

# 3<sup>rd</sup> AZN Conference, Consumer Protection in New Era

# Agenda

1. Value Creation: Capital Management
2. Case Study

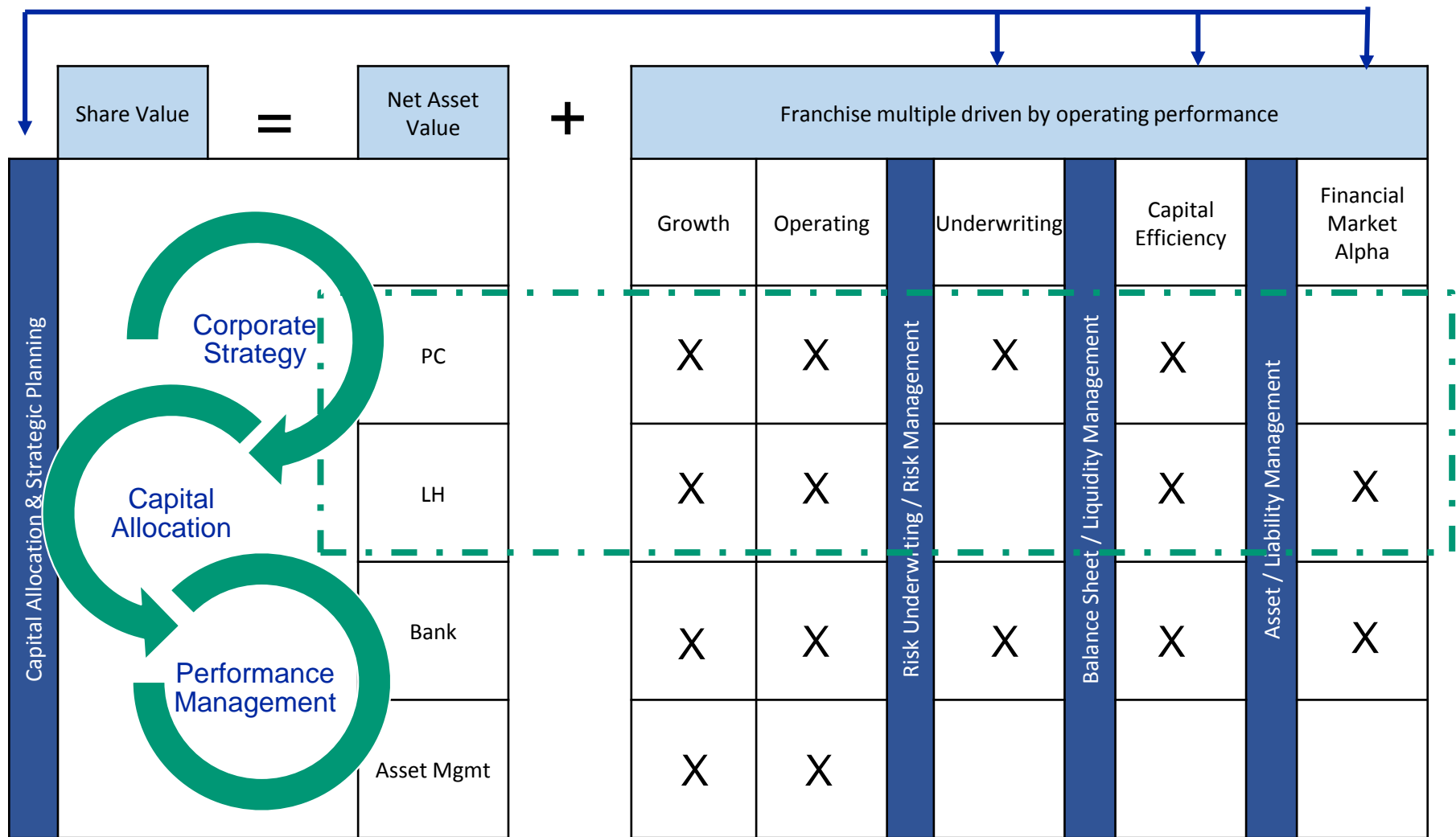
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# Value Creation: Capital Management

# Value Creation in Finance & Risk

- » Can we evaluate the impact of “Brexit”, or “X-country goes out of Eurozone” on the BS?
- » Which products do we expect to be more profitable and less capital intensive in the future?
- » How a spike in rates or a certain asset mix will impact the BS?
- » How changing asset duration does impact ALM and EC?

# Value Creation in Finance & Risk

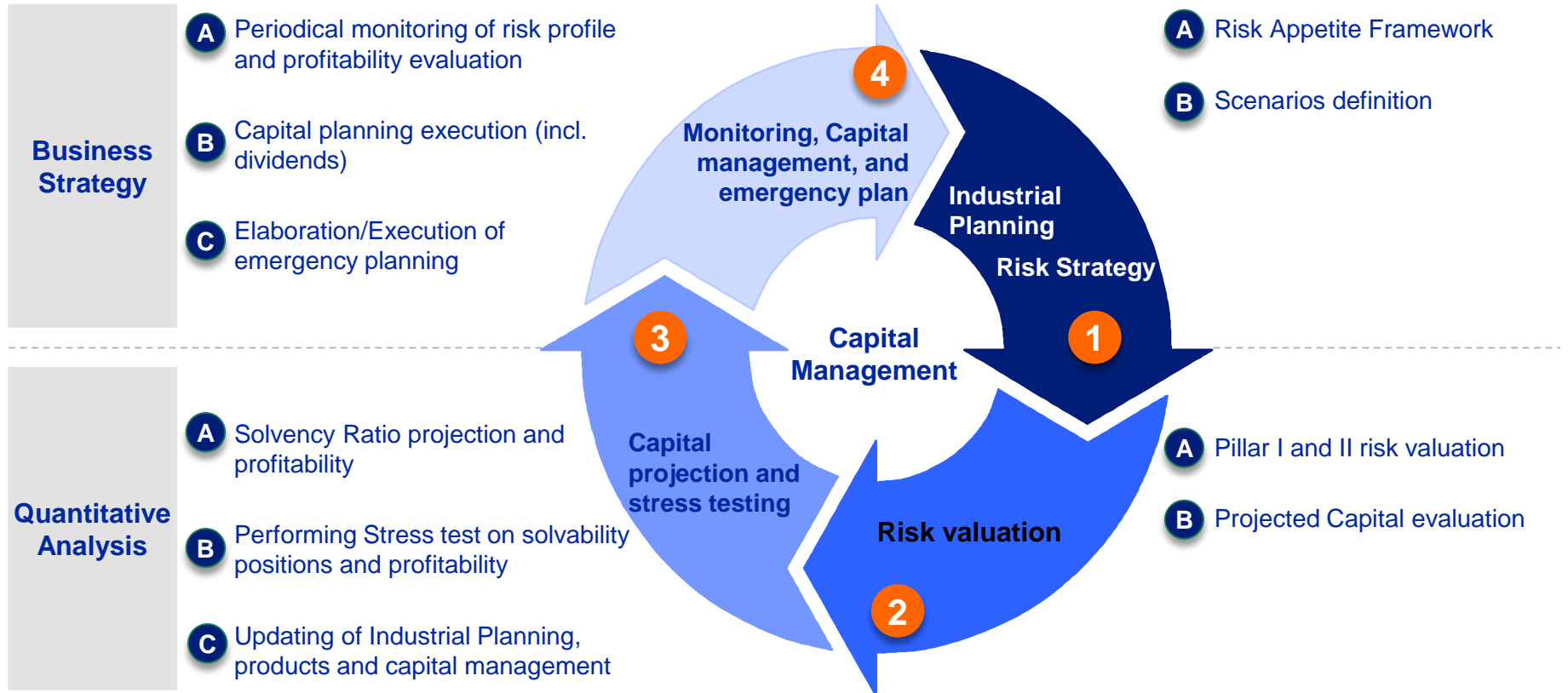


Source: Value and Capital Management by Thomas C. Wilson

# Capital Management

## Capital Management and Monitoring

## Planning and Risk Valuation



Source: BCG – Moody's Analytics – XI Italian Congress of Actuaries



# Business Forecasting – Survey Results

Why so difficult ?

