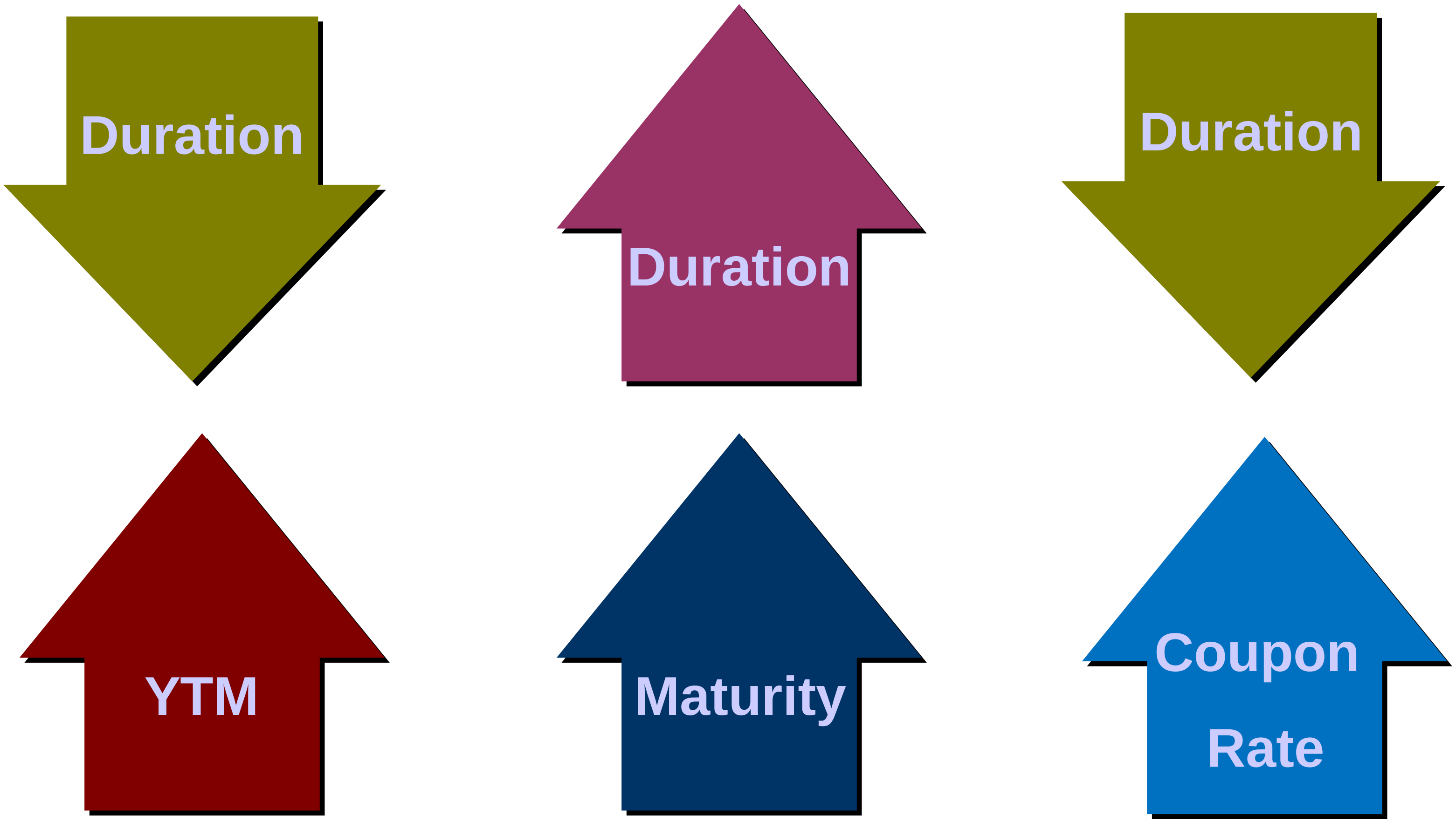
Summary

- Duration’s function
- Duration of fixed income securities
- Decomposition of liabilities
- Drivers of liability’s duration

