged (and the hedge qualifies for the risk mitigation exception to be applied).

In this scenario, there are consecutive negative returns on underlying items in years 2-5. The large fall of 24% in year 2 is followed by an even larger fall of 55% in year 3. In the unhedged case, the CSM at the start of year 3 is not large enough to absorb the impact of this large fall, the contract becomes onerous, and a loss of -577 is immediately realized. In fact, in this scenario, the contract remains onerous until the end of the coverage period, so that all subsequent changes in the variable fee result in immediate P&L. In particular, the negative returns in years 4, 5, 7 and 10 all result in realized losses.

Figure 6: Profit pattern under scenario 2
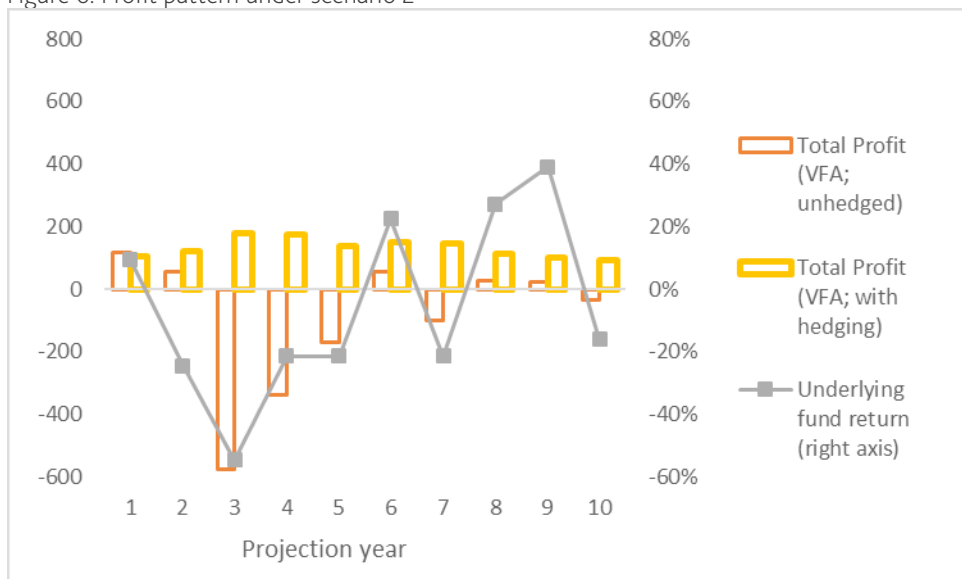


In the hedged case, changes in items being hedged result in immediate P&L rather than adjusting the CSM (assuming qualifying criteria are met). These changes approximately cancel against the corresponding P&L on the hedge assets (with some residual P&L reflecting any hedge mismatch) resulting in a far smoother pattern of profit emergence.

## Many scenarios

The scenarios presented in the previous section are just two of many scenarios that might arise in the future. Here we quantify the distributions of P&L using 1,000 stochastic scenarios.

First, we explore the relationship between profits at consecutive years. Previously, we highlighted that the VFA lowers the impact of financial risk on year 1 P&L using the mechanism of the CSM. To explore further, we plot the total profit realized in year 2 against the total profit released in year 1, in the 1,000 stochastic scenarios. Figure 7 compares P&L in years 1 and 2 using the VFA approach without any hedging (left chart) and with assets hedging the variable fee (right chart).

As noted earlier, the overall variability of P&L in year 1 is similar whether hedged or not. Figure 7 highlights two key differences between the hedged and unhedged cases:

1. Without hedging, the distribution of year 1 profits is highly skewed on the downside. Although the CSM serves to dampen the effect of poor fund returns on P&L, it can only work so far. If the underlying items fall enough the CSM is extinguished, the contract becomes onerous, and subsequent losses are immediately realized.

2. In the absence of hedging, year 2 profits are correlated with year 1 profits (and more generally profits exhibit serial correlation), as long as the CSM remains positive. This correlation is due to the CSM mechanism, whereby changes in the variable fee are spread out over time. In particular, changes in the variable fee over the first year are partly released as year 1 profit, and partly released as year 2 profit (and partly released in later years).