- » Multi Scenarios
- » Multi Capital Modelling Framework
- » Multi Balance Sheet
- » Multi Years

## Governance



## Modelling & Technologies



## Data



# Capital Management Process

## Overview

### Scenarios

Macroeconomic Variable

Risk Factors

Distribution of Risk Factors

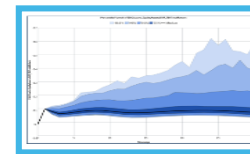
Narrative Scenarios

BASE  
NEAR-TERM REBOUND  
LOW OIL PRICE  
AD HOC: WEAK BANKING SYSTEM

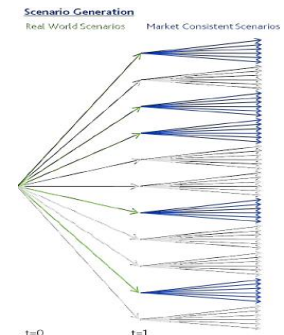
Yield curve

Spread

Equity volatility



### ALM (time 0 - n)



- Deterministic scenarios - understandable by the board

- Risk factors reflecting modelling specification

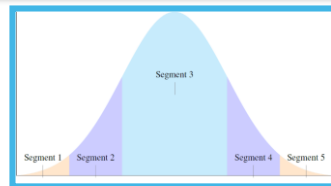
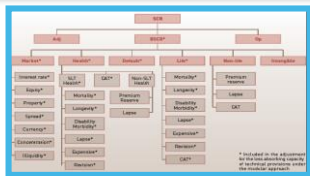
- Calibration of the scenarios

- ALM running

### Capital Calculation (time 0 - n)

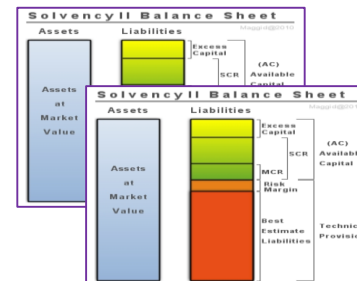
Standard Formula

Internal Model



- Capital Framework Calculation

### BS/Reports



- BS consolidation

### RAPM

Rorac

Raroc

ECI

CER

- Classic KPI vs Risk Adjusted



2

Case Study

# Political Risk



**VS**

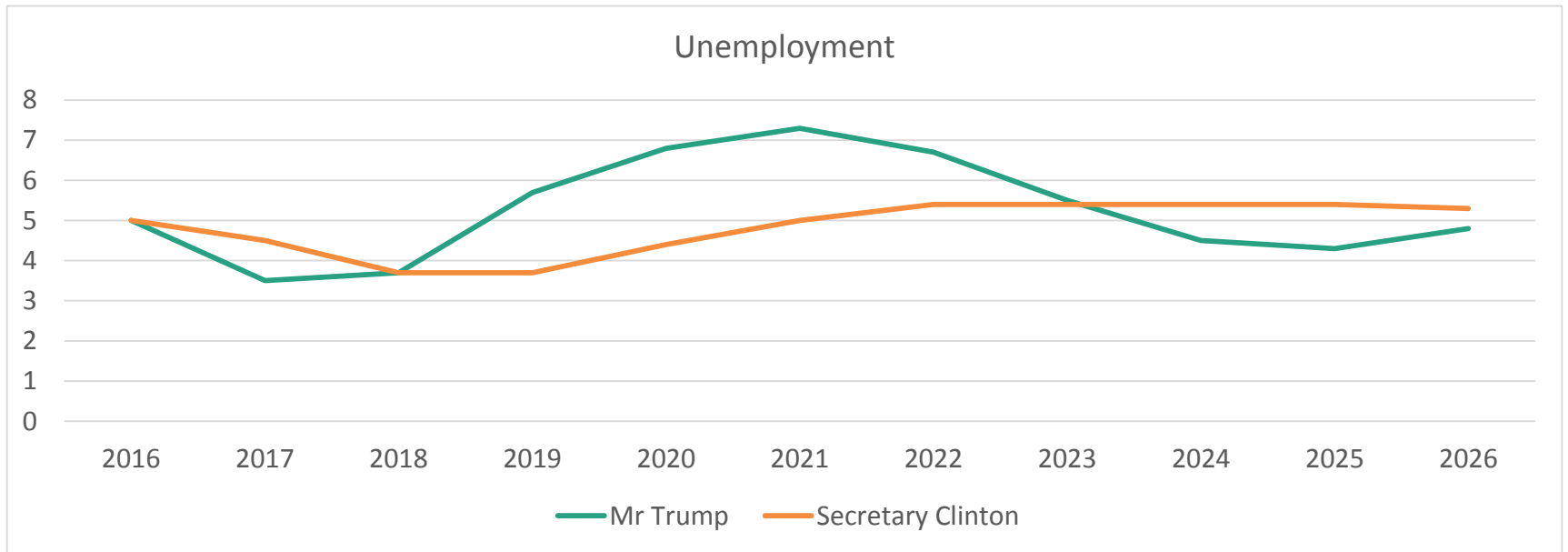
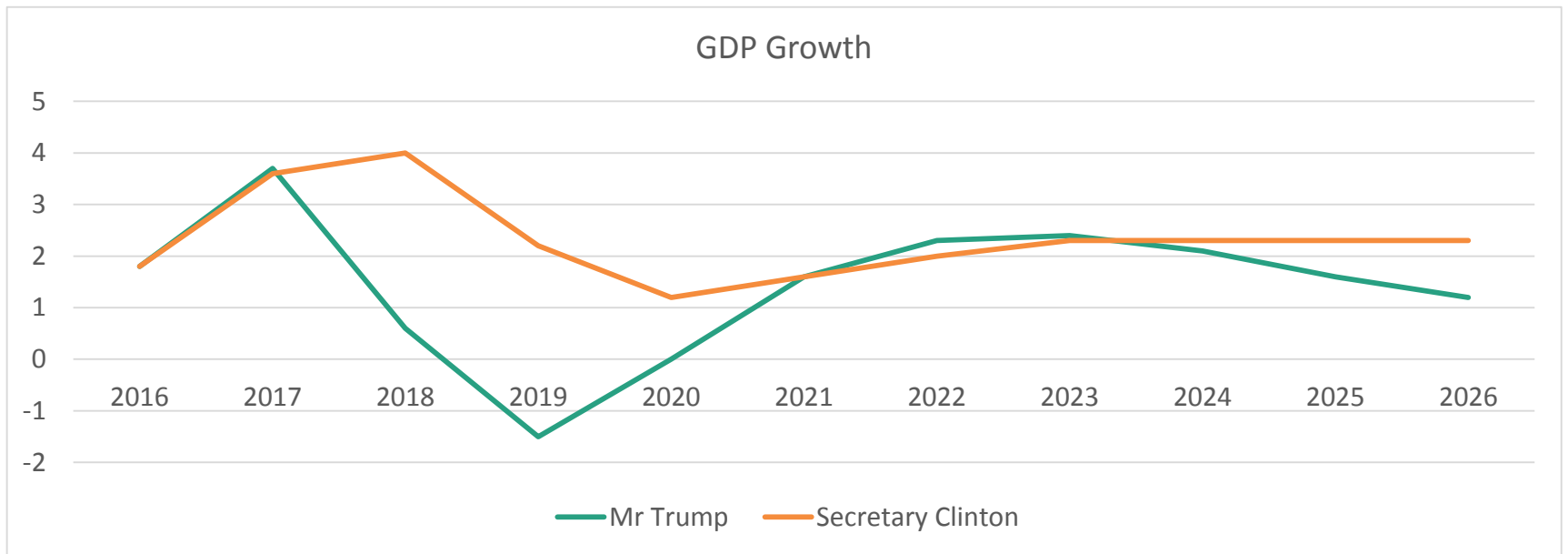


