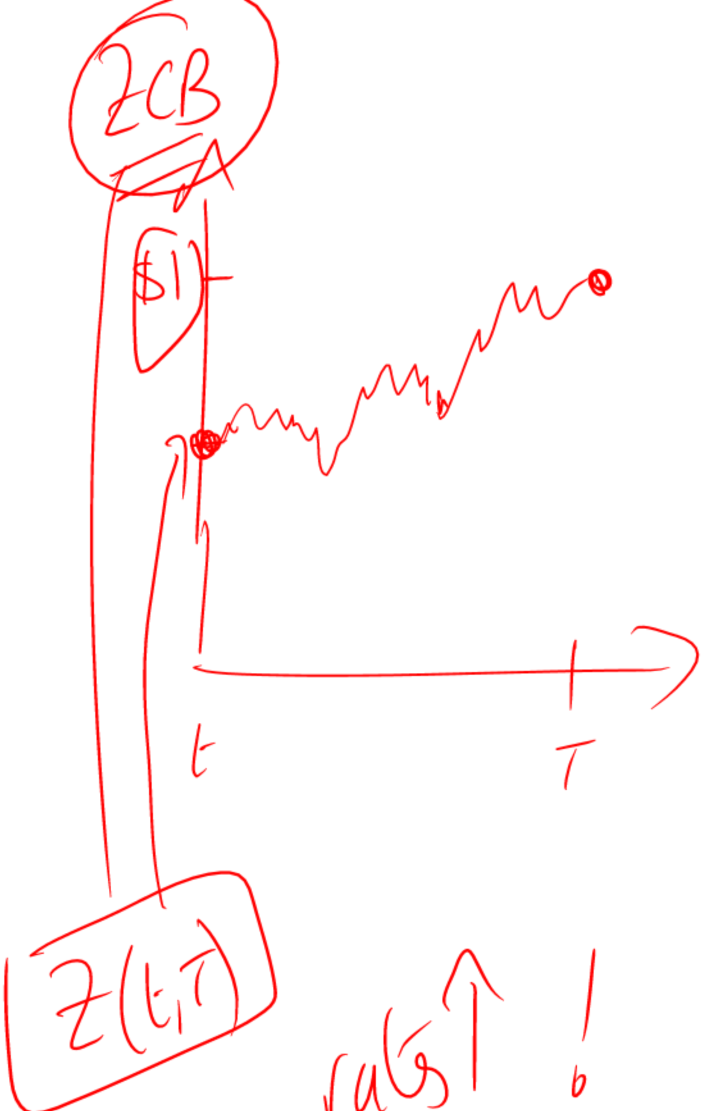
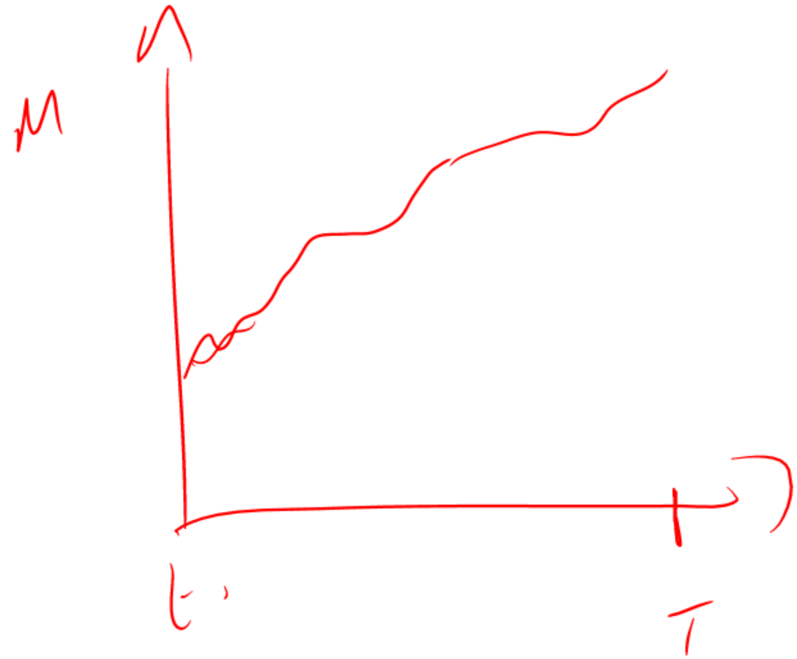


