OliverWyman

GOES MODEL OFFICE RESULTS

Revised scenarios

2/26/2025

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VM-21 PROJECTIONS

Component	Description of functionality
Liability modeling	• Liability cash flows for model office comprised of the following product features: – Base variable annuity contract and a variety of GMxBs (GLWB, GMDB, GMIB) with typical features and charges • Modeled on a direct basis only (i.e., without reinsurance)
Asset modeling	• Guardrail VM-21 prescribed strategy**:** 10-year bonds with ratings A and AA consistent with the guardrail prescribed under VM-21
Calculations	• Outer loop cash flows under best estimate assumptions and input deterministic scenarios • Pre-tax asset and liability projections under input stochastic scenarios reflecting all cashflows under prudent best estimate and VM-21 prescribed assumptions • Inforce asset iteration at valuation date under input stochastic scenarios to achieve no GPVAD • Fair value of living benefit riders on annual timesteps to support implicit hedging approach
Assumption sets	• Best estimate • Prudent best estimate • VM-21 standard projection prescribed
Hedging	• Employs the "cost of reinsurance" method (i.e., implicit method) in the best efforts run, option cost is charged at time 0 and rider fees and claims are removed
Reporting	• Stochastic reserve (CTE70 pre-tax under adjusted and best efforts hedge) • Standard projection add-on under CTEPA method (CTE70 under prescribed in excess of SR, subject to CTE70 – CTE65 unfloored buffer) • C3 at 100% RBC (CTE98 pre-tax and subsequent calculations). Note: C3 will be unsmoothed

VM-21 MODEL OFFICE

In-force archetypes were created using a model office creation toolkit and varied by driving characteristics. A wide range was used in determining variation in driving characteristics to capture a range of impacts to compare against field testing

Characteristic	Variations	Values
GMWB guarantee strength	Weak guarantee	**Rollup rate:** 3% **Income rates:** 4.0% - 5.5% based on attained age
	Strong guarantee	**Rollup rate: 7**% **Income rates:** 5.5% - 7.0% based on attained age
Hedging	Hedged	**Hedge modeling:** Implicit method
	Unhedged	**Hedge modeling:** None
Block maturity	New	**Issue year:** 2022 **Average age:** 66 **Percentage of GMWB contracts taking income:** 20%
	Mature	**Issue year:** 2007 **Average age:** 75 **Percentage of GMWB contracts taking income:** 75%
Moneyness	OTM / ATM / ITM	**OTM:** Benefit Base is 90%-100% of AV **ATM:** Benefit Base is 100%-110% of AV **ITM:** Benefit Base is 110%-140% of AV
Other	Static inputs	**M/F sex split:** 50/50 **Q/NQ split:** 65/35 **Equity allocation:** 70%

VM-20 ULSG PROJECTIONS AND MODEL OFFICE DESCRIPTION

Model assumptions and product features were selected based on industry benchmarks to be a simplified representation of products currently offered

Projection model details	▪ Universal life with shadow design lifetime secondary guarantee issued in 2020 ▪ Time 0 reserves are held in 50% 5-year BBB bonds and 50% 7-year BBB bonds ▪ Reinvestment strategy uses 50% A/AA corporate bonds – 10% 5-year – 25% 7-year – 35% 10-year – 25% 20-year – 5% 30-year
Best estimate assumptions	▪ Follows industry benchmark assumptions ▪ Mortality experience is 100% credible with 25 years of sufficient data ▪ UL crediting rate is dynamic and based on NAER less a spread, varying for each stochastic scenario
Prudent estimate assumptions	▪ VM-20 prescribed mortality margins based on credibility and sufficient data period ▪ Minimal lapse when policy maintained in-force by NLG (i.e. CSV = 0)

GOES SCENARIO UPDATES

REVISIONS TO GOES

Z1 **Initial Treasury Yield Curve Fitting Methodology:** The revised initial yield curve fitting methodology places more emphasis on the longer maturities for greater alignment with insurance company investment strategies.

Z2 **Dynamic Generalized Fractional Flooring (DGFF):** The DGFF methodology is an extension of the previous generalized fractional floor and the parameters are set to target a 3% level of negative 1-year UST rates in the steady state.

Z3 **Equity Calibration:** The revised equity calibration raises the 1st percentile gross wealth factors (GWFs) of the Large Capitalization equity fund to be closer to the acceptance criteria targets compared to the prior 2024 field test calibration.

