




# 2024 BAS Case Competition

Team 10

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# Agenda

**01**

**Introduction**

**02**

**Correlation Analysis**

**03**

**Selected Factors**

**04**

**Proposed Formula**

**05**

**Projections**

**06**

**Adding a GLB**



# Factors Affecting Lapse Rate

Policy Years

Statutory Reserves

Mortality Rates

Crediting Rates

5-Yr Treasury Rates

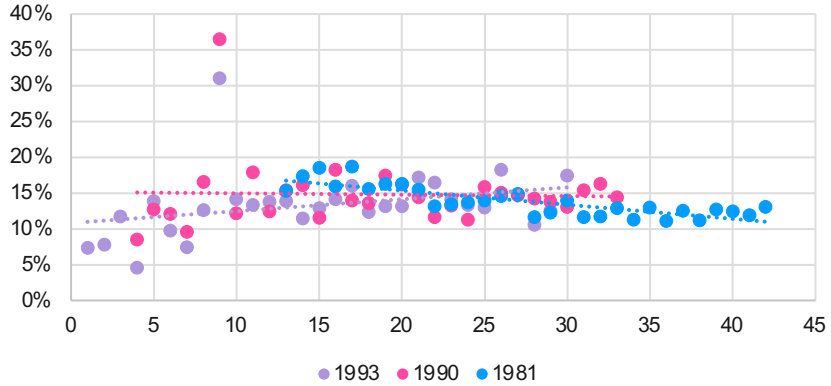
Surrender Charges

Market Value  
Adjustment (MVA)