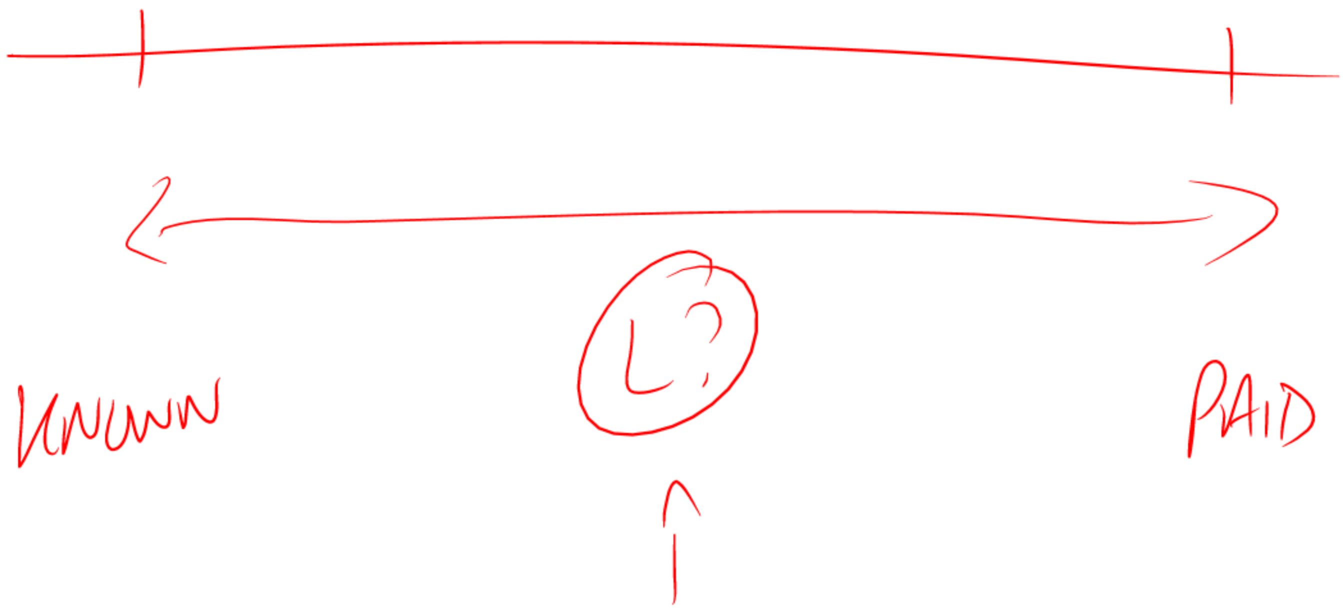
rates ↑ !