**The policies of Mr. Trump and Secretary Clinton are vastly different, implying significantly different risks.**

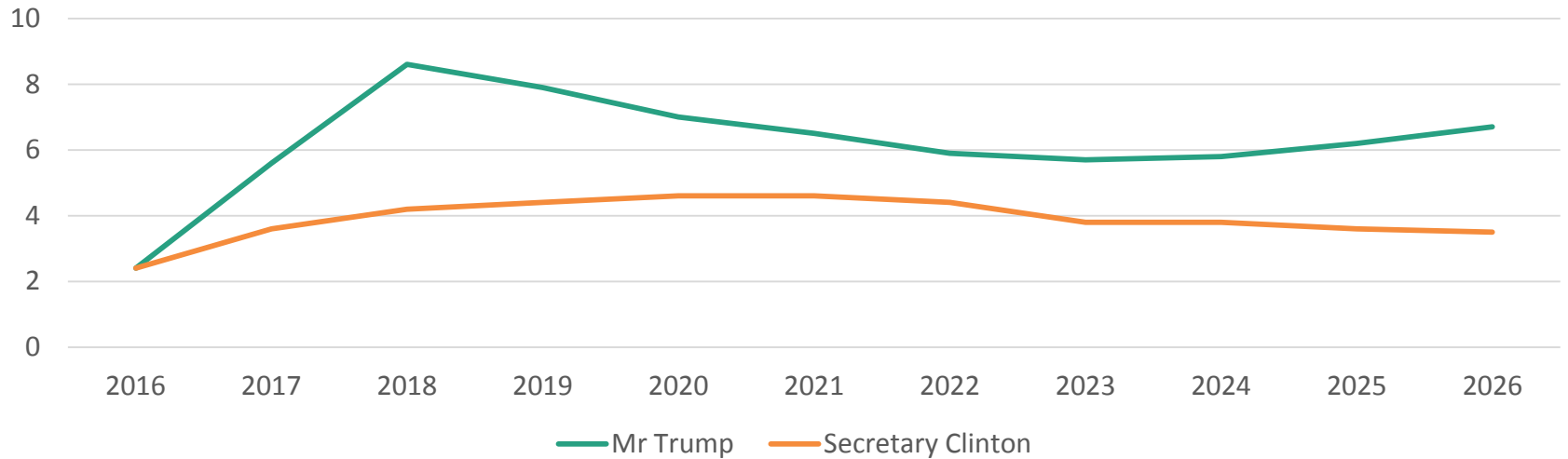
This scenario analysis can be used for business planning around specific postulated outcomes, such as “Bad Brexit”, “Slovenian upgrade/downgrade”, “TTIP” or a given election outcome.

# Scenarios

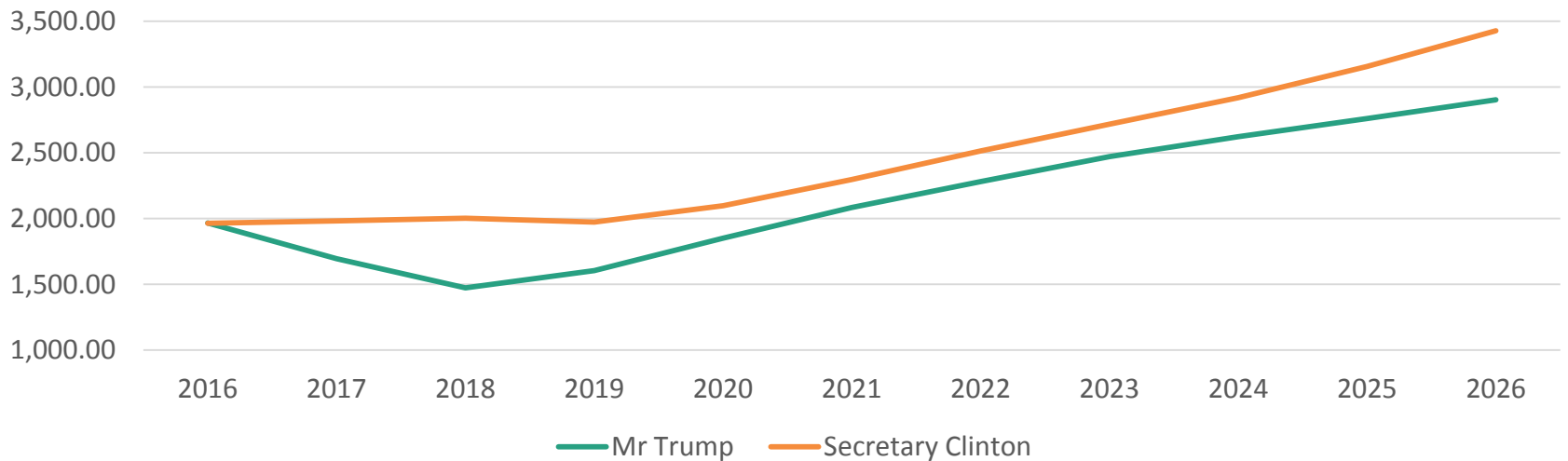
- » 3 scenarios have been built for each candidate:
  - “Face value”, “Lite” and “Candidate goes to Washington”
- » Scenarios have been modelled with “Moody’s Analytics model for US economy”
- » Projection of scenarios is 10 years, aligned with the congressional Budget forecast
- » The main policies which have been considered are:
  - Taxes
  - Government Spending
  - International trade
  - Immigration policy
- » Assumptions have been made:
  - Some sides policies have not been considered (lack of details, low impact, late in the plan)
  - Trumps policy lacks details and historical data