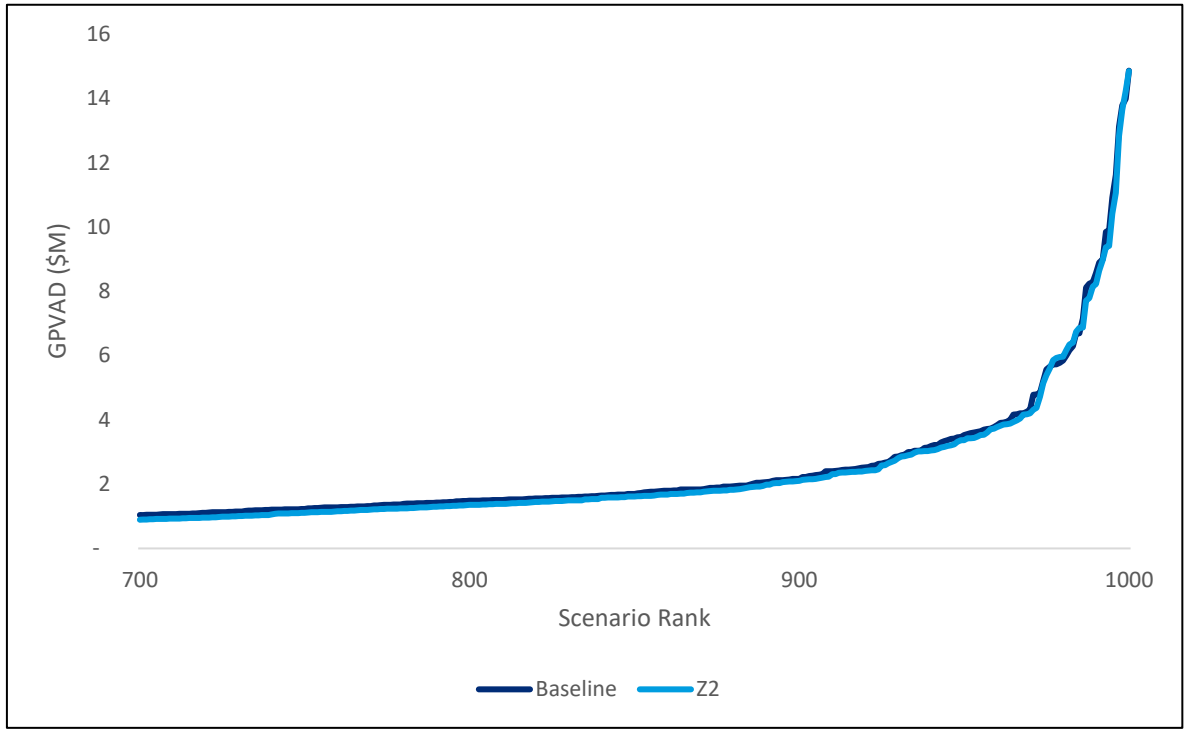
VM-20 ULSG STOCHASTIC RESERVE – REVISED SCENARIO IMPACTS

The Stochastic Reserve ("SR") was produced using a 1,000 scenario subset of the GOES scenario sets

CTE's of scenario reserves

Scenario Set	CTE70 (SR)	CTE95	CTE98
Baseline	2,527,536	6,396,504	9,405,700
Z1 vs Baseline	-3.26%	+0.88%	+1.70%
Z2 vs Z1	-1.45%	-2.84%	-3.45%
Z2 vs Baseline	-4.66%	-1.99%	-1.81%

CTE70 scenario reserves



Observations

- The cumulative impact to the adjusted CTE reserves from the scenario revisions is moderate
- Changes to yield curve fitting (Z1) had opposing impacts to CTE-70 and CTE-98
- UST flooring (Z2) impacts are slightly more pronounced in the extreme tail, relative to Z1

Z3 scenario set was not in scope for the VM-20 testing since equity calibration would not affect ULSG

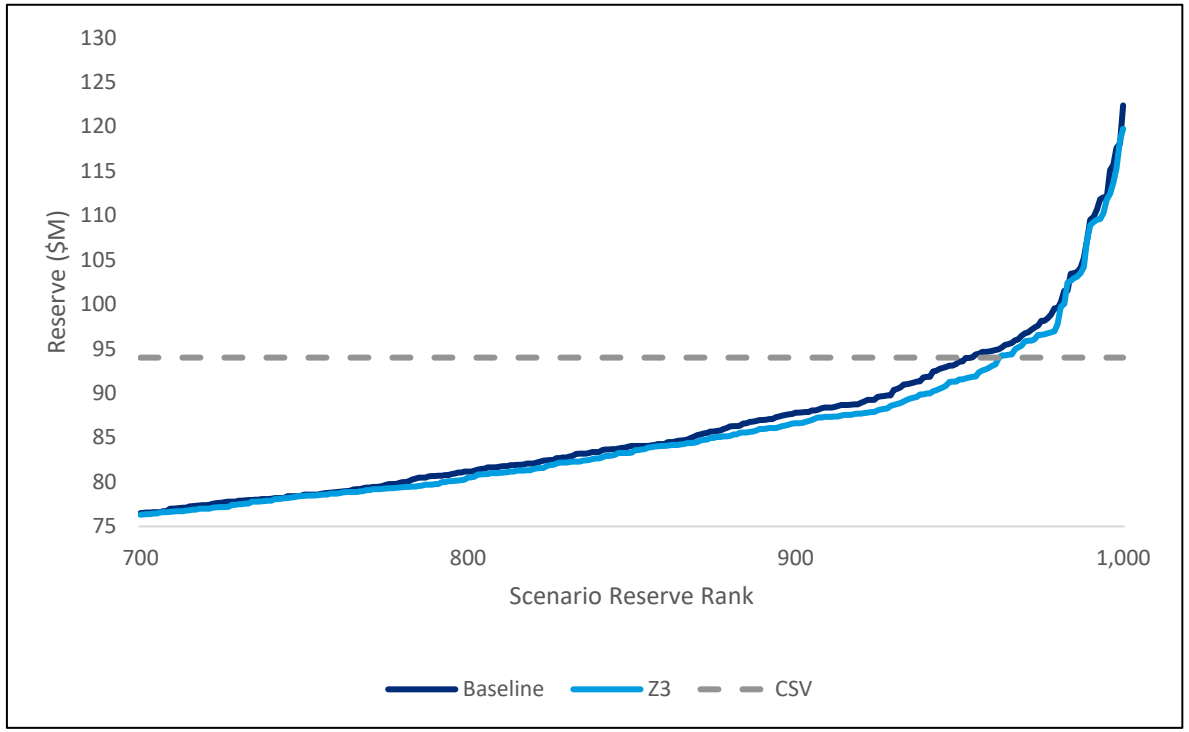
VM-21 VA STOCHASTIC RESERVE – REVISED SCENARIO IMPACTS

The New/ Weak / ITM archetype scenario reserves for the CTE70 adjusted are graphed below on an unfloored basis

Unfloored CTE adjusted scenario reserve metrics

Scenario Set	CTE70	CTE95	CTE98
Baseline	100,463,924	101,327,971	107,032,539
Z1 vs Baseline	-0.08%	-0.45%	-0.54%
Z2 vs Z1	-0.00%	-0.00%	+0.00%
Z3 vs Z2	-0.10%	-0.90%	-0.40%
Z3 vs Baseline	-0.18%	-1.35%	-0.94%