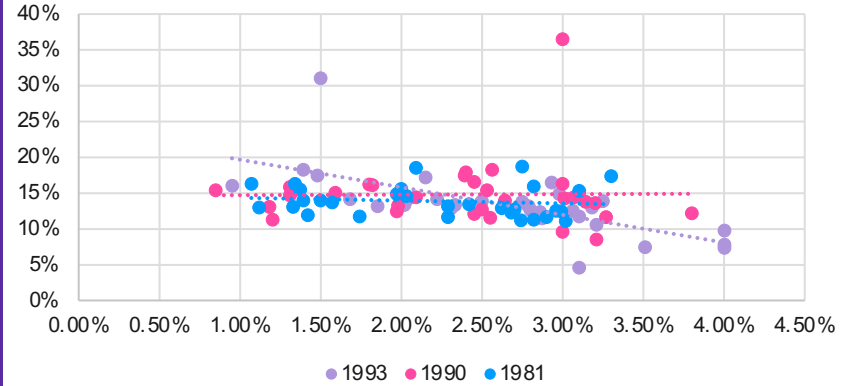
10-Yr Treasury  
Rates

General Account  
Portfolio Yields

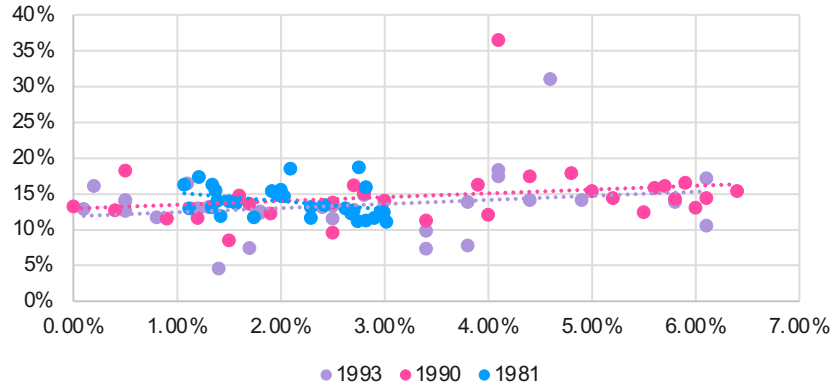
### Policy Year vs Full Lapse



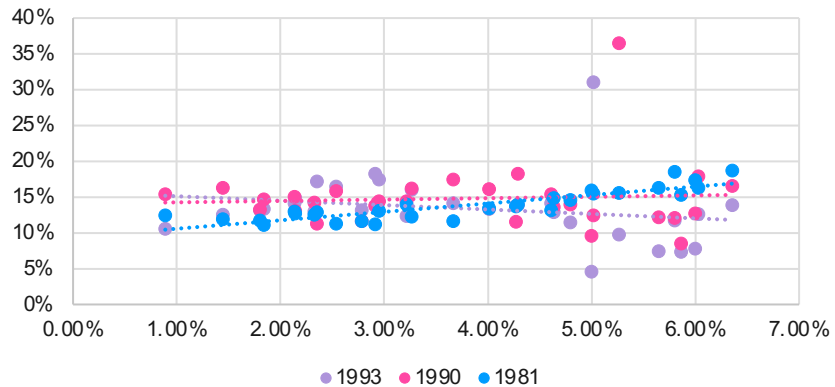
### Crediting Rate vs Full Lapse



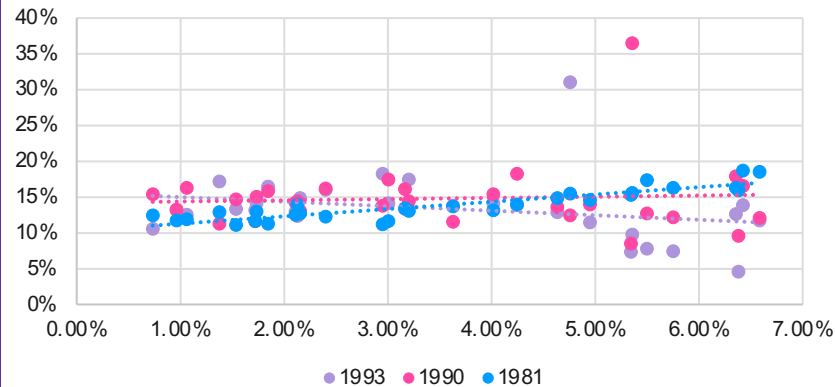