Figure 7: Relationship between profits in years 1 and 2
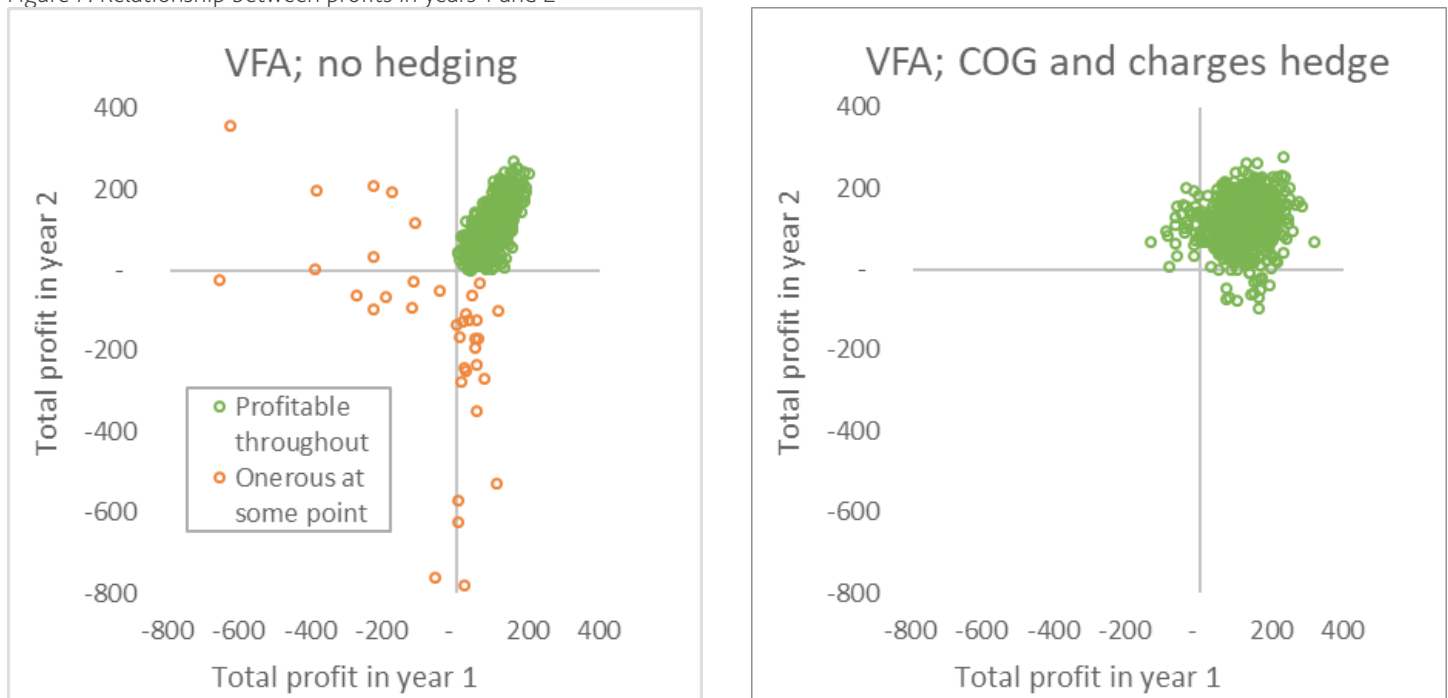
Now consider projection over the entire coverage period. Figure 8 shows the estimated distribution of total profits at each future year over the entire coverage period, under three different asset strategies:

1. Assets invested in the underlying items with no hedging.

2. Assets invested in the underlying items, with an overlay to hedge the cost of guarantees only.

3. Assets invested in the underlying items, with an overlay to hedge the entire variable fee (cost of guarantees and the value of charges).

The VFA is used in all cases, and the risk mitigation exception applied where relevant.

In the absence of hedging, we expect profits to increase over time on average. This is due to the accumulation of unearned profit over the early years of the projection due to increases in the variable fee, which is subsequently released as service is provided. Although profits are positive throughout time in most scenarios, there is a chance of experiencing a loss, corresponding to scenarios where the CSM is too small to absorb changes in the variable fee and the contract becomes onerous.

Hedging has the expected effect of reducing uncertainty in profits at each future year, in particular lowering the probability of becoming onerous (as part of the change in variable fee is hedged, so the CSM has a greater chance of being able to absorb any remaining losses).

If only the cost of guarantees is hedged, there is still considerable variability in the variable fee, primarily due to the value of charges remaining unhedged. And even when the entire variable fee is hedged, there is some uncertainty in profits (particularly in early years) due to residual hedging errors.