Unfloored CTE70 adjusted scenario reserves



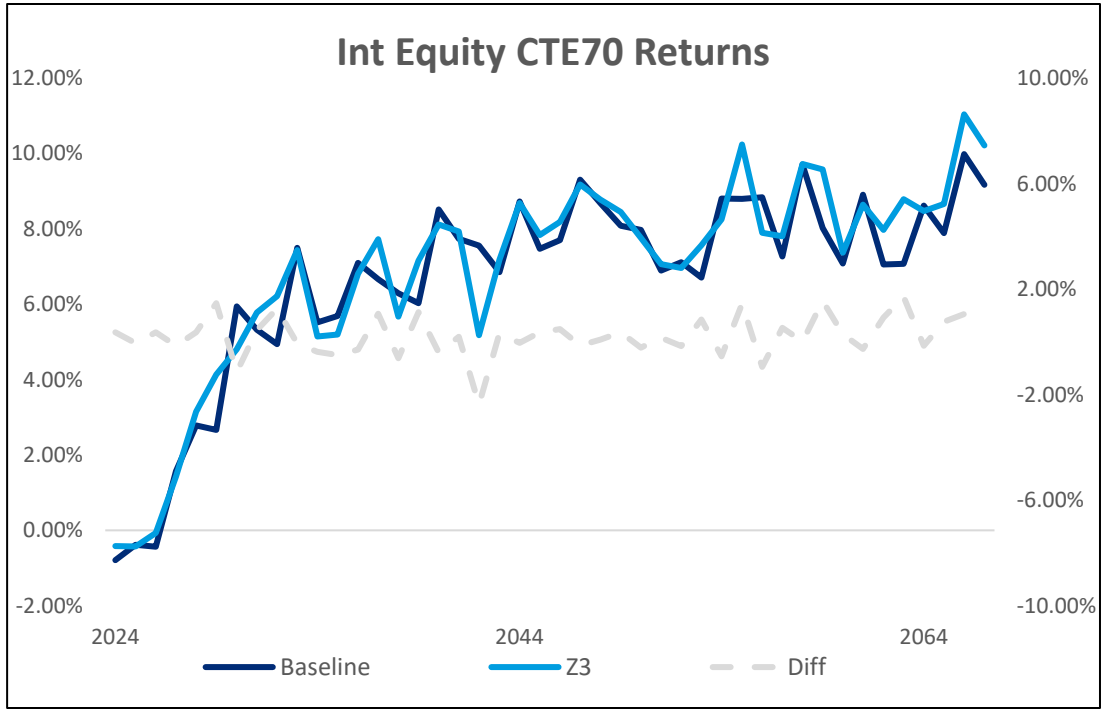
Observations

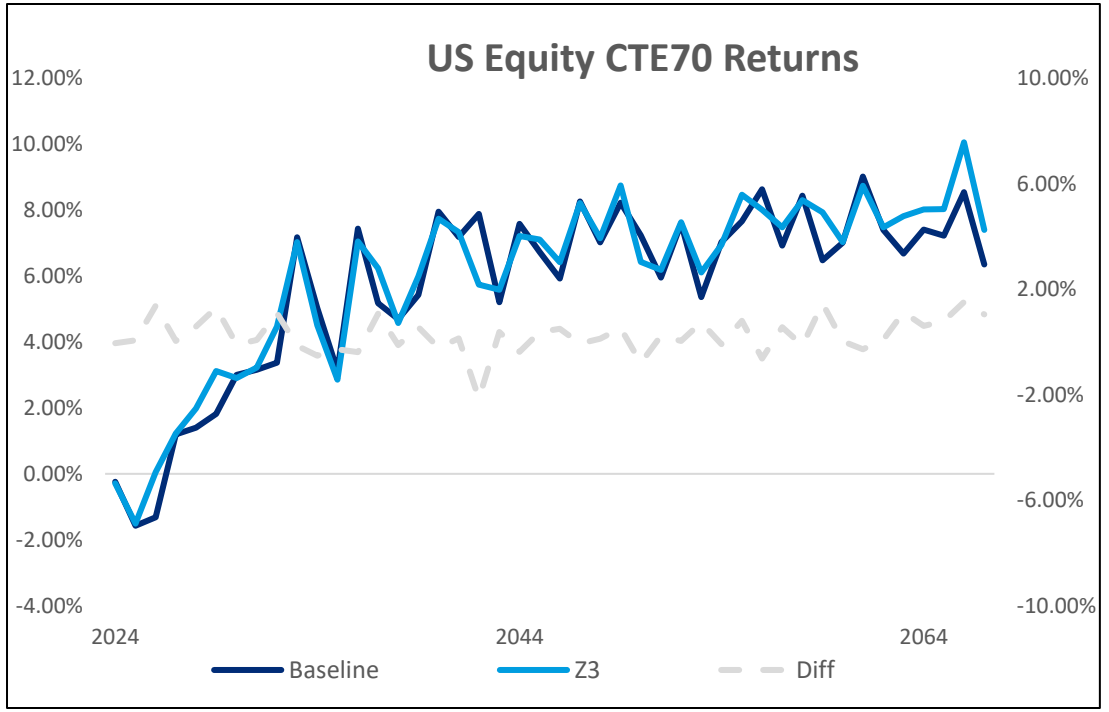
- The cumulative impact to the CTE adjusted reserves from the scenario revisions is minor
- Changes to yield curve fitting and UST flooring (Z1, Z2) had minor impacts
- Updates to the equity calibration (Z3), while still minor, led to an overall decrease in scenario reserves
- Impacts are more pronounced in the tail

OTM and ATM archetypes tested showed lesser but similar impacts than the ITM archetype impacts shown above