Factors Affecting Duration



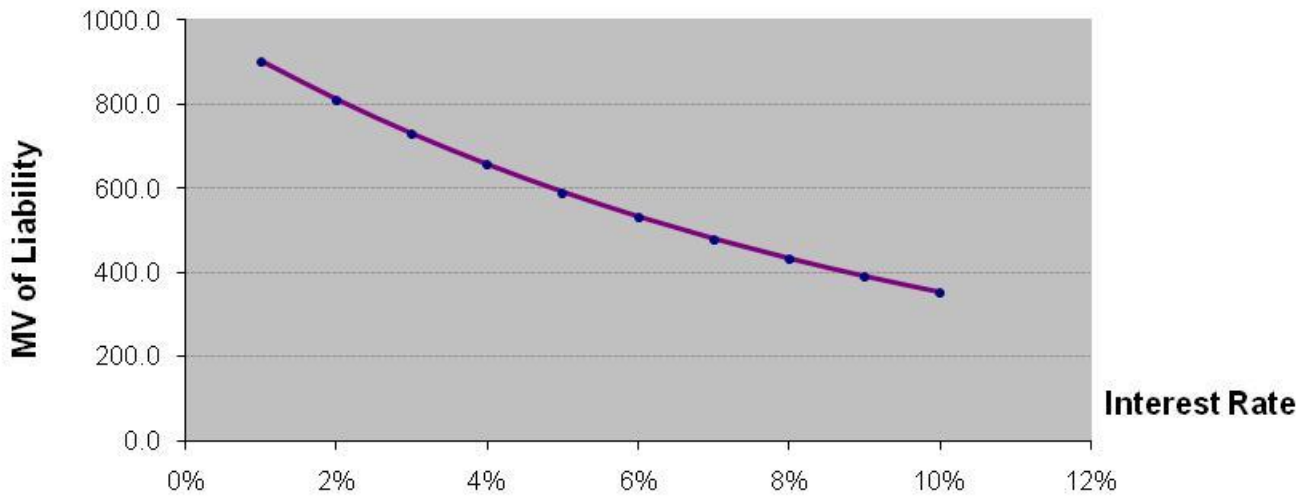
Effective Duration

- Floaters
  - The duration is near zero and equals to a zero coupon bond maturing at the next coupon date
  - A discount FRN can exhibit negative duration
- Putable bond
  - The duration at higher yield is shorter than an option-free bond
- Interest-only Mortgage-Backed Strips
  - An IO strip typically has negative duration
  - Duration for adjustable rate mortgage can be negative

Death Benefit

Example: 20-year Term Life Insurance

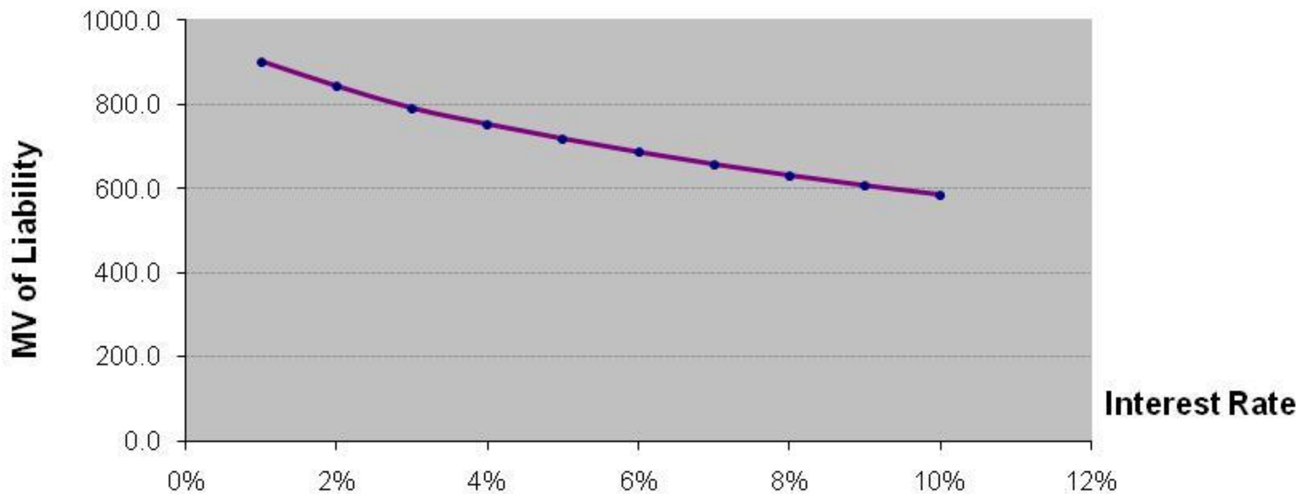
- Death benefit is the major liability cash out flow
- Similar to a portfolio of zero coupon bonds, its duration increases as interest rates decrease



