under the forward measure Q^{Ti+1} as follows:

$$\boldsymbol{IDIC}(\tau, T_{i+1}; T_{ij}; K_{ij}) = B_n(\tau, T_{i+1}) E^{Q^{Ti+1}} \left(\frac{X(T_i)}{X(0)} R(T_i; T_i) I(R(T_{ij}; T_{ij})) > K_{ij}) | F_\tau \right). \quad \text{(B.1)}$$

According to (1), we can rewrite (B.1) as follows:

$$(\mathbf{B.1}) = \frac{B_n(\tau,T_{i+1})}{X(0)} E^{Q^{Ti+1}} (X(T_i)(\frac{1-B_n(T_i,T_i^*)}{\Gamma_i B_n(T_i,T_i^*)}) I(B_n(T_{ij}, T_{ij}^*) < \bar{K}_{ij}) | F_\tau),$$

$$= \frac{B_n(\tau,T_{i+1})}{\Gamma_i X(0)} E^{Q^{Ti+1}} (\frac{X(T_i) B_r(T_i,T_i)}{B_n(T_i,T_i^*)}) I(B_n(T_{ij}, T_{ij}^*) < \bar{K}_{ij}) | F_\tau) -$$
$$\frac{B_n(\tau,T_{i+1})}{\Gamma_i X(0)} E^{Q^{Ti+1}} (X(T_i) \; I(B_n(T_{ij}, T_{ij}^*) < \bar{K}_{ij}) | F_\tau). \quad \text{(B.2)}$$

The second part in (B.2) can be obtained by Appendix A as follows:

$$\frac{B_n(\tau,T_{i+1})}{\Gamma_i X(0)} E^{Q^{Ti+1}} (X(T_i) \; I(B_n(T_{ij}, T_{ij}^*) < \bar{K}_{ij}) | F_\tau) = \frac{IDC(\tau,T_{i+1};T_{ij};K_{ij})}{\Gamma_i}. \quad \text{(B.3)}$$

Next, we rewrite the first part in (B.2) as follows:

$$\frac{B_n(\tau,T_{i+1})}{\Gamma_i X(0)} E^{Q^{Ti+1}} (g^*(T_i, T_i) \; I(h(T_{ij}, T_{ij}) < \bar{K}_{ij}) | F_\tau) \quad \text{(B.4)}$$

where $h(T_{ij}, T_{ij})$ is defined in (A.14) and $g^*(t, T_i)$ is defined as follows:

$$g^*(t, T_i) = \frac{X(t) B_r(t, T_i)}{B_n(t, T_{i+1})} \frac{B_n(t, T_{i+1})}{B_n(t, T_i^*)}.$$

Similar to the deriving process of IDC in Appendix A, (B.4) can be derived by replacing $g(t, T_i)$ with $g^*(t, T_i)$ and the result is given as follows:

$$(\boldsymbol{B.4}) = \frac{X(\tau) B_r(\tau,T_i)}{X(0) B_n(t,T_i)} \frac{B_n(\tau,T_i)}{\Gamma_i B_n(\tau,T_i^*)} \emptyset(\tau, T_i) B_n(\tau, T_i) N\left(d^*(T_{ij})\right). \quad \text{(B.5)}$$

where

$$d^*(T_{ij}) = \frac{ln\left(\frac{1+\Gamma_{ij} R(\tau,T_{ij})}{1+\Gamma_{ij} K_{ij}}\right) - \xi^*(\tau,T_{ij}) + \frac{1}{2} V(\tau,T_{ij})}{\sqrt{V(\tau,T_{ij})}}, \quad \text{(B.6)}$$

$$\xi^*(\tau, T_{ij}) = \int_\tau^{T_{ij}} (\mu_h(u, T_{ij}) + \eta^*(u, T_{ij}) \cdot v_h(u, T_{ij})) \, du, \quad \text{(B.7)}$$

$$\eta^*(u, T_{ij}) = \begin{cases} v_{g^*}(t, T_i) & 0 \le t \le T_i, \\ 0 & T_i < t \le T_{ij}, \end{cases} \quad \text{(B.8)}$$

$$v_{g^*}(t, T_i) = (\sigma_x(t) + \sigma_{B_n}(t, T_i^*) - (\sigma_{B_r}(t, T_i), \quad \text{(B.9)}$$

$$\emptyset^*(\tau, T_i) = \exp(\int_T^{T_i} \sigma_{B_n}(u, T_{i+1}) - \sigma_{B_n}(u, T_i^*)) \cdot (\sigma_{B_r}(u, T_i) - \sigma_{B_n}(u, T_i^*) - \sigma_x(u))). \quad \text{(B.10)}$$

With the above derivation, IDIC can be derived as follows:

$$\boldsymbol{IDIC}(\tau, T_{i+1}; T_{ij}; K_{ij}) = (\boldsymbol{B.5}) - (\boldsymbol{B.3}).$$

As to the pricing formula for the IDIP, it can be derived similarly to the IDIC case.