POLICY HOLDER INVESTMENT ACCOUNT RETURNS

Z0 vs Z3 scenario returns for international equity and US equity markets



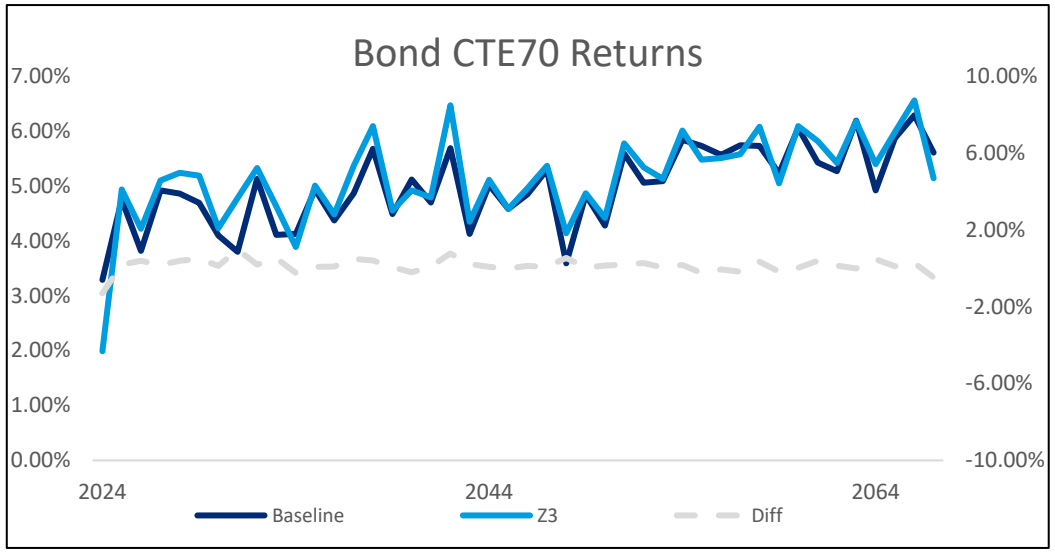


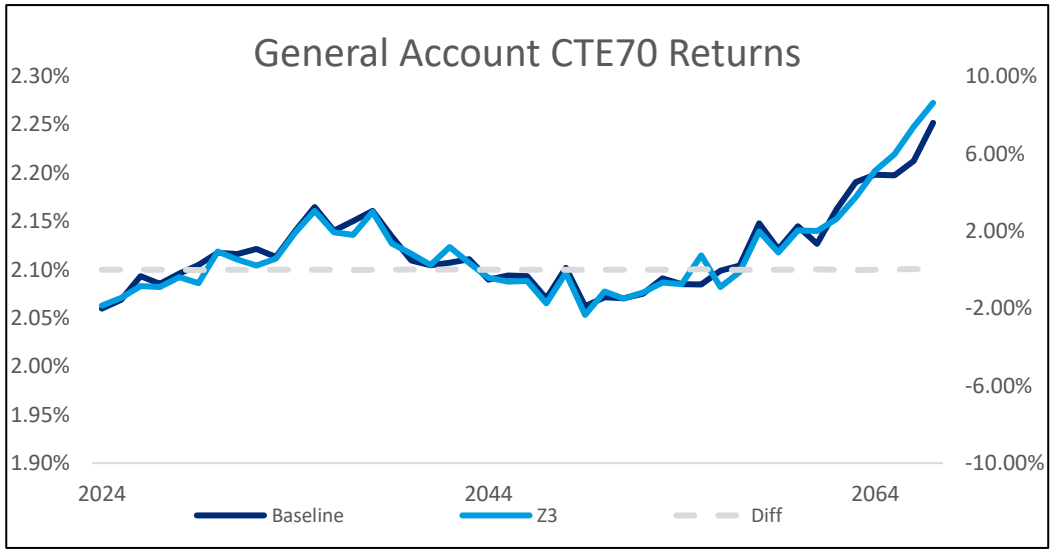
Observations

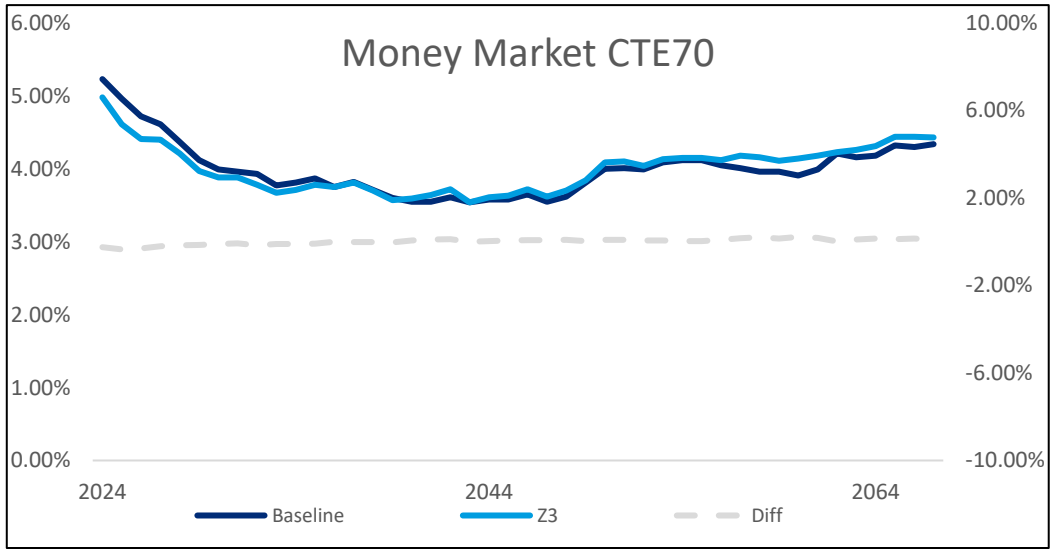
- Consistent with Z3 scenario revisions, which improve equity returns for tail scenarios, we observe a slight increase in average equity returns for the CTE70
- As expected, CTE70 scenarios are characterized by an early drop in equity returns in both baseline and revised scenario sets

POLICY HOLDER INVESTMENT ACCOUNT RETURNS

Z0 vs Z3 Scenario Returns for bond, interest rate, and money markets







Observations

- Fixed income markets showed minor impact from scenario revisions
- Revisions to the scenario treasury rates had minimal impacts to VA results, given that most of the model office deposits are allocated to equities

