

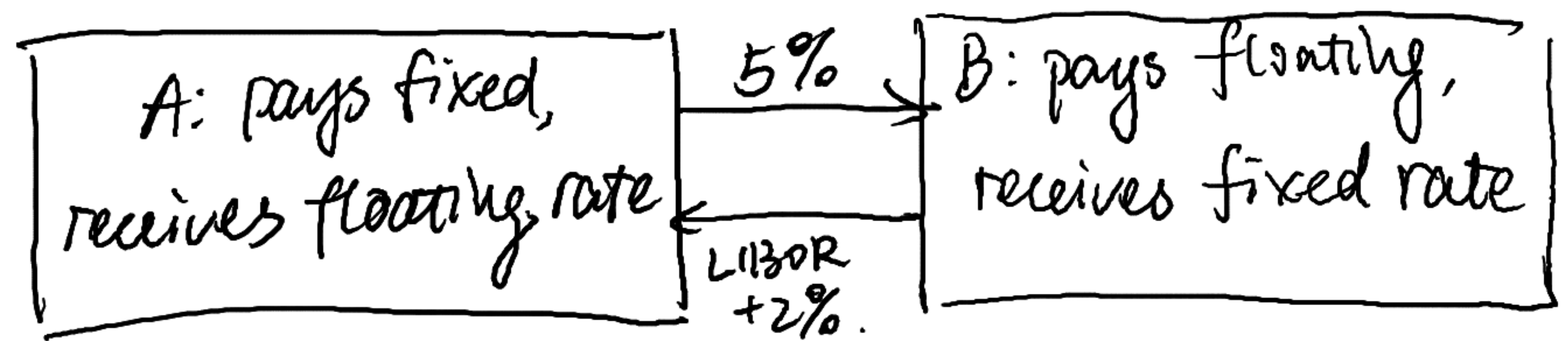
derivatives notes

IRS interest rate swap.

is an OTC derivatives

- 8 70% centrally cleared.
- ▷ largest class of derivatives in terms of notional amount and risk exposures
- 8 standardized in terms of payment date and rates
- 8. so dominant that lawyers think swap == derivatives

Definition of IRS.



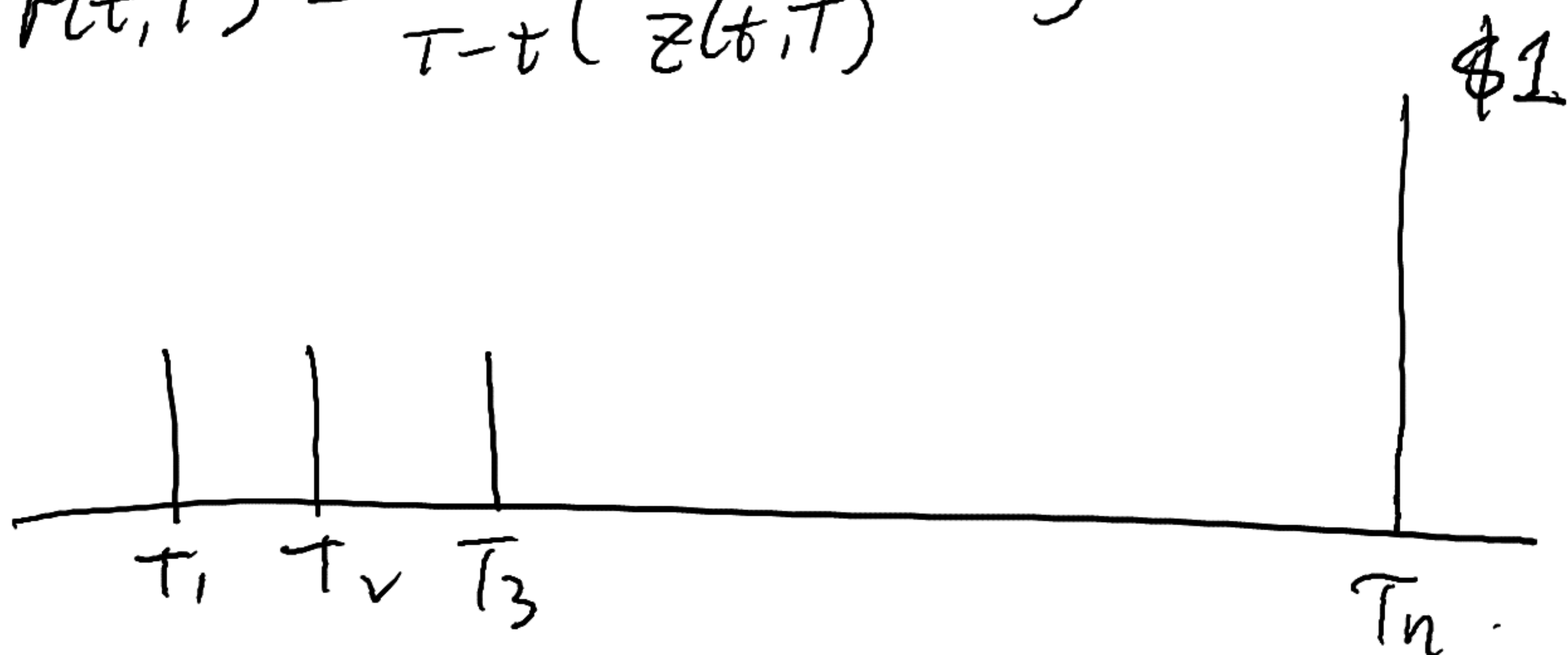
Bond issuers they issue bonds, they have to pay a fixed rate 5% every 6 months. But they might not always have that 5% fixed rate. So they may say, I just want to pay LIBOR + 2%.