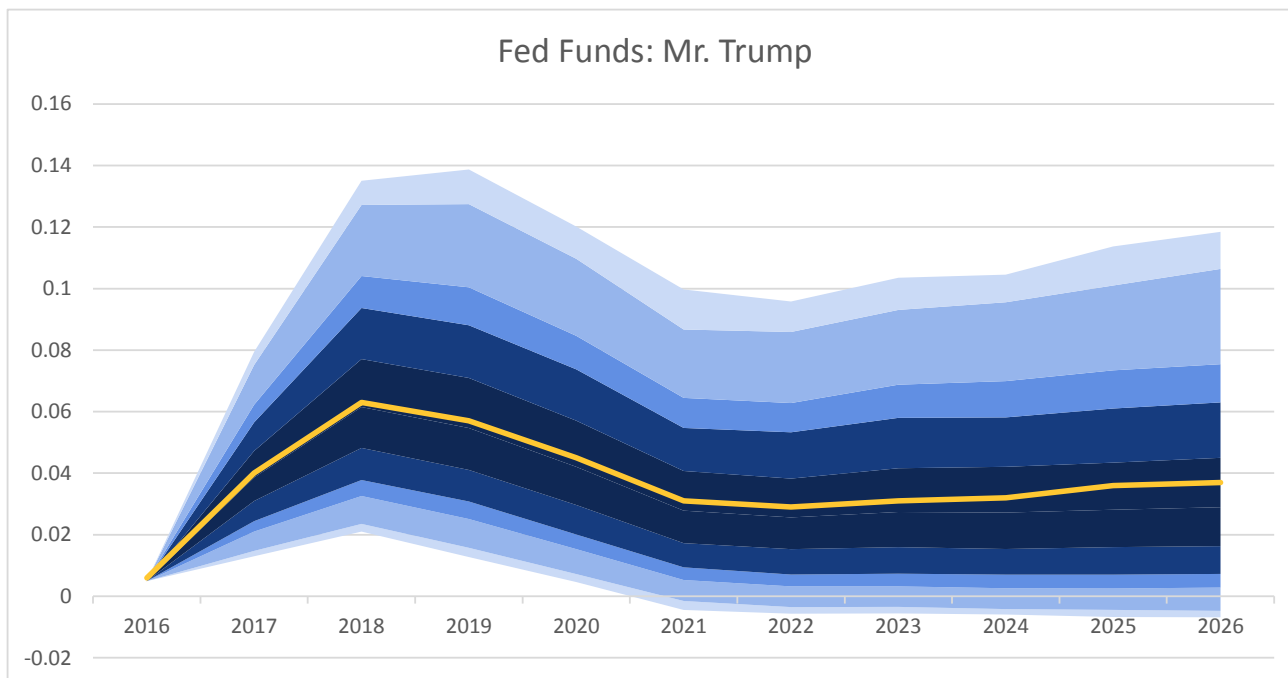
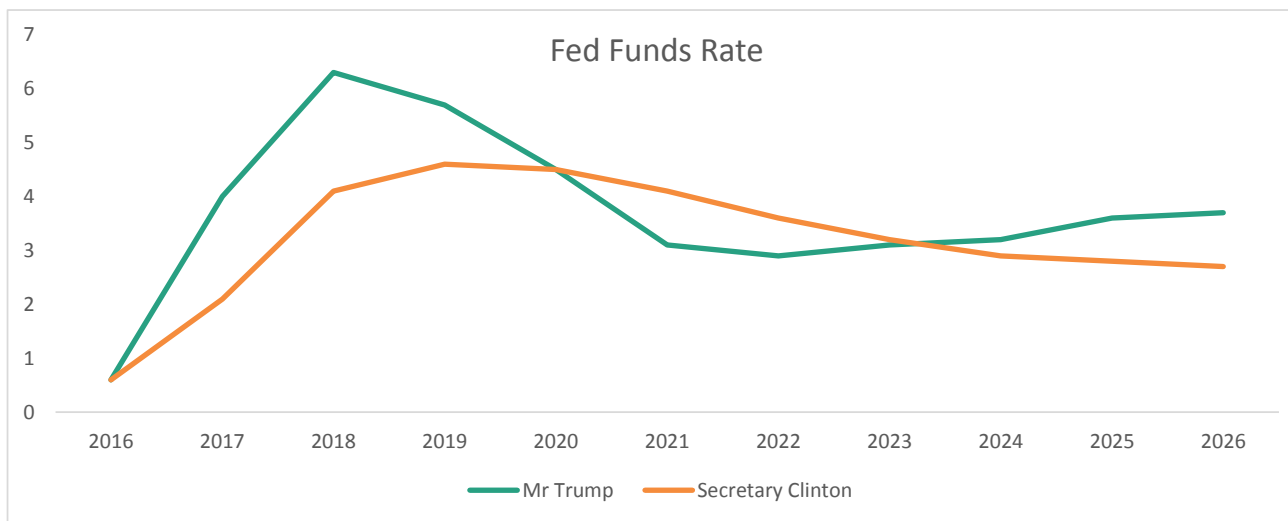