Figure 8: Estimated distribution of projected total profits
No hedging
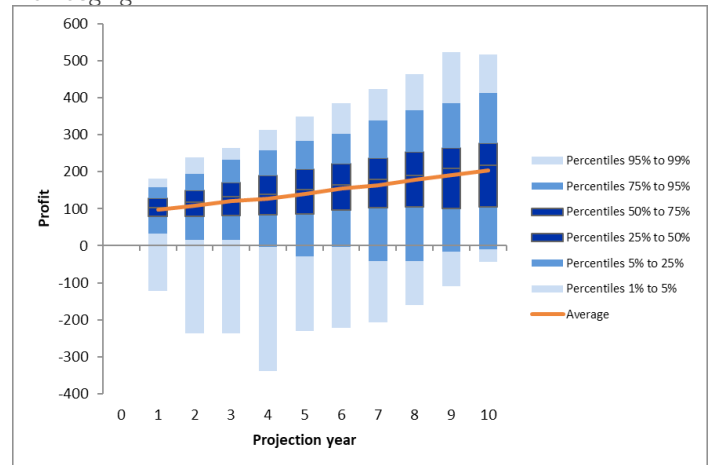


Hedge Cost of Guarantees
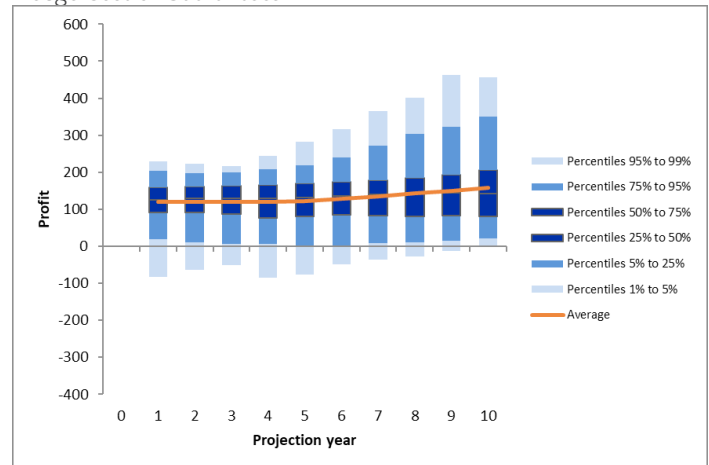


Hedge entire variable fee (Cost of Guarantees and Value of Fees)
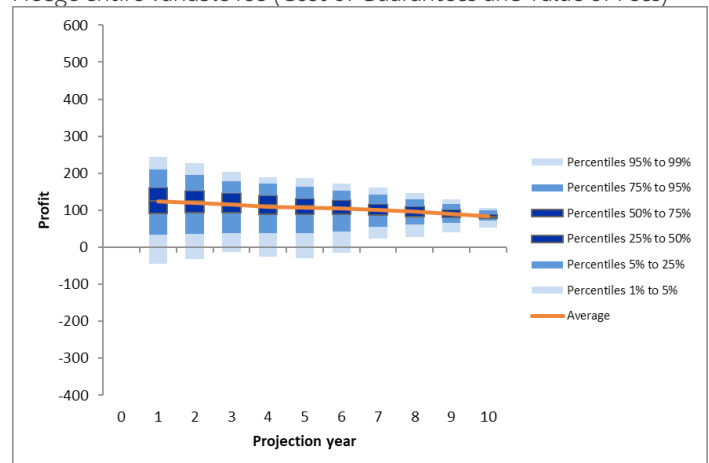
As noted earlier, the difference in accounting treatment depending on whether part or all the variable fee is hedged means that the analysis of realized profit over any one year does not give a complete picture of economic profit. For example, Figure 8 indicates that the distribution of realized profits over the first year is similar regardless of the hedging strategy. However, we know from previous analysis that the distribution of unearned profits varies considerably, as unhedged changes in the variable fee adjust the CSM. In the case where only the cost of guarantees is hedged, for example, the hedge is expected to smooth variability in economic profit, while the remaining component (the value of charges) continues to adjust the CSM and is gradually released over time.

To understand the true impact of hedging, it is helpful to measure the distribution of cumulative profit i.e. the sum of P&L realized to date, as shown in Figure 9. In particular, at the end of the coverage period, the distribution of cumulative profit is independent of accounting treatment and reflects the true economic performance of hedging. Although the variability of profits is smoothed out under the VFA (without hedging), the accumulated profit in future years can vary widely depending on the particular economic scenario.