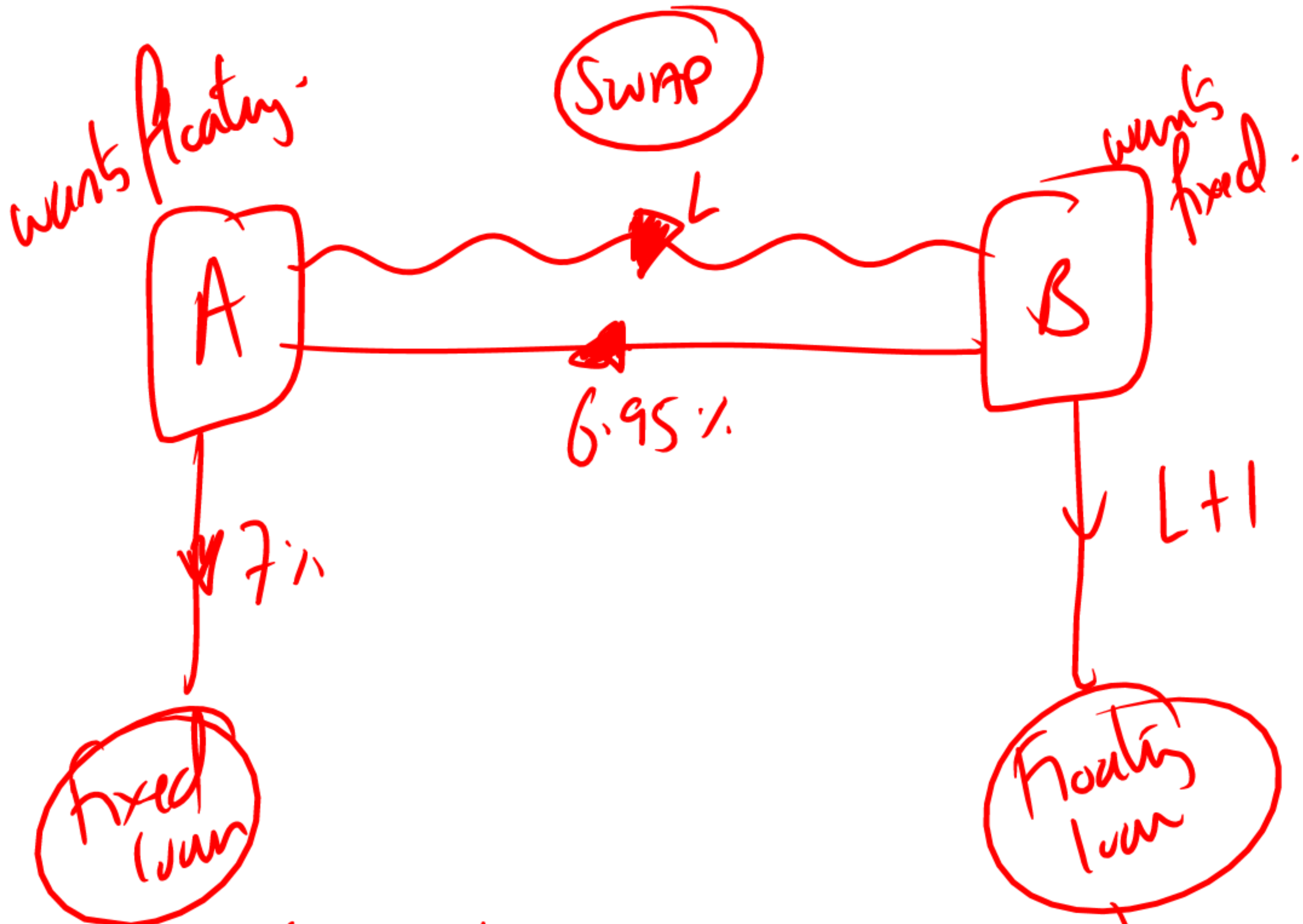
rates ↓

assumes r is constant!