10Y Treasury Yield

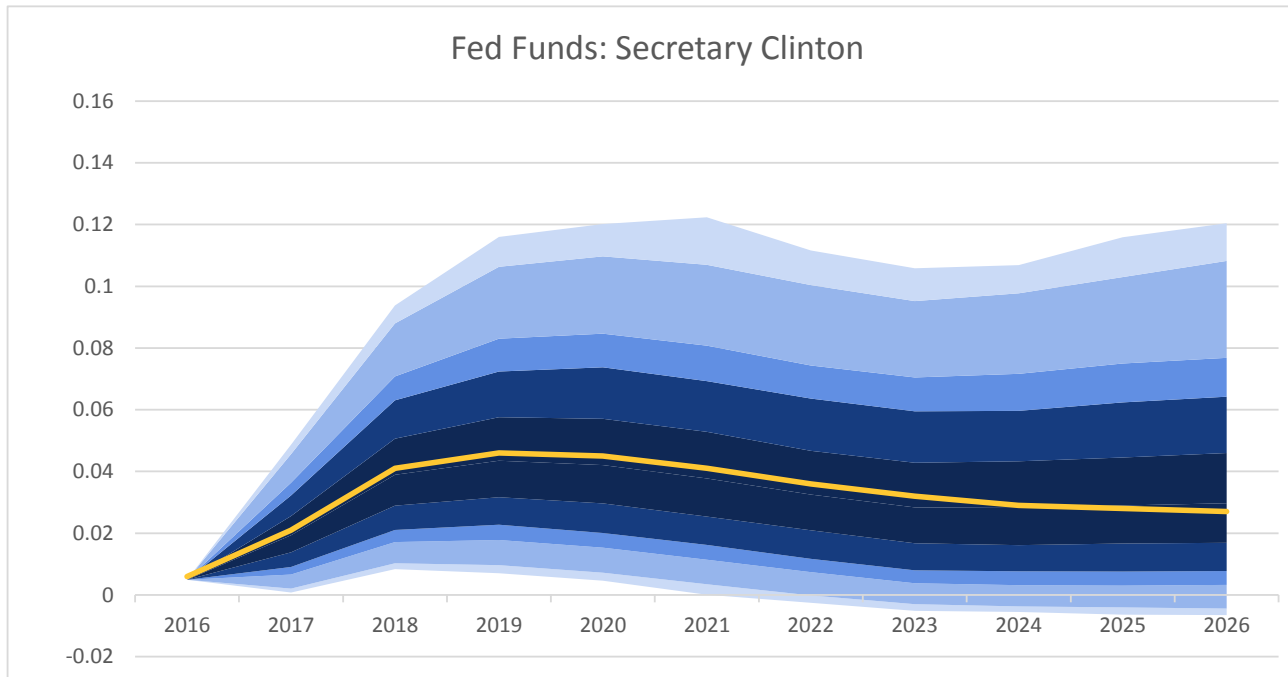
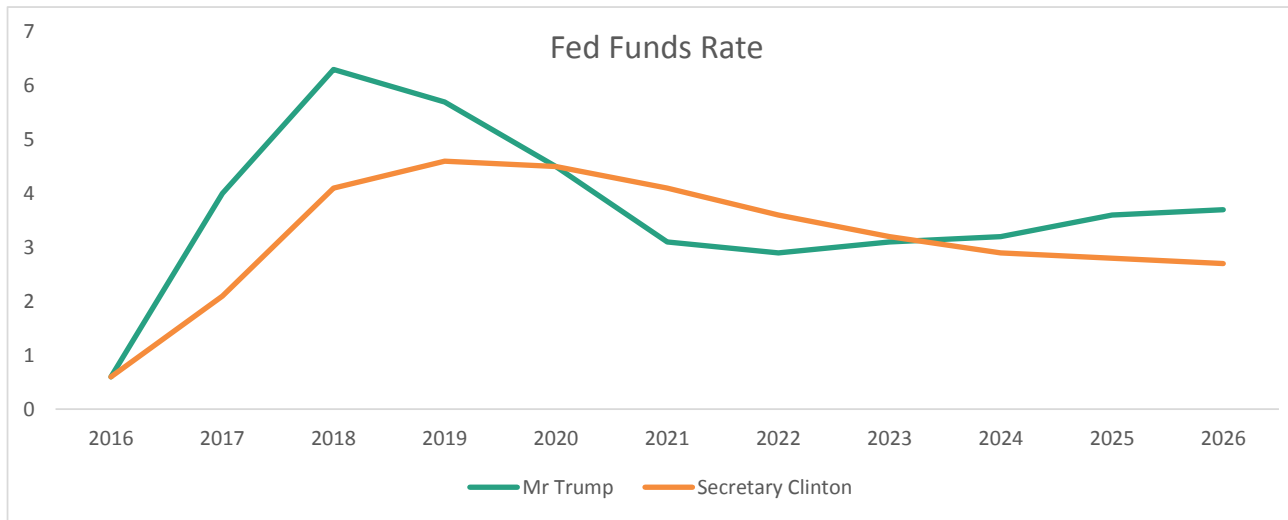


S&P500









# 2a

Case Study – Multi year  
calculation using proxy  
Generator

# Calculation: CTE(70) reserve projection

## » Policy payout linked to corporate bond portfolio with an annually applied guarantee.

- Annual policy return is  $\text{Max}(\text{fund return} - 1.5\%, 2\%)$ .
- Underlying fund diversified US corporate bonds, 70% A-rated and 30% BBB rated, 8 year term.
- Policyholder assumed to exit after 10 years, at which point the value of the policy will be received.
- Path dependency; nested stochastic CTE(70) reserve calculation: Assume an annual return of  $\text{max}(\text{fund return} - 1.5\%, 2\%)$  is credited to the policy account,

i.e.  $\text{Policy Account}(t) = \text{Policy Account}(t-1) \times (1 + \text{max}(\text{fund return}(t-1, t) - 1.5\%, 2\%))$

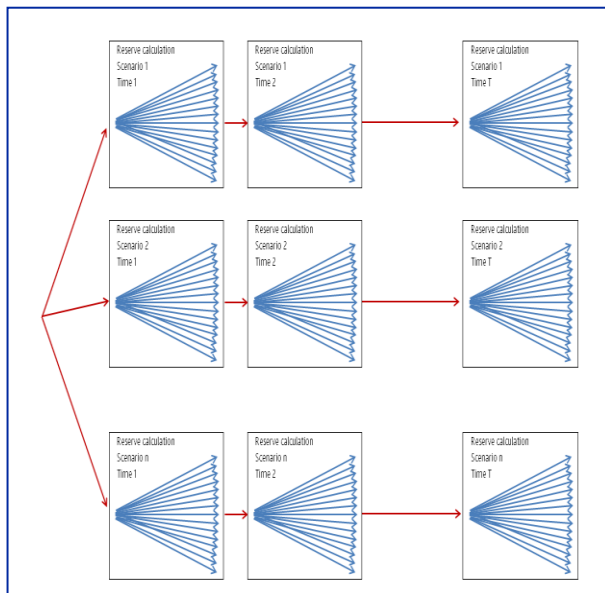
## » The CTE(70) reserve can be projected using proxy functions estimated by least-squares Monte Carlo (LSMC).

See Morrison et al. (2013) “Multi-year projection of conditional tail expectation (CTE) reserves”.

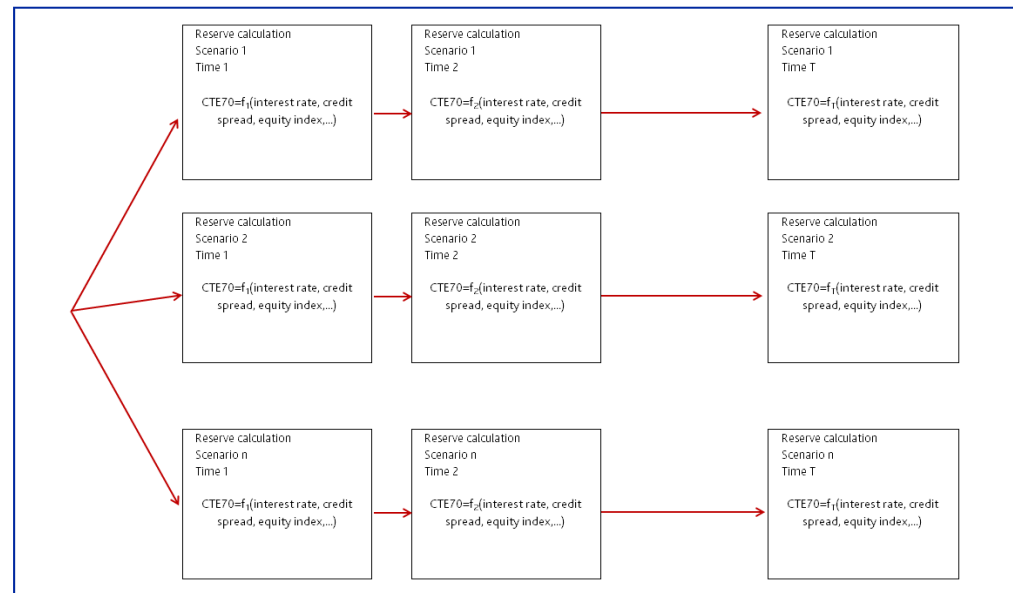
- Risk free yield curves, corporate credit spreads, and the policy account at each time are the key risk factors driving CTE(70)

