$$I_t = \rho_t\, C_t$$

$$\text{Let } X_t = \sum_{i=1}^{t} C_i \ \text{ and } \ Y_t = \sum_{i=1}^{t} B_{i-d}$$

$$\text{Then } Y_t = -Z_0 + \rho_t\, X_t + Z_t$$