APPENDIX – PHASE 1 FIELD TEST RESULTS

VM-20 RESULTS

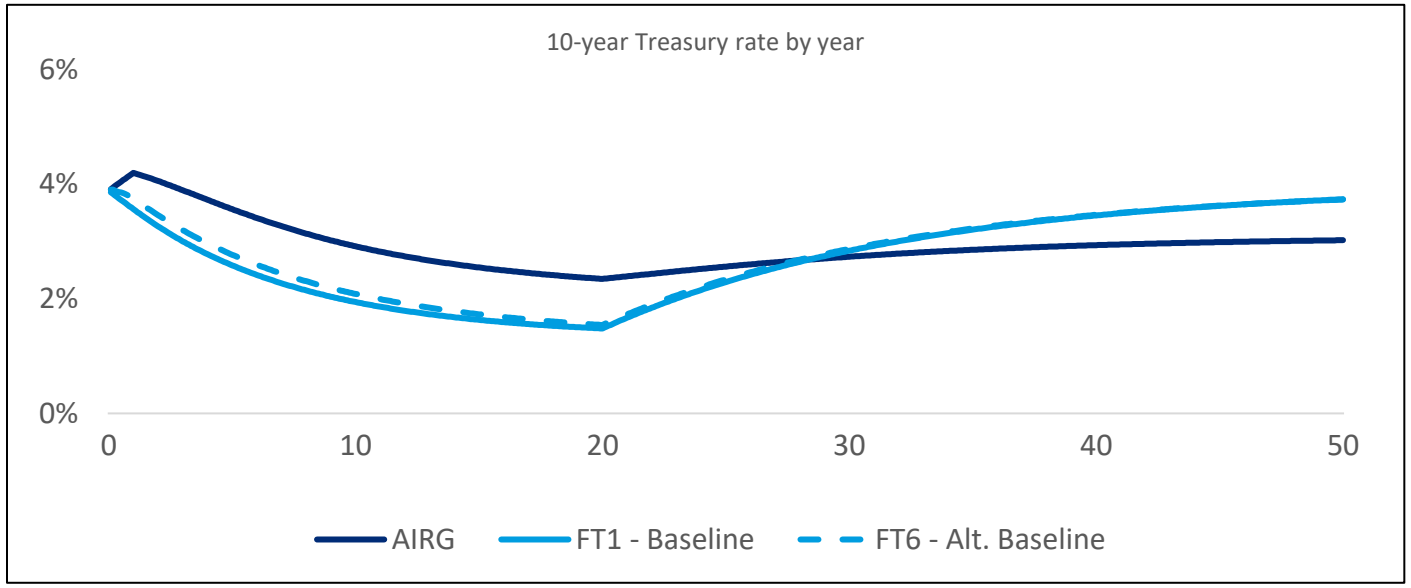
DETERMINISTIC RESERVE – BASELINE SCENARIO IMPACT

The Deterministic Reserve ("DR") is produced using scenario 12 of the SERT scenario set

Term and ULSG Results (000s)

Scenario Set	Term DR	Change from AIRG	ULSG DR	Change from AIRG
AIRG	108		2,325	
FT1 Baseline	129	+19%	2,879	+24%
FT6 Alt. Baseline	134	+24%	2,765	+19%

SERT Scenario #12 (DR)



Commentary

- Per VM-20 Appendix 1 the DR scenario (#12) **shocks Treasury rates for years 1-20** and should be **one standard deviation** from the baseline scenario
- The **volatility of GOES** scenarios result in a significantly **larger downward shock** than under AIRG
- **Long-term rates are higher** in the GOES scenario sets than AIRG
- There is minimal impact to results between the GOES FT1 baseline and FT6 alternative baseline
- **Starting assets are held in cash and reinvested at time 0.** The use of 2-year bonds for Term (10-year bonds for ULSG) allows the analysis to reflect the impact of differences in the yield curve at multiple durations; **more robust Asset-Liability Matching ("ALM") practices would mitigate impacts**
- As a result of the significantly lower rates in earlier durations, GOES baseline scenarios are producing a roughly **20% increase to the DR** for both Term and ULSG

The GOES DR scenario has significantly lower Treasury rates for years 1-20 and results in an increase to the DR for Term and ULSG

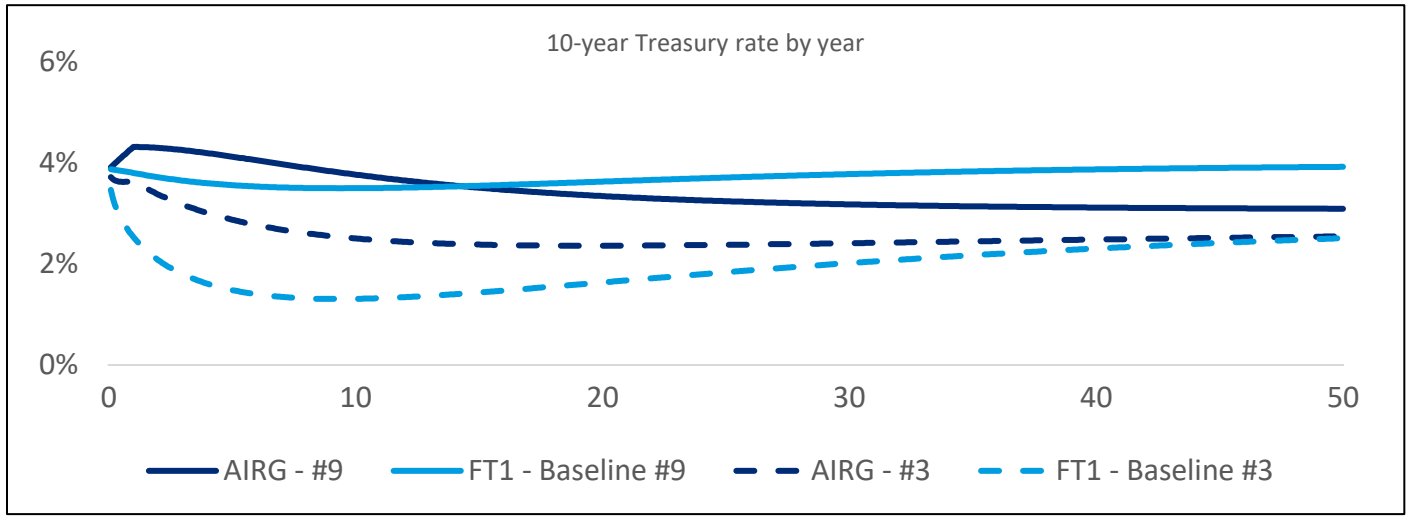
SERT RESULTS – BASELINE

SERT results across the AIRG and GOES Field Test sensitivity scenarios are summarized in the table below, the passing threshold is 6%

Term and ULSG results (000s)

	Term		ULSG	
Scenario Set	Max reserve (#3 pop down)	SERT ratio	Max reserve (#3 pop down)	SERT ratio
AIRG	95	**3.6%**	1,625	**8.6%**
FT1 Baseline	129	**6.3%**	2,281	**19.0%**
FT6 Alt. Baseline	136	**6.6%**	2,240	**20.2%**