# Case studies – adoption of Proxy Function

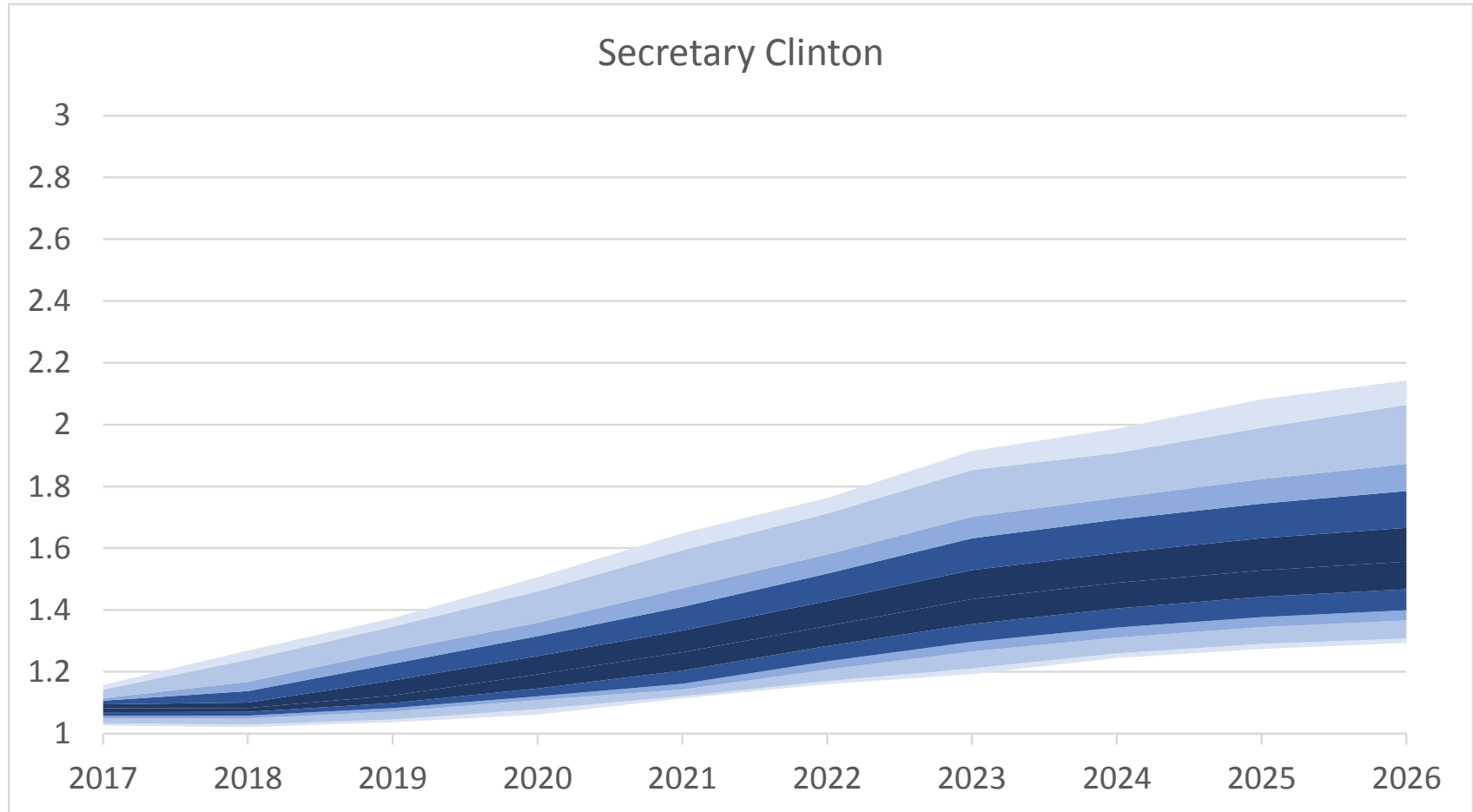
## ALM



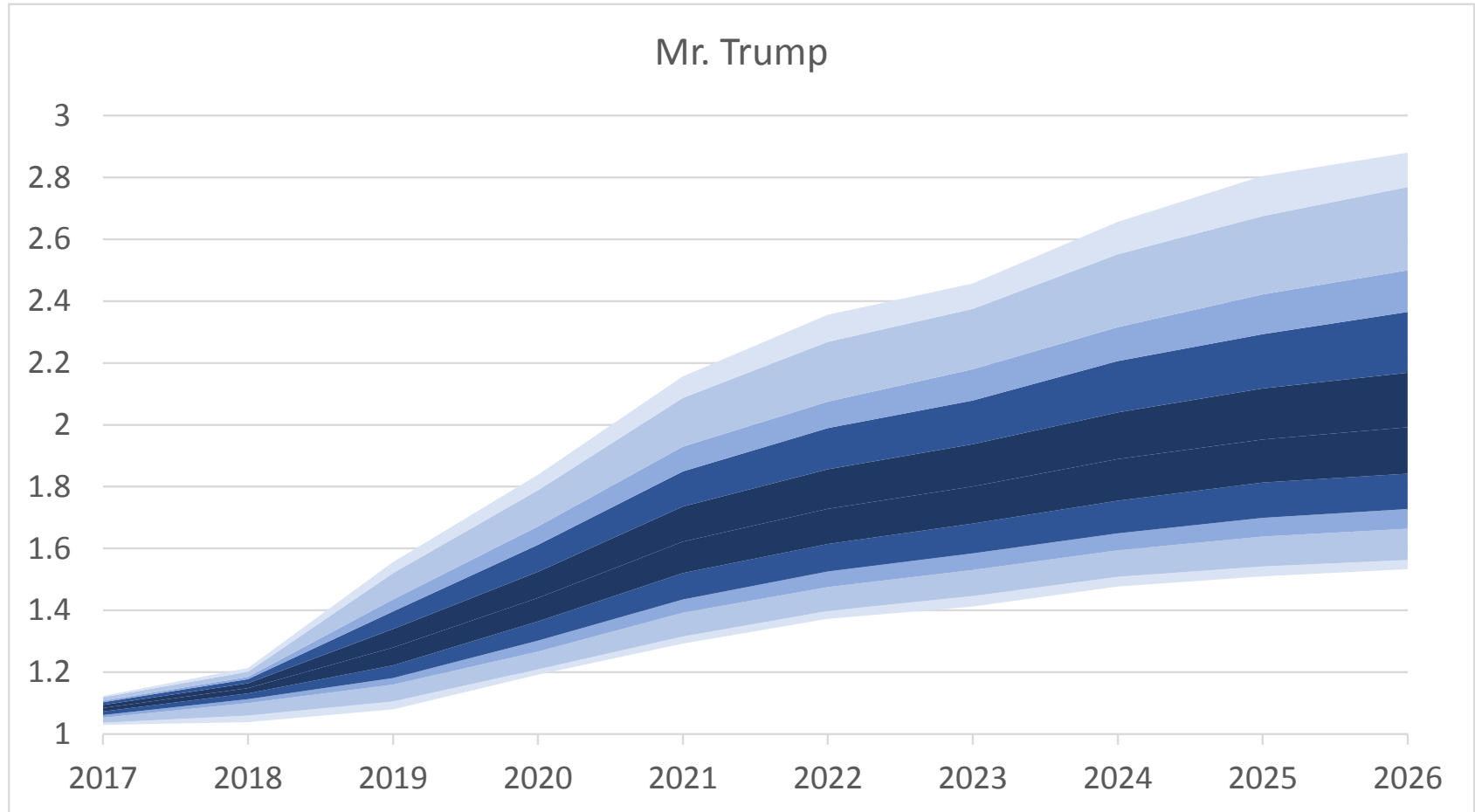
## Proxy Function