So now IB (investing bank), the middle man between the bond issuers and the bond buyers. they say issuers you pay me LIBOR + 2%, I pay the fixed 5% to the bond buyer.

$$Z(t, T) = \frac{1}{1 + r(t, T)(T - t)}$$

inversely
proportional

$$r(t, T) = \frac{1}{T - t} \left(\frac{1}{Z(t, T)} - 1 \right)$$



$$\Delta T = \text{freq}$$

C = coupon rate

Discount Bond. $B(t) < 1.0$. or. $C < y_t$.

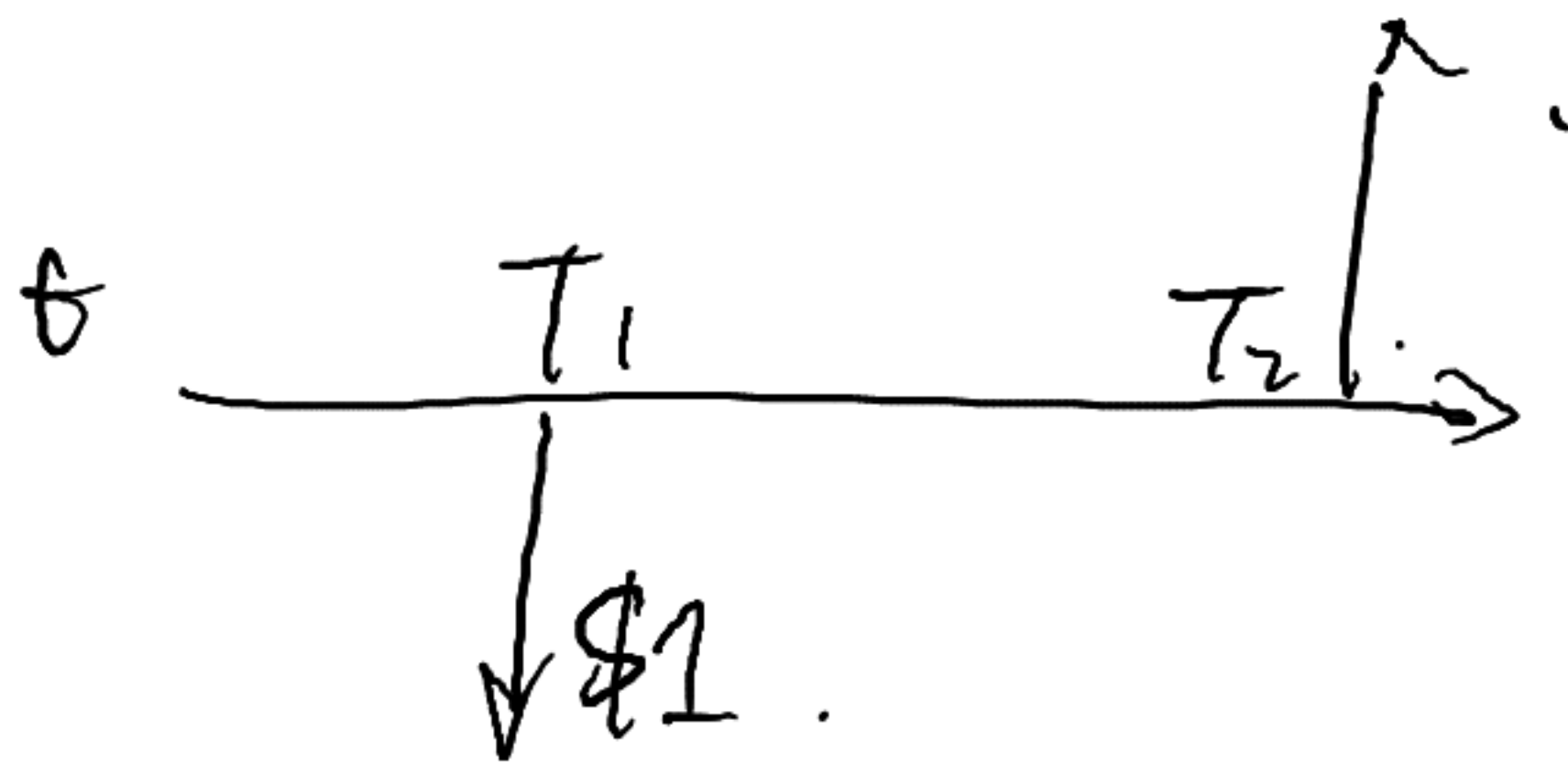
Premium Bond. $B(t) > 1.0$ or $C > y_t$.