Policyholder Dividend

Dividend and PUA (e.g. Whole Life)

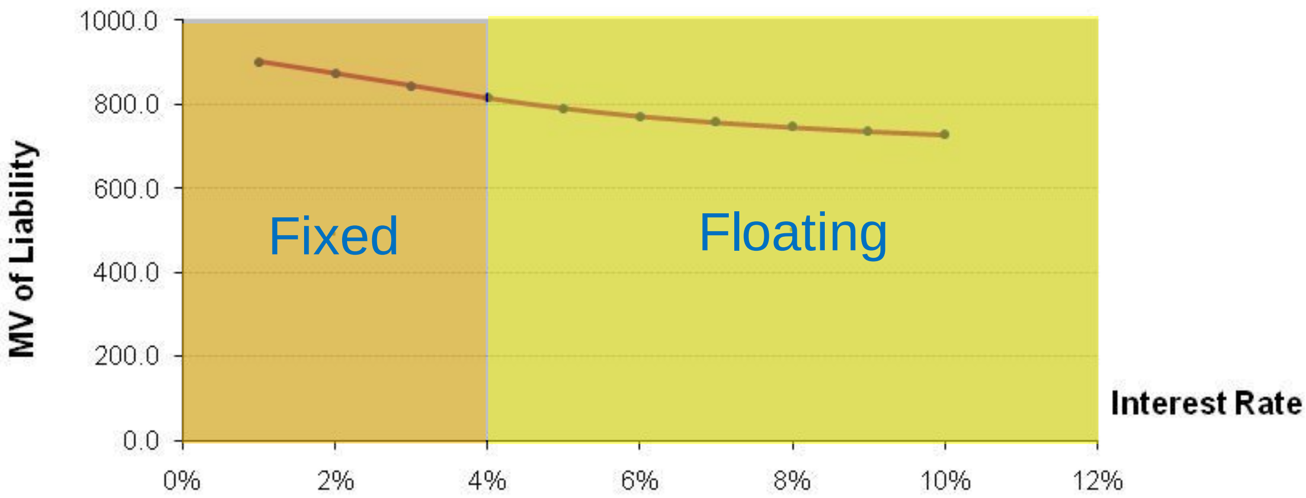
- The duration of policyholder dividend can be negative. Dividend amounts will decrease as portfolio rates decrease.
- PUA amounts will decrease, as well as its dividends.
- The duration of cash value is more like a Fixed-coupon bond, so the duration of total benefit is usually positive.



Surrender Benefit

Crediting New Money Rates (e.g. Fixed Deferred Annuities)

- Surrender benefit accounts for most cash out flow
- Similar to a floater, its duration is small for crediting new money rates
- More like a bond when new money rates close to the guaranteed rate



Drivers of Duration

- Spread Compression
  - Crediting rates are fixed and equal the guaranteed rate
  - A bond with fixed coupons has longer duration than a floater
- Interest Rates
  - High volatility leads to high dynamic lapse and shorter duration
  - Discount rates tied to interest rates, the duration moves against the discount rate in general.
  - Steeper slope of yield curve will increase crediting rates. While the discount rates are still low, the surrender benefits will be similar to a bond sold at premium, which has shorter duration than a par bond

Drivers of Duration

- Lapse Rates
  - Higher lapse rates shorten the duration of surrender benefit in general
  - Dynamic lapse shortens the duration of surrender benefit, like a putable bond, because policyholders will surrender when the PV of the general account is less than the interim value of the general account
- Mortality
  - Higher mortality rates will shorten the duration of death benefit
  - It may increase the duration of net benefit if death benefit plus surrender benefit is less than offset by premium

Drivers of Duration

- COI charge (e.g. UL)
  - The duration can be negative due to the COI charge since it makes the account value acts like an IO strip
  - The COI charge drives down the PV of surrender benefits in the low interest rate scenarios
- Single Premium (e.g. BOLI)
  - The duration is usually shorter than those with recurring premiums
  - In the high interest rate scenarios, the corridor may be reached in early policy years and cause the duration of DB to decrease