$$M(T) = M(t)e^{r(T-t)}$$


KNOWN
L?
PAID

$$f = \frac{R_2 T_2 - R_1 T_1}{T_2 - T_1}$$



Net Cost : $7 - 6.95 + L$ $= L + 0.05$

$(L+1) - L + 6.95$ $= 7.95$

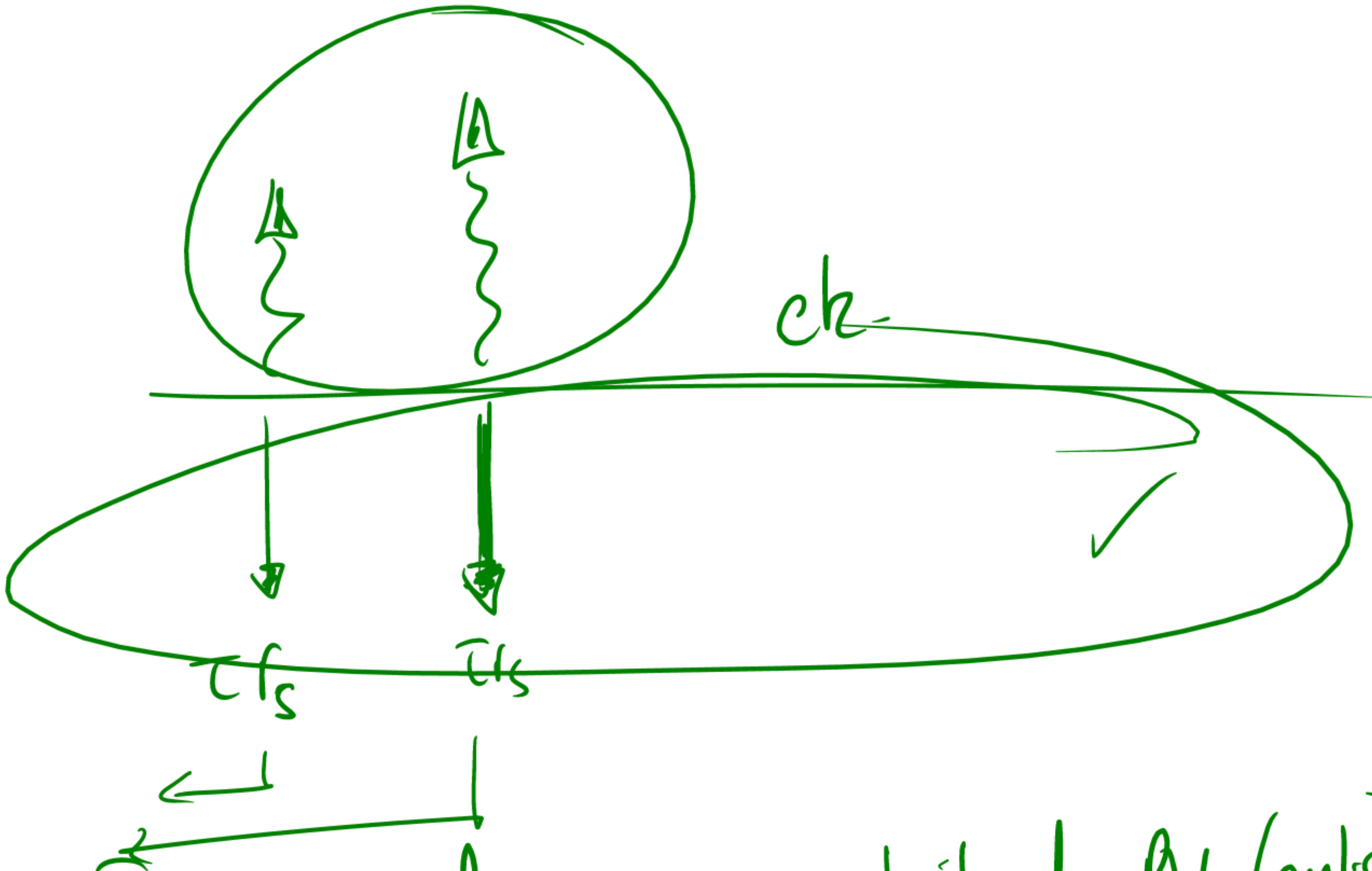
Quoli

$L + 0.30$

25bp

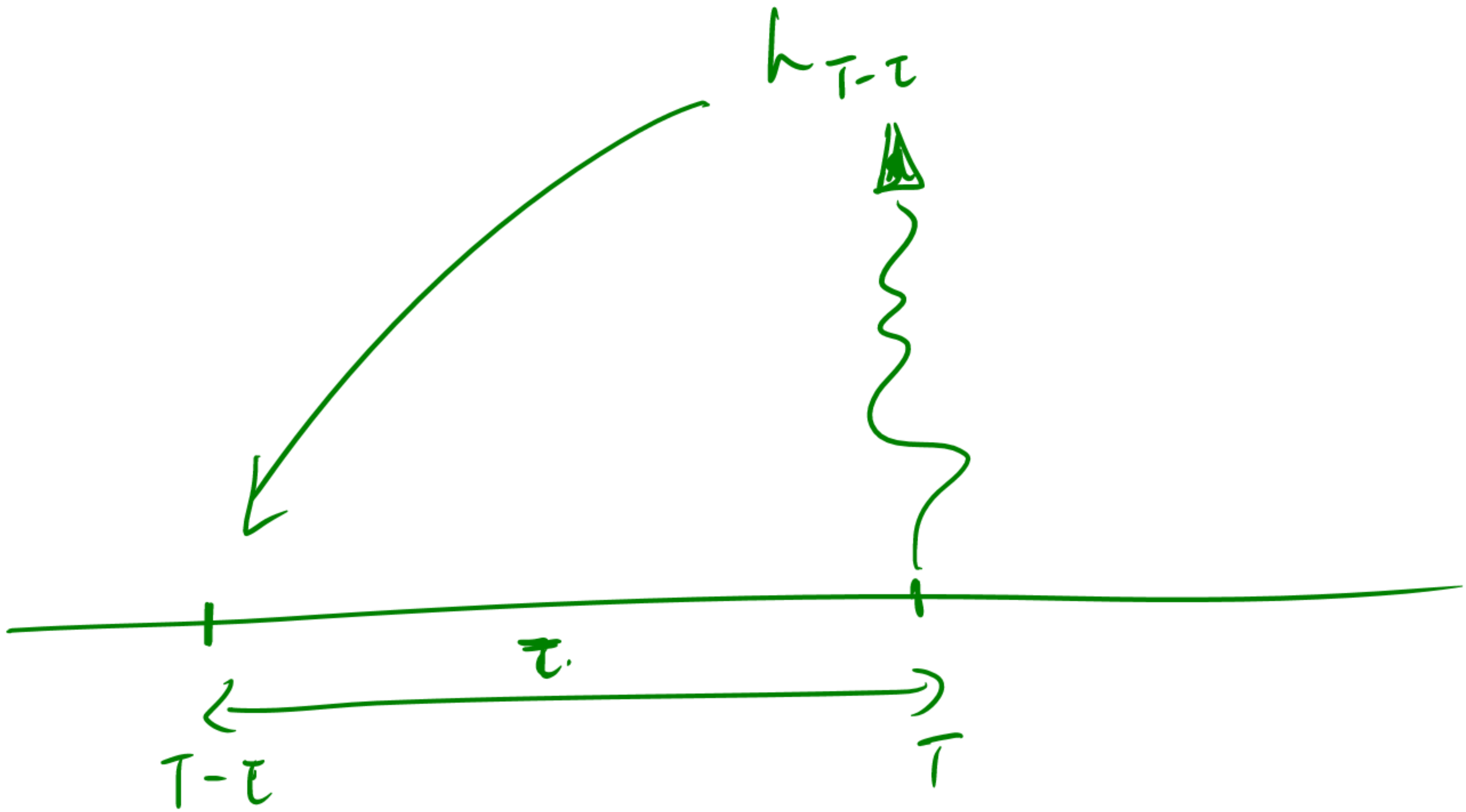