SERT #9 – Baseline vs SERT #3 pop down



Commentary

- Under GOES, the **baseline SERT scenario (#9)** which is an un-shocked yield curve, is showing slightly **lower Treasury rates in early projection years** and **higher Treasury rates in later years**, due to a higher mean reversion parameter
- Per VM-20 Appendix 1, the **pop down scenario** is described as having an **interest rate shock** selected to maintain the cumulative shock at the 10% level.
- The **wider dispersion** of Treasury rates under GOES results in a **significantly larger shock to Treasury rates**
- The **maximum reserve** calculation for the SERT is **increased significantly** and results in **higher SERT ratios** than under AIRG for the same liability profile
- The determination of the **SERT ratio may need to be reviewed** or the **scenario generation process may need to be further calibrated** to ensure the Exclusion Test's objectives are appropriately met

Similarly to the DR scenario, the SERT baseline (#9) and pop down (#3) scenario sets are showing a wider dispersion of rates than AIRG

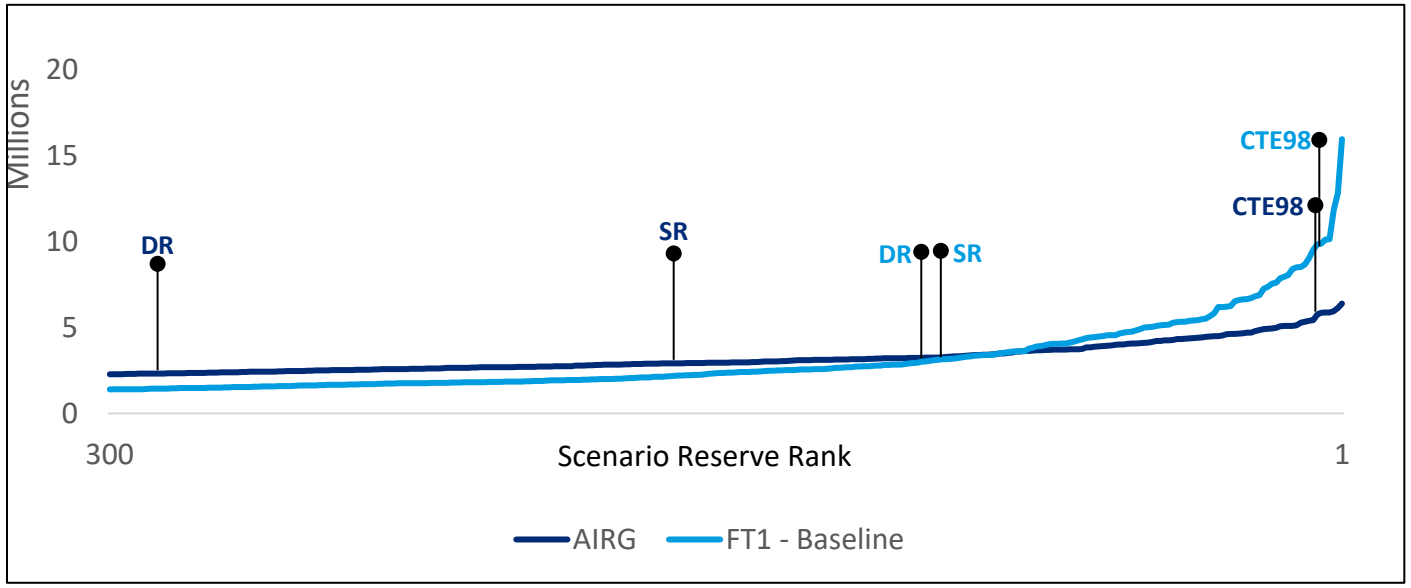
STOCHASTIC RESERVE – BASELINE SCENARIO IMPACT

The Stochastic Reserve ("SR") was produced using a 1,000 scenario subset of the AIRG and GOES scenario sets

ULSG Results (000s)

Scenario Set	DR	Change from AIRG	SR	Change from AIRG	CTE98	Change from AIRG
AIRG	2,325		3,229		5,417	
FT1 Baseline	2,879	+24%	3,167	-2%	9,336	+72%
FT6 Alt. Baseline	2,765	+19%	2,847	-12%	8,247	+52%

CTE70 Scenario Reserves



Commentary

- The GOES scenarios set are producing results that are **largely consistent with AIRG at the CTE70 level**
- The **spread between the "worst" and "best" CTE70 scenario** is much **wider under GOES**, explained by the broader range of yield curve paths
- For nearly **two thirds of the CTE70 scenarios**, the **AIRG is producing higher reserves than under GOES**
- The deep **tail scenarios are significantly more severe under GOES**. In comparison to the AIRG, the CTE98 increases over 70% for FT1 and 50% for FT6
- Given there is **no scenario reserve flooring under VM-20**, The sharp **increase in tail scenario reserves** is partially offset by the small **favorable impact from scenarios below VaR90** where AIRG produced higher reserves than GOES
- Under GOES, the **SR is higher than the DR** by a significantly **smaller margin than under AIRG**, driven by the strengthening of the DR

The impact of the sharp increase in deep tail scenarios is mitigated by the decrease in less adverse scenarios included in the CTE70