### Mortality Rate vs Full Lapse



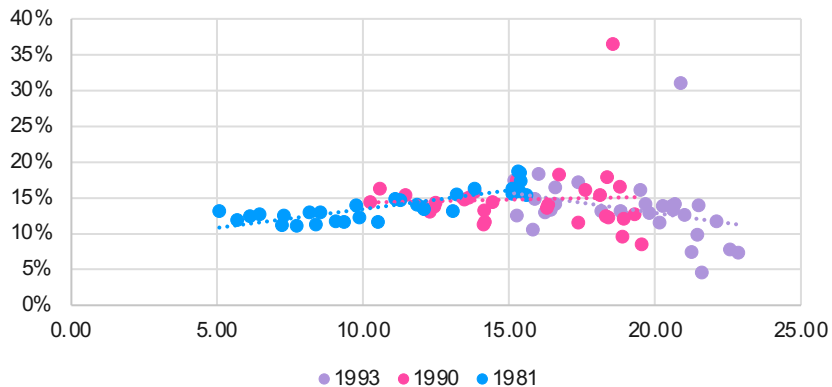
### 10-Yr Treasury Rate vs Full Lapse



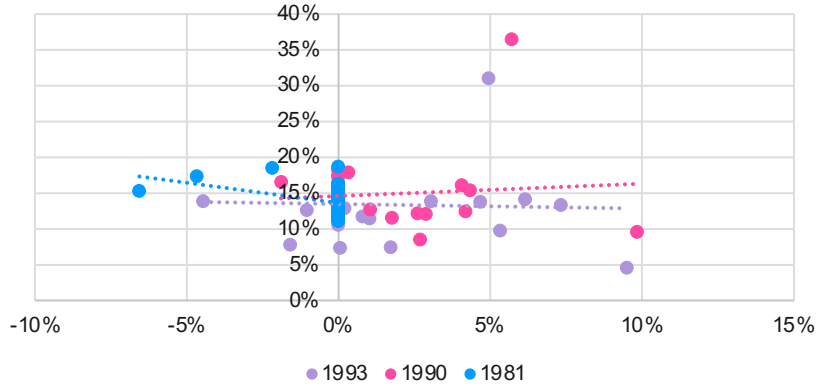
### 5-Yr Treasury Rate vs Full Lapse



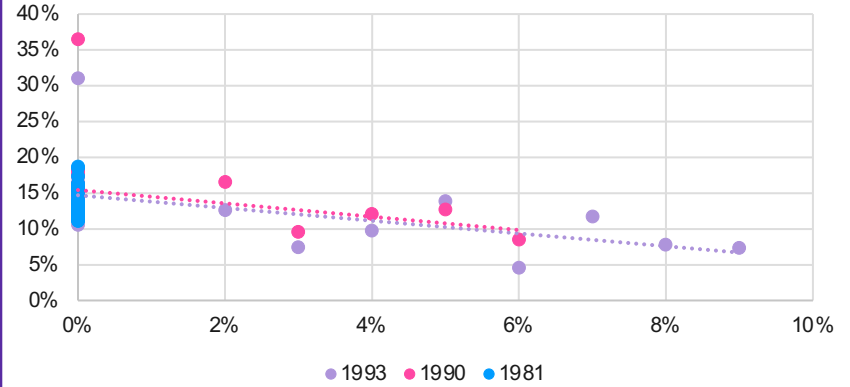
### Statutory Reserves (\$ Billions) vs Full Lapse