8.2

25bps

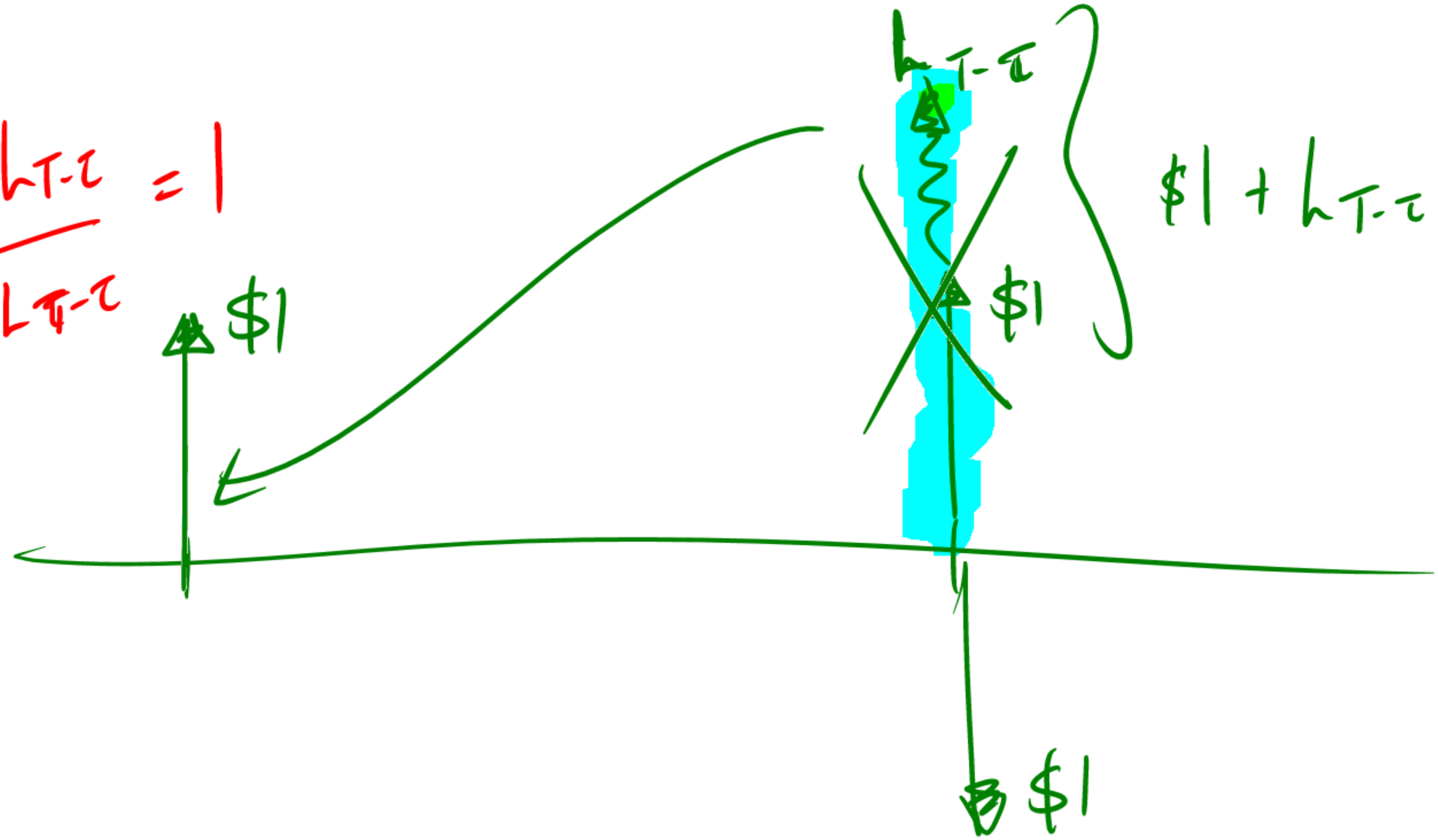


Fair priced swap: Initial PV (pubs) = 0

PV (fixed) = PV (floating)