Par Bond $B(t) = 1.0$. or $C = y_t$.

Yield: Y_t .

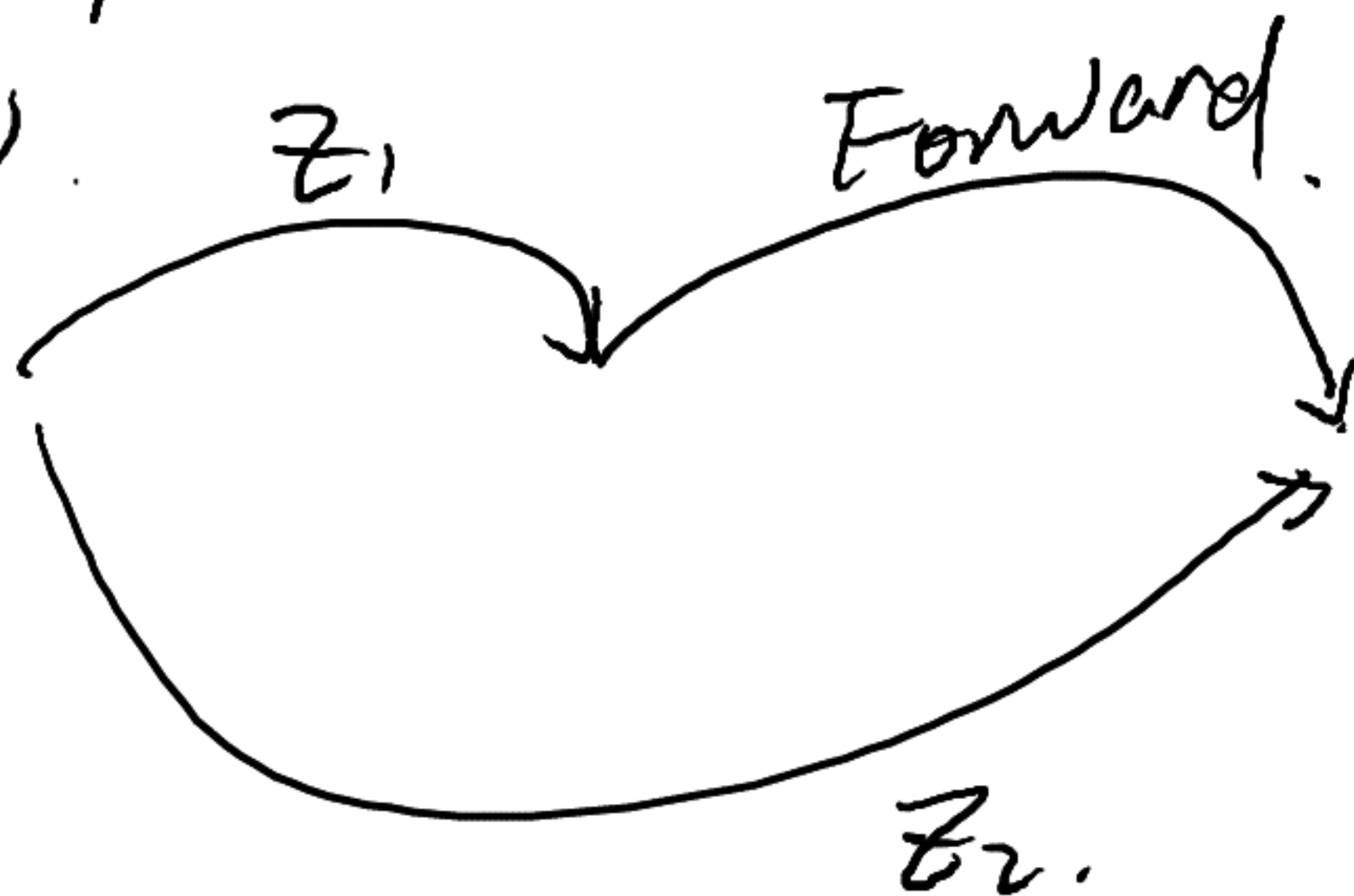
the yield changes along a bond at different time

Forward Rate Agreement.



How to calculate forward rate?

By no arbitrage law.



Forward Rate vs. Floating Rate.

Swap Rate.

the rate that every one is happy with a swap
For this rate, I enter into swap.

$$V(\text{fixed payer}) = (S_t - K) \cdot$$

$$A(t, T_t, \dots, T_n).$$