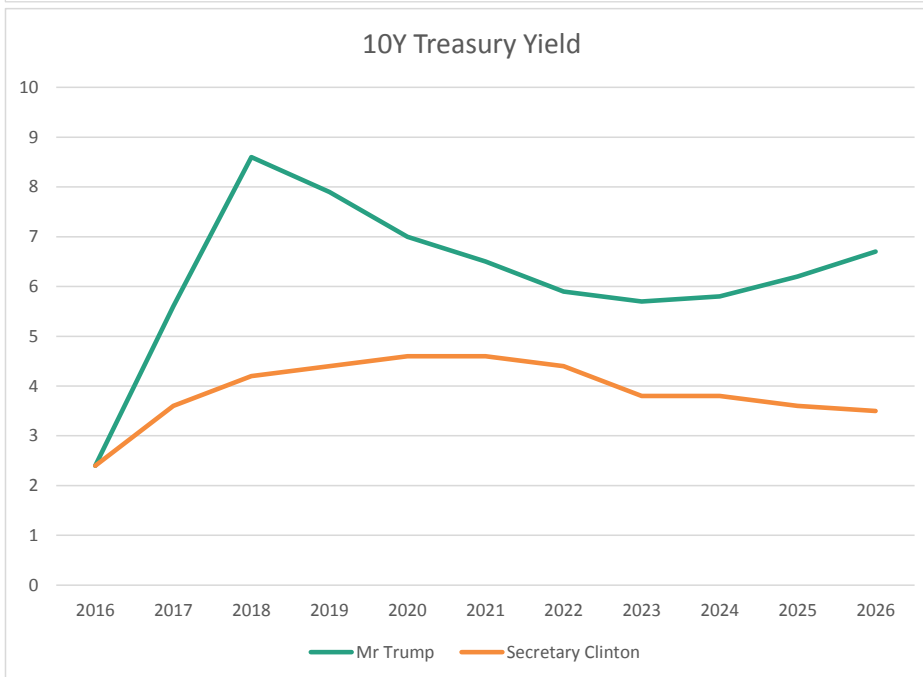
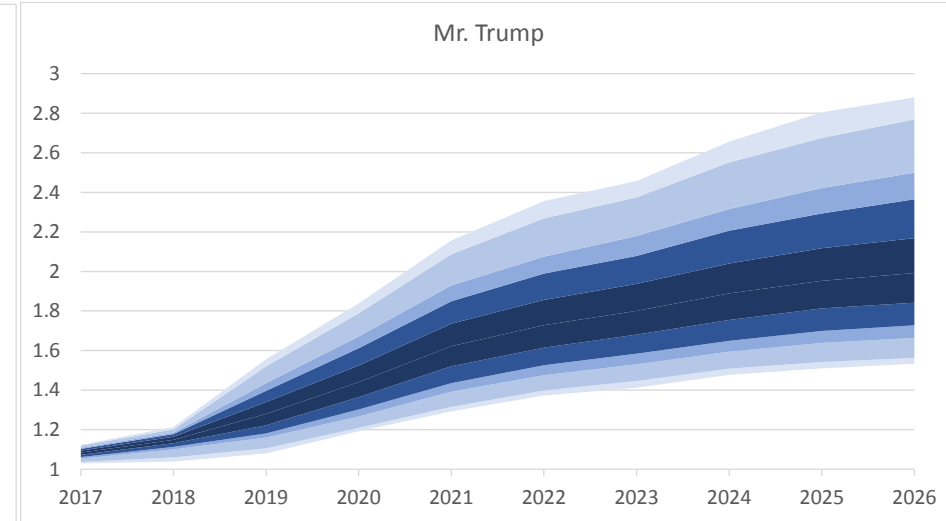
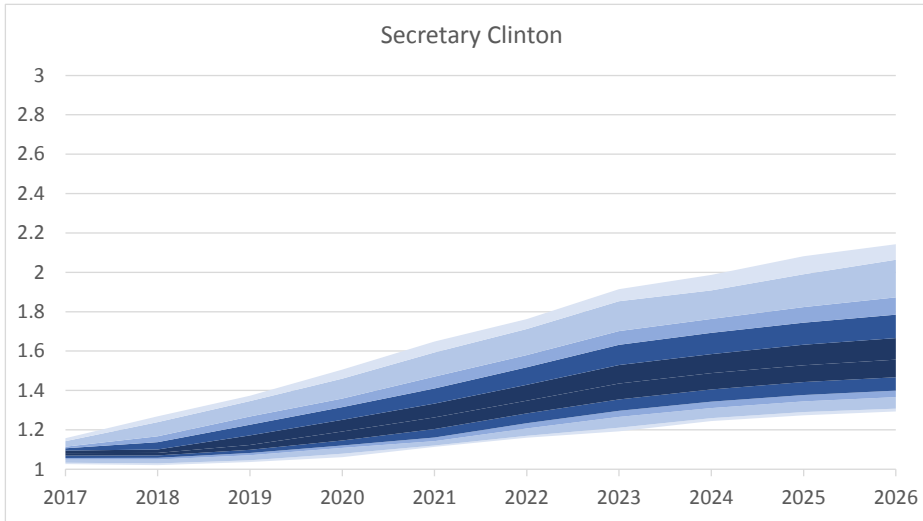
# CTE(70) discounted policy payout under Secretary Clinton