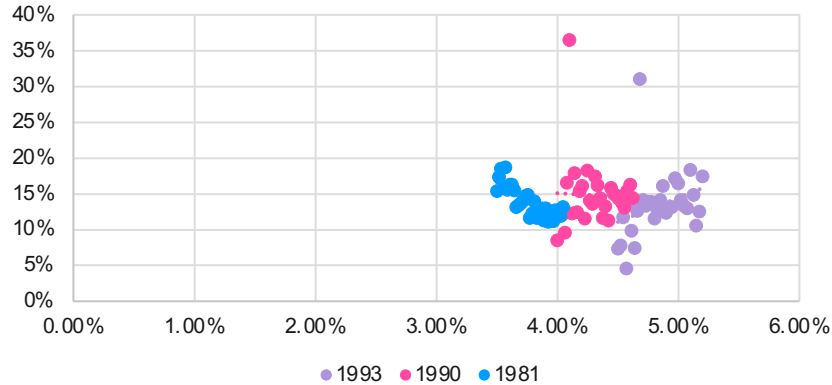
### MVA vs Full Lapse



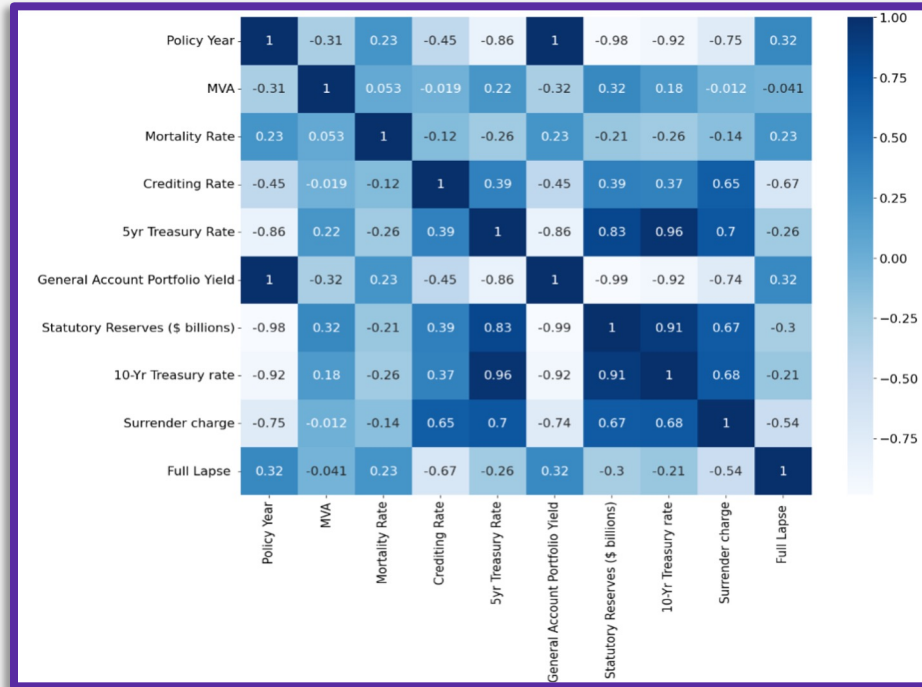
### Surrender Charge vs Full Lapse



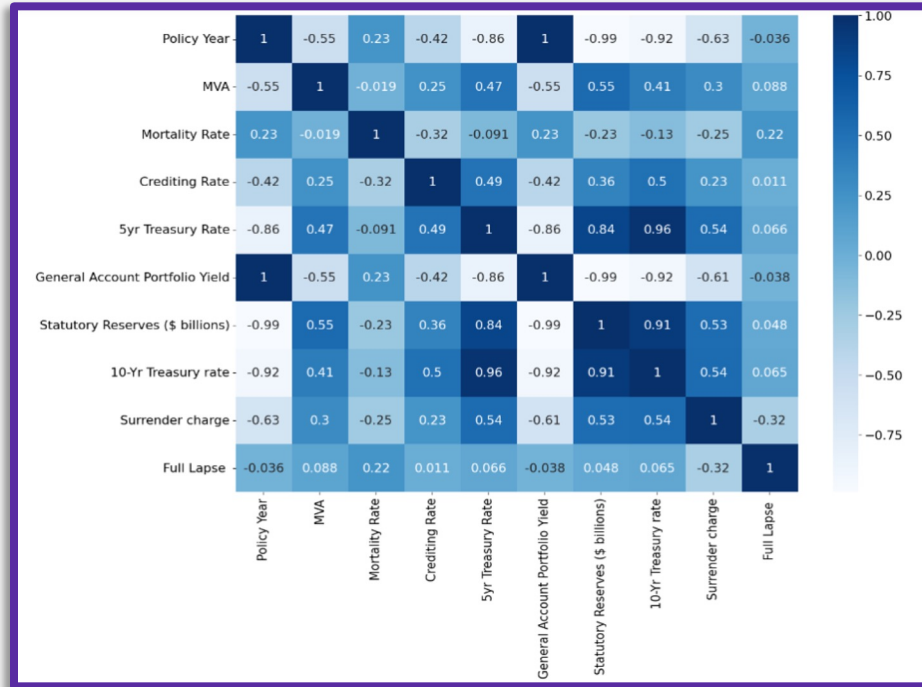
### General Account Portfolio Yield vs Full Lapse