Figure 9: Distribution of projected cumulative profit
No hedging
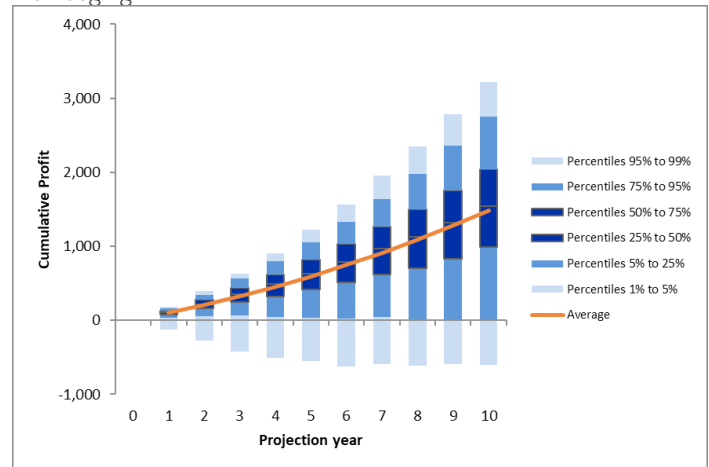


Hedge Cost of Guarantees
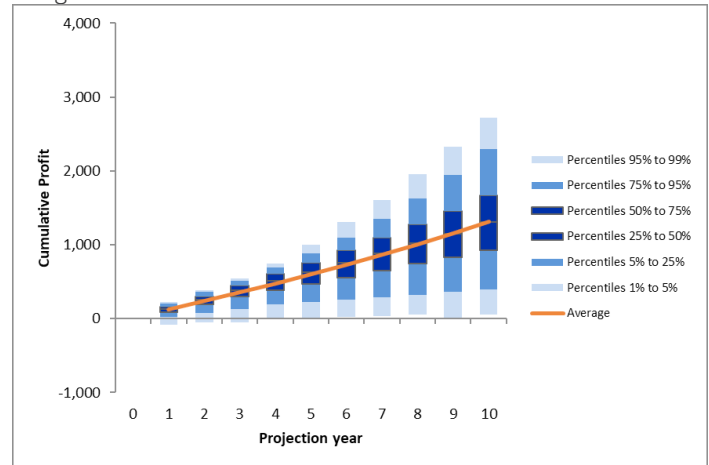


Hedge entire variable fee (Cost of Guarantees and Value of Fees)
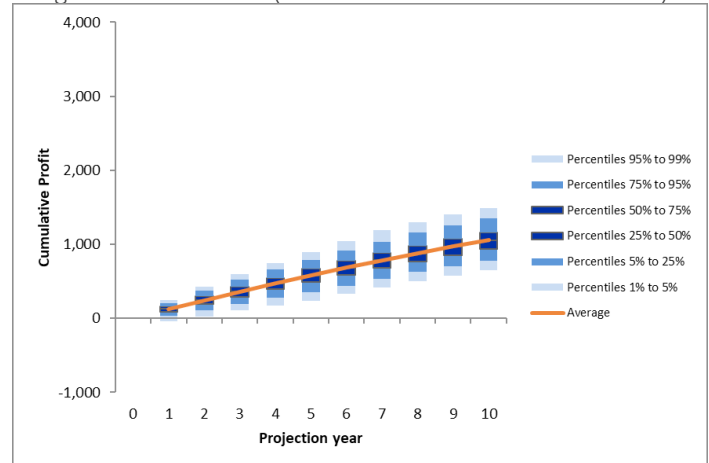
## Summary

This paper highlights some important aspects of profit emergence for contracts with participation features under IFRS 17, in particular:

» The Variable Fee Approach and General Measurement Model differ in their treatment of changes in the 'variable fee' and whether it is realized immediately as P&L (GMM) or amortized via the CSM (VFA). When assets are invested in the underlying items, and measured at Fair Value through P&L, the resulting economic mismatches between assets and liabilities gives rise to immediate P&L under the GMM. The VFA has the effect of smoothing such economic mismatches over time, so that net profits are (in general) less volatile than under the General Measurement Model.

» While the CSM absorbs losses due to falls in the variable fee under the VFA, it is floored at zero. When such losses exceed the CSM, the contract is deemed 'onerous' and all P&L is immediately realized (as long as the contract remains onerous). Even under the VFA, P&L can be relatively volatile depending on the particular economic scenario.

» The default treatment of the variable fee under the VFA is designed to smooth economic mismatches where these exist, but conversely gives rise to an accounting mismatch where assets and liabilities are well matched. When a risk mitigation strategy is used (and as long as qualifying criteria are met) certain changes in variable fee can be recognized immediately in P&L rather than adjusting the CSM, thus avoiding such accounting mismatches.

» In the illustrative example analyzed here, the distribution of earned profit over the first year looks similar whether hedged or not, but the distribution of unearned profit (CSM) is different. Hedging lowers P&L variability in year 1 by reducing economic mismatches. In contrast, the CSM mechanism lowers P&L variability in year 1 by spreading the effect of economic mismatches over time.