# CTE(70) discounted policy payout under Mr. Trump



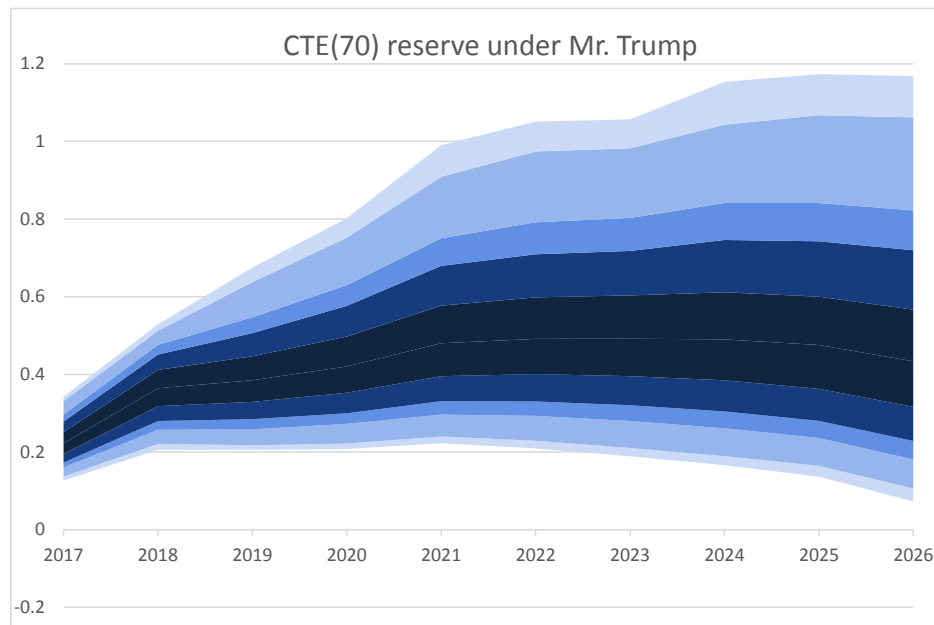
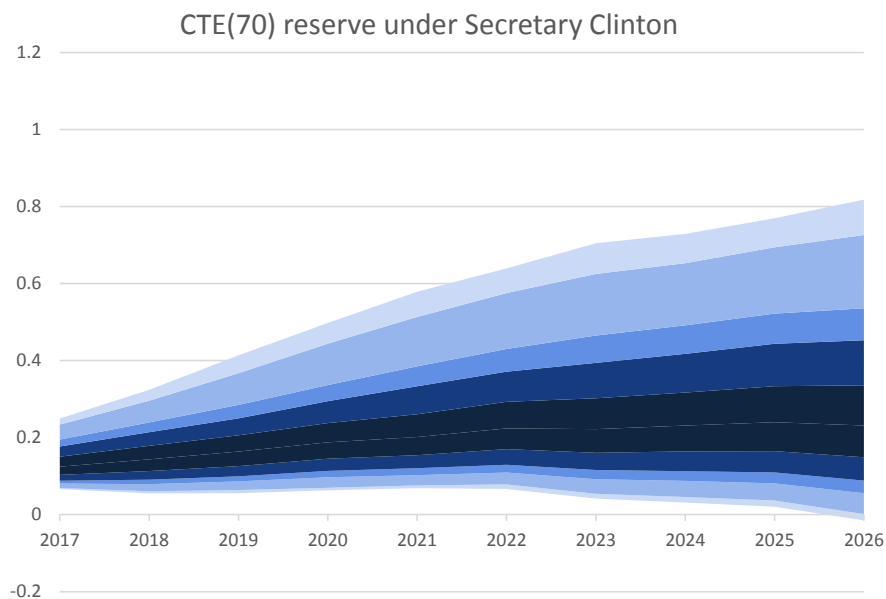




- » Policy value is highly sensitive to rate increases early in the projection (the guarantee bites under poor corporate bond returns)
- » Under Mr. Trump's policies as term goes on, indebtedness of the government increases yields / inflation peaks at 5.4%
- » Expected CTE(70) under Mr. Trump is greater and much more uncertain

# Reserve position

What is the required reserve to cover the CTE(70) liability value in excess of the underlying fund value? (liability minus asset fund)



Why are Mr. Trump's policies so worrying for this policy?

- » Fund losses in early years due to rate rises under major government borrowing.
- » Over time rates revert and fund returns are positive, but the policy account is by that stage much greater due to the protection of the guarantee.

# Takeaways

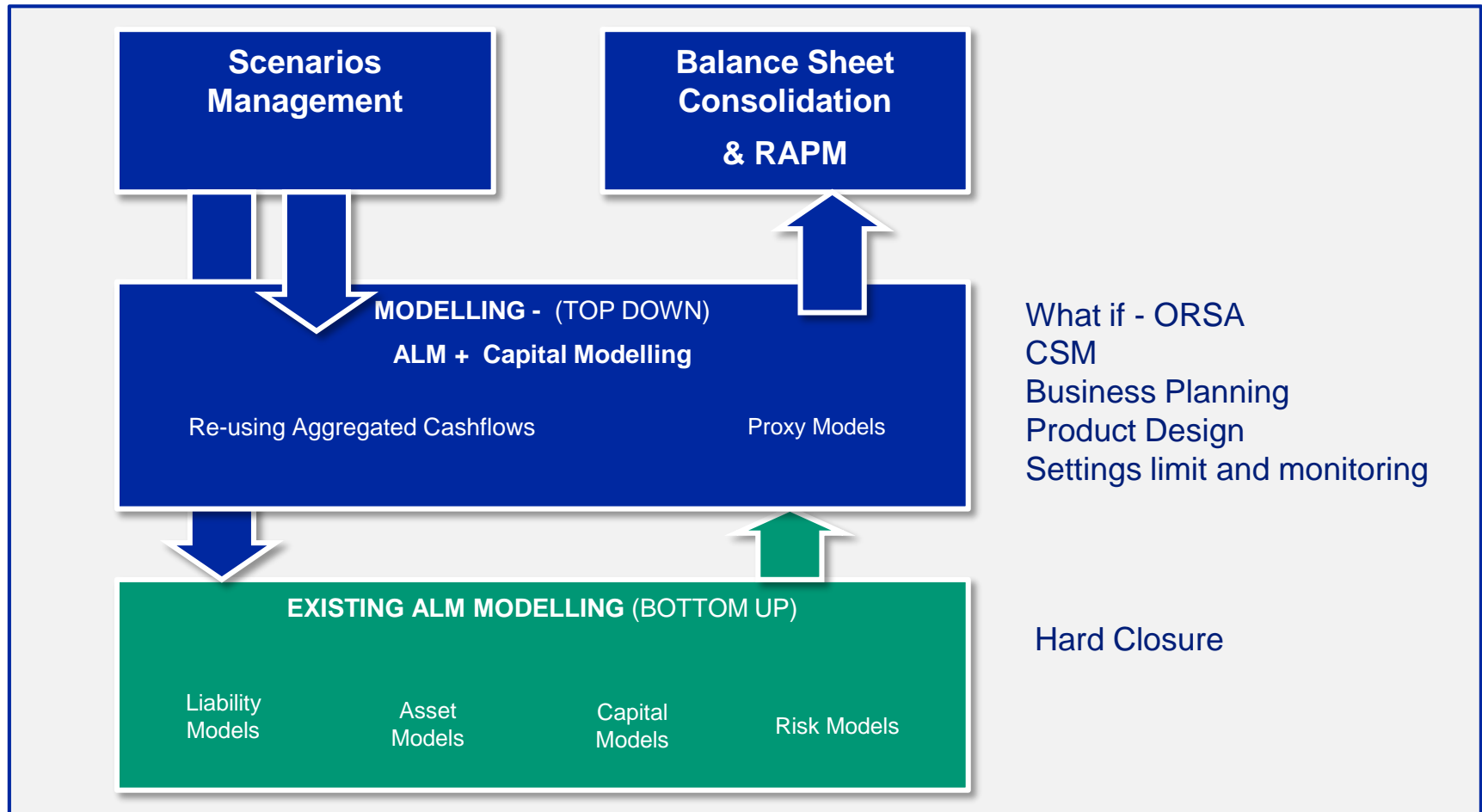
- » Political risk and ad hoc-risks can be modelled
- » Real World scenarios used for:
  - Strategic asset allocation
  - Strategic plan and what if analysis required by senior management & board
  - Valuation and reserving
  - Regulatory stress test

Can be recalibrated on narrative scenarios.

Risk factors can either be provided by Moody's Analytics or provided by our clients.

- » Complex calculation (like nested stochastic simulations) as well as simple deterministic calculation can be ran through a proxy modelling software:
  - Accuracy of results is guaranteed by an appropriate fitting
  - Computational effort is annulled
  - Ultimately, more analysis can be done and better informed decision could be taken  
e.g. With profit vs linked type of investment = (More profitable vs less capital intense)

# Conclusion - European Trend Capital Modelling Framework





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