# Python Correlation Chart - 1993

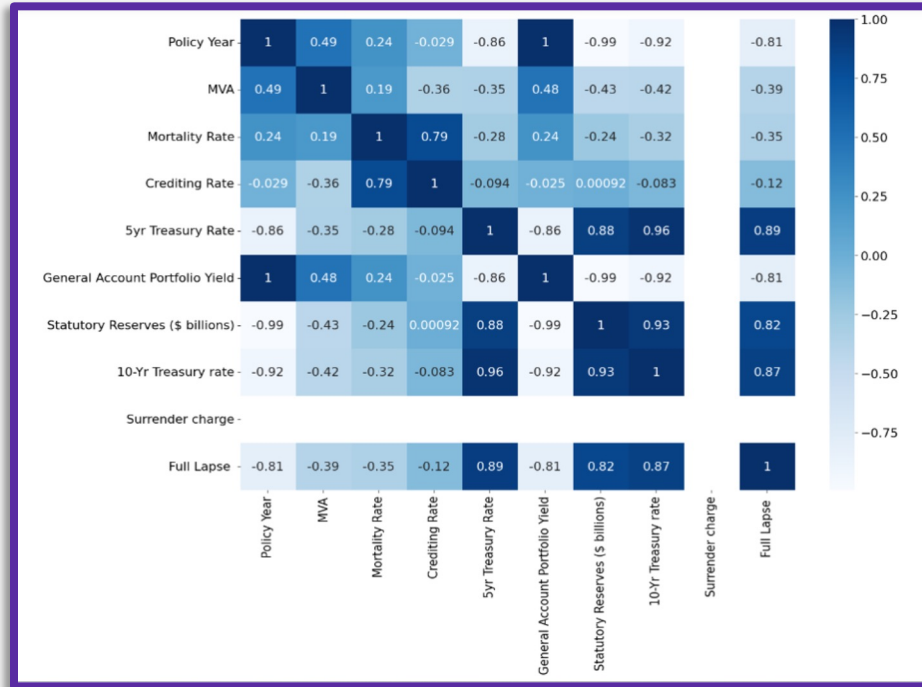


# Python Correlation Chart - 1990





# Python Correlation Chart - 1981



# 4 Chosen Factors

## Crediting Rate

- Attractive to customers
- If competitors have higher crediting rates, customers will lapse to switch

## 5-Yr Treasury Rate

- Competitor rates are set against a blend of treasury rates

## Surrender Charge

- 2 cases: within/past surrender period
- Higher surrender charge → lower lapse rate

## 10-Yr Treasury Rate



# Combining 4 Factors into a Formula

# Dynamic Lapse Formula

$$a * (MR - CR)^b - c * SC + d$$

a, b, c, d are coefficients

MR = Market/competitor rate = 105%(50%\*5-yr treasury rate + 50%\*10-yr treasury rate)

CR = Crediting rate

SC = Surrender charge

# Linear Regression Formula

$$\text{Lapse Rate} = 0.13212 - 0.86167(\text{CR}) - 0.14611(5\text{Y TR}) + 0.82539(10\text{Y TR}) - 1.08116(\text{SC})$$

Crediting Rate	5-Yr Treasury Rate	10-Yr Treasury rate	Surrender charge	Projected Lapse
4.50%	4.07%	3.96%	12%	0.23%
4.50%	3.70%	3.95%	10%	2.32%
4.50%	3.83%	4.00%	10%	2.39%
4.70%	4.07%	4.19%	7%	5.65%
4.80%	4.25%	4.28%	5%	7.83%
4.80%	5.11%	4.93%	4%	9.56%
5.00%	5.10%	5.07%	3%	10.59%
5.00%	5.70%	5.64%	2%	12.23%
5.00%	6.20%	5.80%	0%	14.60%
5.20%	5.90%	5.50%	0%	14.13%
5.20%	5.99%	6.16%	0%	14.69%
5.50%	6.10%	5.90%	0%	14.23%
5.50%	7.50%	7.42%	0%	15.70%
5.50%	7.00%	6.60%	0%	14.94%
5.50%	7.70%	7.00%	0%	15.38%

~3%

~35%

~10%

# Adding a GLB

## GLB Riders

- Guaranteed Minimum Income Benefit
- Guaranteed Minimum Accumulation Benefit
- Guaranteed Minimum Withdrawal Benefit
- Guaranteed Lifetime Withdrawal Benefit

## In-the-moneyness:

- Withdrawal Base / Account Value
- Greater In-the-Moneyness = Decreased Lapse

## Policyholder Age:

- Older Age = Decreased Lapse



**Thank You**