VM-21 RESULTS

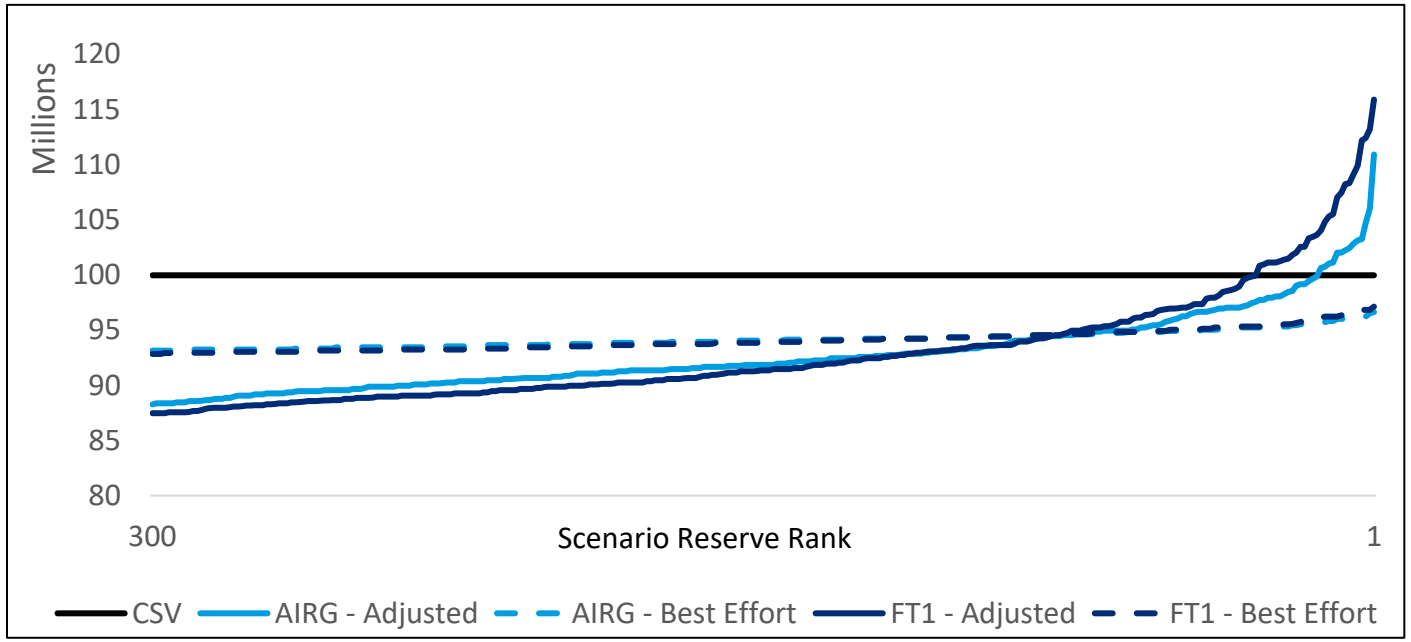
STOCHASTIC RESERVE – BASELINE SCENARIO IMPACT

The Mature / Strong / ATM cohort scenarios reserves for the CTE70 are graphed for AIRG and FT1 under the unfloored adjusted and best effort runs

Unfloored CTE70 adjusted scenario reserve metrics

Scenario Set	CTE70	CTE80	CTE90	CTE95	CTE98
AIRG	93	94	97	99	102
FT1 - Baseline	93	95	99	102	107

Unfloored CTE70 scenario reserves



Commentary

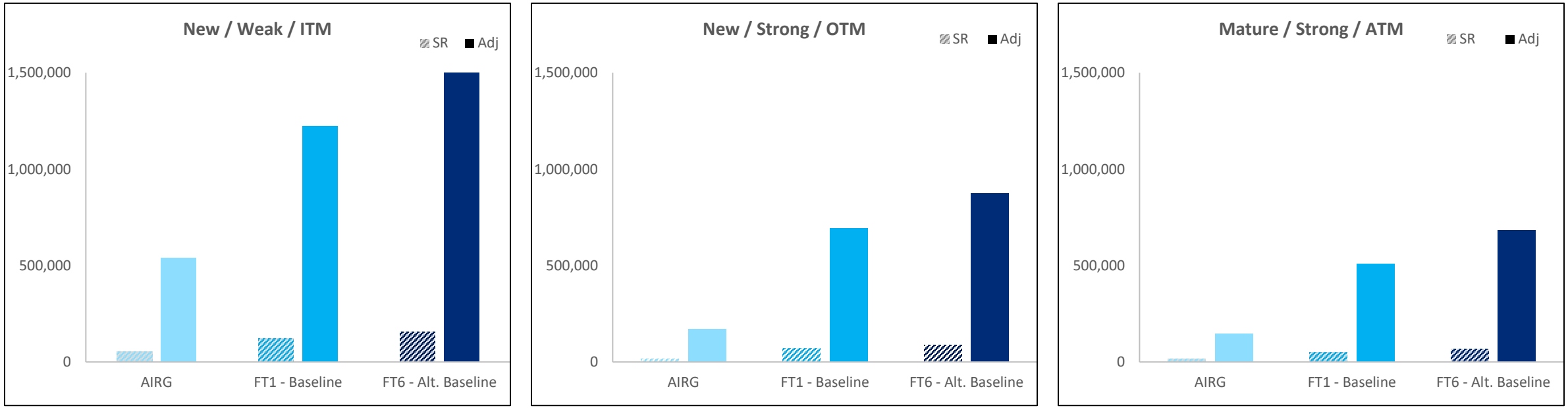
- GOES scenarios are producing **larger adjusted scenario reserves than AIRG for tail scenarios**
- Severity of adverse impact to tail scenarios are the result of **increased volatility to equity returns and Treasury rates under GOES**
  - **Equity returns in tail scenarios are lower** than under the AIRG, leading to increased claims and reduced fees
  - **Treasury rates in tail scenarios are lower than under AIRG and may go negative**, leading to lower investment income and higher discounted claims
  - Deep tail scenarios exhibit low equity returns and Treasury rates
- **CSV flooring at the scenario level has a significant impact under GOES**, preventing impacts from less adverse scenarios from offsetting the increase to tail scenario reserves
- The profile of the underlying inforce may have a significant impact to CTE70 and impact of flooring

Results from the GOES are more adverse than AIRG the further we go in the tail, with a 5% increase to CTE98 adjusted

BASELINE SCENARIOS – RESERVES COMPARISON

Comparison of VM-21 reserves in excess of CSV for all three cohorts, outlining the difference between the **AIRG**, the **GOES baseline**, and the **alternative baseline** reserves

VM21 SR and CTE (adjusted) ("Adj") reserves in excess of CSV



CTE70 (adjusted) by archetype (000s)