$h_{T-\tau}$
τ
$T-\tau$
T

$$PV_{T-\tau} = \frac{1 + h_{T-\tau}}{1 + h_{T-\tau}} = 1$$



FV $\qquad\qquad$ PV

$\overline{\overline{T}}$ $\qquad\qquad$ $\overline{\overline{t}}$

$$\underline{\underline{M(T)}} = M(t)\, e^{\int_t^T r(\tau)\,d\tau}$$

$$\$1 = Z(t,T)\, e^{\underline{\underline{\int_t^T r(\tau)\,d\tau}}}$$

assume r = yield, y is <u>constant</u>

$$\$1 = Z(t,T)\, e^{y(T-t)}$$

Solving for y

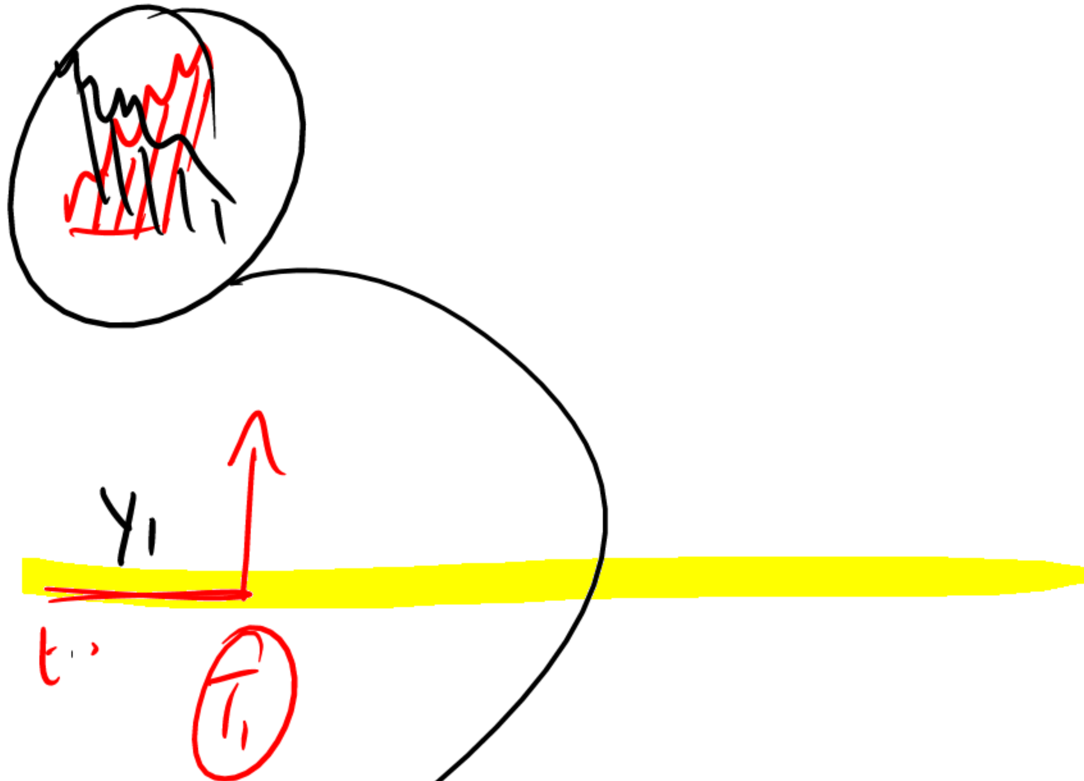
$$\frac{dV}{dy} = \frac{\$}{(1/\text{time})} = \$\ \text{time}.$$

Dimension

$$\text{Duration} = -\frac{1}{V}\frac{dy}{dy}\ \frac{\$\,\text{time}}{\$.} = \underline{\underline{\text{time}}}$$

avg time!

$$-\frac{1}{V}\cdot\frac{dV}{dy} = \frac{(T-t)Pe^{-y(T-t)} + \sum (t_i - t)Ce^{-y(t_i-t)}}{Pe^{-y(T-t)} + \sum Ce^{-y(t_i-t)}}$$



$Z(t,T_1)$

$$Z(t,T_1) = e^{-\int_t^{T_1} r(\tau)\,d\tau}$$

Simple assumption: $r = "y_1"$

$$Z(t,T_1) = e^{-y(T-t)}$$

$$y_1 = -\frac{\ln(Z)}{(T_1-t)}$$

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Price a swap.

- YTM. – duration / convexity
- bootstrap fwd rates out Z. (YTM)

"Black Book": Ch 14-15-16