

SYMBOLS FOR TIME

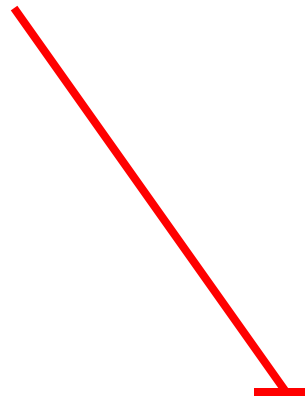
τ = time variable

t = time now,

T = target date

T^* = modeling limit ($t=\text{forever}$)

Cost spent to build variation point i at time τ



$c_i(\tau)$

i = index over variation points

SYMBOLS FOR TIME

τ = time variable

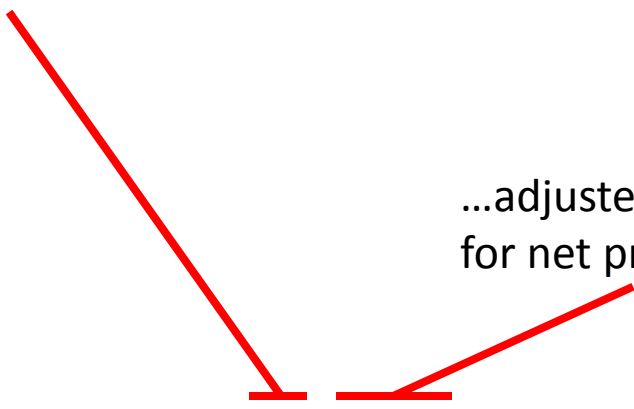
t = time now,

T = target date

T^* = modeling limit ($t=\text{forever}$)

Cost spent to build variation point i at time τ

...adjusted by a factor to account
for net present value of money


$$c_i(\tau)e^{-r(\tau-t)}$$

i = index over variation points

r = assumed interest rate

SYMBOLS FOR TIME

τ = time variable

t = time now,

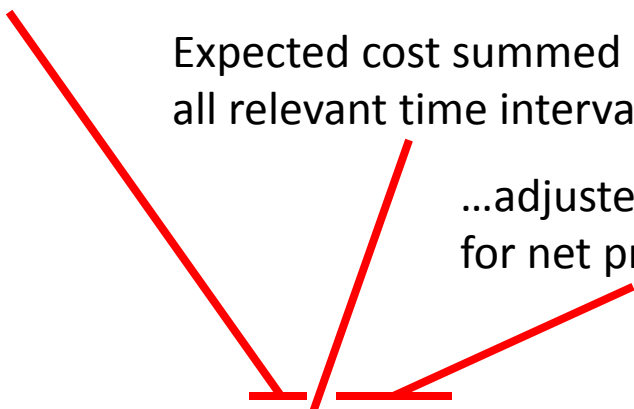
T = target date

T^* = modeling limit ($t=\text{forever}$)

Cost spent to build variation point i at time τ

Expected cost summed over
all relevant time intervals

...adjusted by a factor to account
for net present value of money


$$E \left[\sum_{\tau=t}^T c_i(\tau) e^{-r(\tau-t)} \right]$$

i = index over variation points

r = assumed interest rate

SYMBOLS FOR TIME


τ = time variable

t = time now,

T = target date

T^* = modeling limit ($t=\text{forever}$)

Expected costs of building variation point i
incurred from now until time T


$$E \left[\sum_{\tau=t}^T c_i(\tau) e^{-r(\tau-t)} \right]$$

i = index over variation points

r = assumed interest rate

SYMBOLS FOR TIME

τ = time variable

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T^* = modeling limit ($t=\text{forever}$)

$X_{i,k}(\tau)$

value of variation point i in product k
at time τ

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit ($t=\text{forever}$)

$X_{i,k}(\tau)$

value of variation point i in product k

at time $\tau =: \underline{VMP_{i,k}(\tau)} - \underline{MC_{i,k}(\tau)}$

marginal value of the i^{th} variation
point in the k^{th} product at time τ .

