LEDS Curve Construction

$$f_i^d = \frac{1}{t_i - t_{i-1}} \int_{t_{i-1}}^{t_i} f(s)ds$$

Discrete Forward Rate f_i^d

MC: $f_i = f_i^d + g(x(t))$

Instantaneous Forward Rate "Short Rate" $f_i, \quad f(t)$

$$f(t,T) = -\frac{\partial}{\partial T} lnP(t,T)$$

$$f_i^d = \frac{r_i t_i - r_{i-1} t_{i-1}}{t_i - t_{i-1}}$$

$$f(t) = \frac{d}{dt}[r(t)t]$$

$$r(t)t = r_{i-1}t_{i-1} + \int_{t_{i-1}}^{t} f(s)ds$$

Forward Rate (Simply Compounded)
$$f(t,T) = \frac{1}{T-t}\left[\frac{P(t)}{P(T)} - 1\right]$$

Spot Rate ("Zero Rate")
$$r(t) = -\frac{1}{t}lnP(t)$$

Discount Factor
$$P(t) = e^{-\int_0^t f(s)ds}$$

$$P_i = \frac{1}{1 + L_i \delta_i}$$

$$P_{i+1} = \frac{P_i}{1 + F_i \delta_i}$$

Bootstrap

Libor Rate L_i

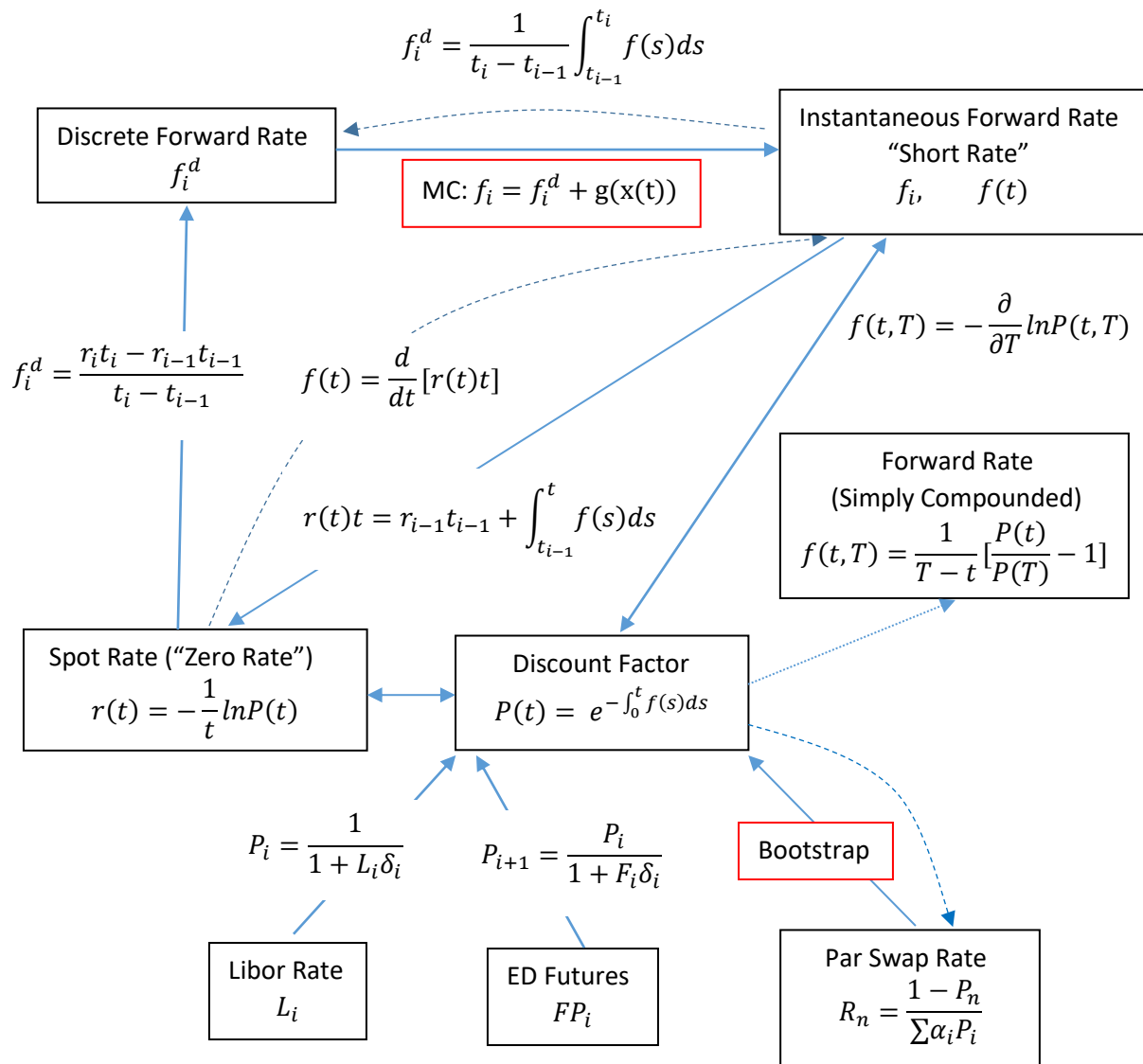**ED Futures** FP_i

Par Swap Rate
$$R_n = \frac{1 - P_n}{\sum \alpha_i P_i}$$

1. MC: Monotone-Convex Interpolation Method by Hagan and West, 2008.

2. All rates are continuously compounded unless stated explicitly.