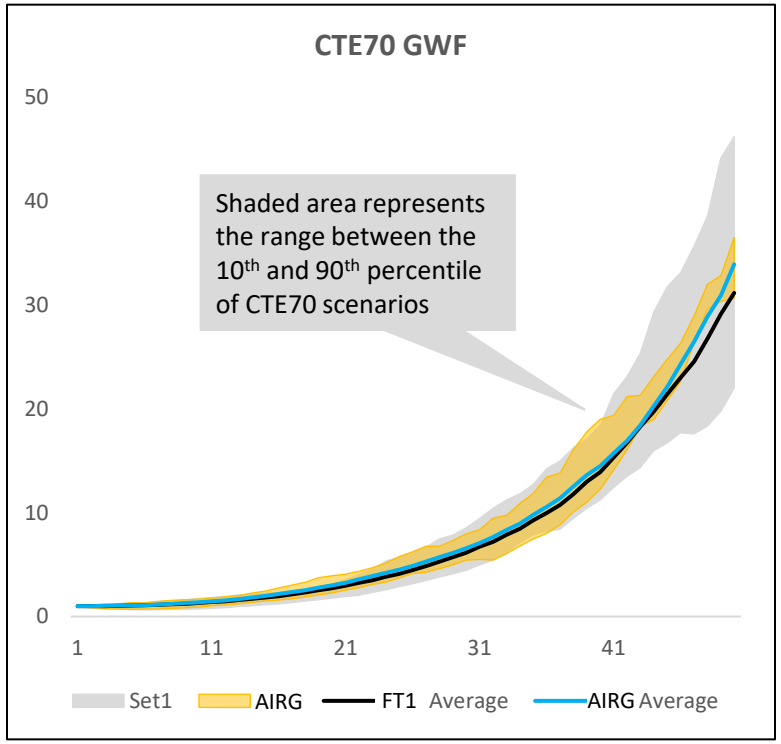
Archetype	AIRG [A]	GOES FT1 [B]	GOES Alt. Baseline [C]	([B] – [A]) / [A]	([C] – [B]) / [B]
New / Weak / ITM	540	1,223	1,542	126%	26%
New / Strong / OTM	171	693	876	303%	26%
Mature / Strong / ATM	145	509	684	251%	34%

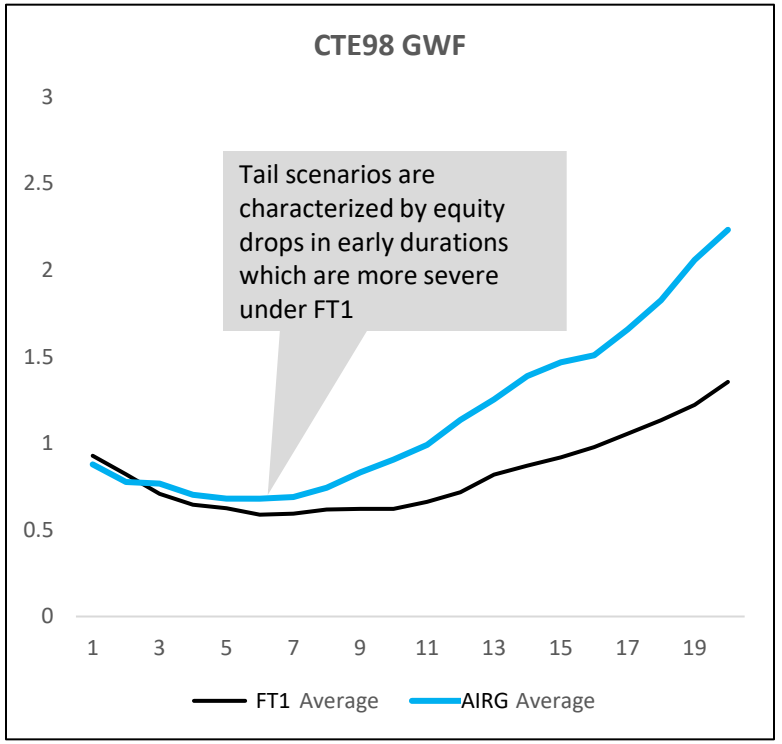
GOES FT1 produces higher reserves than the AIRG as a result of compressed equity returns in the tail and lower Treasury rates in early durations. The alternative baseline produced similar but slightly more adverse results than FT1

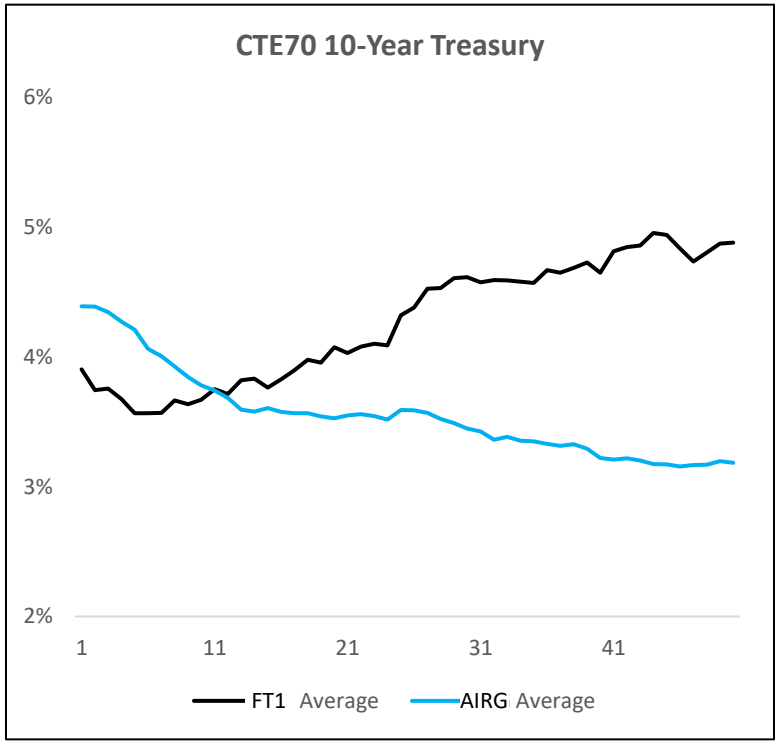
BASELINE SCENARIOS – SCENARIO ANALYSIS – MATURE / STRONG / ATM COHORT

Comparison of average accumulated gross wealth factors ("GWF") and 10-Year Treasury curve for CTE70 and CTE98 scenarios over 50 years of projection for the Mature / Strong Guarantee / ATM cohort

Mature / Strong Guarantee / ATM Cohort







Average equity return from GOES scenarios is similar to AIRG at the CTE70 and CTE98 levels but more disbursed and adverse in the tail; lower GOES rates in earlier years are producing adverse results despite reverting to a higher mean in later years

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