marginal cost of tailoring variation
point i for use in product k

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit ($t=\text{forever}$)

...adjusted by a factor to account for net present value of money

$$X_{i,k}(\tau) e^{-r(\tau-t)}$$

value of variation point i in product k at time $\tau =: \underline{VMP_{i,k}(\tau)} - \underline{MC_{i,k}(\tau)}$

marginal value of the i^{th} variation point in the k^{th} product at time τ .

marginal cost of tailoring variation point i for use in product k

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

...adjusted by a factor to account for net present value of money

summed over all time

$$\sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)}$$

value of variation point i in product k at time $\tau =: \underline{VMP_{i,k}(\tau)} - \underline{MC_{i,k}(\tau)}$

marginal value of the i^{th} variation point in the k^{th} product at time τ .

marginal cost of tailoring variation point i for use in product k

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

Value cannot
be negative

$$\max \left(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)} \right)$$

...adjusted by a factor to account
for net present value of money

summed over all time

value of variation point i in product k
at time $\tau =: \underline{VMP_{i,k}(\tau)} - \underline{MC_{i,k}(\tau)}$

marginal value of the i^{th} variation
point in the k^{th} product at time τ .

marginal cost of tailoring variation
point i for use in product k

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

$$\max \left(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)} \right)$$

value of variation point i in product k
over all time

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

$$E\left[\sum_k \max\left(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)}\right)\right]$$

value of variation point i in product k
over all time...
...and over all products

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

$$p_{i,T} E \left[\sum_k \max \left(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)} \right) \right]$$

probability that variation point i
will be ready for use by time T

value of variation point i in product k
over all time...
...and over all products

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

Expected costs of building variation point i
incurred from now until time T

$$-E \left[\sum_{\tau=t}^T c_i(\tau) e^{-r(\tau-t)} \right]$$

$$+ p_{i,T} E \left[\sum_k \max \left(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)} \right) \right]$$

probability that variation point i
will be ready for use by time T

value of variation point i in product k
over all time...
...and over all products

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

Expected costs of building variation point i
incurred from now until time T

Value cannot
be negative

$$\max(0, -E \left[\sum_{\tau=t}^T c_i(\tau) e^{-r(\tau-t)} \right])$$

$$+ p_{i,T} E \left[\sum_k \max(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)}) \right]$$

probability that variation point i
will be ready for use by time T

value of variation point i in product k
over all time...
...and over all products

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

**Value of variation point i
over the time interval (t, T)**

Value cannot
be negative

Expected costs of building variation point i
incurred from now until time T

$$v_i(t, T) = \max(0, -E \left[\sum_{\tau=t}^T c_i(\tau) e^{-r(\tau-t)} \right])$$

$$+ p_{i,T} E \left[\sum_k \max(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)}) \right]$$

probability that variation point i
will be ready for use by time T

value of variation point i in product k
over all time...
...and over all products

i = index over variation points

r = assumed interest rate

k = index over products

SYMBOLS FOR TIME

τ = time variable

t = time now,

T = target date

T^* = modeling limit (t =forever)

Value of variation point i
over the time interval (t, T)

Cost spent to build a variation point at time τ

Expected cost summed over
all relevant time intervals

...adjusted by a factor to account
for net present value of money

Value cannot
be negative

Value cannot
be negative

$$v_i(t, T) = \max(0, -E \left[\sum_{\tau=t}^T c_i(\tau) e^{-r(\tau-t)} \right])$$

$$+ p_{i,T} E \left[\sum_k \max(0, \sum_{\tau=T}^{T^*} X_{i,k}(\tau) e^{-r(\tau-t)}) \right]$$

summed over all time

probability that variation point i
will be ready for use by time T

value of variation point i in product k
at time $\tau =: \underline{VMP_{i,k}(\tau)} - \underline{MC_{i,k}(\tau)}$

expected value
over all products

marginal value of the i^{th} variation
point in the k^{th} product at time τ .

marginal cost of tailoring variation
point i for use in product k

i = index over variation points

r = assumed interest rate

k = index over products