Appendix

Derivation of Equation (3.12):

According to Equation (3.11), we have

$$V(0) = C_{0,n}(0) \cdot E_{Q^{0,n}}\left[max\left(S_{0,n}(T_0) - K, 0\right)|F_0\right].$$

By Radon-Nikodym derivative, the probability measure can be changed from $Q^{0,n}$ to $\hat{Q}^m$

$$V(0) = C_{0,n}(0) \cdot E_{\hat{Q}^m}\left[\frac{dQ^{0,n}}{d\hat{Q}^m} max\left(S_{0,n}(T_0) - K, 0\right)|F_0\right]$$
$$= C_{0,n}(0) \cdot E_{\hat{Q}^m}\left[\frac{C_{0,n}(T_0)/C_{0,n}(0)}{\hat{C}_m(T_0)/\hat{C}_m(0)} max\left(S_{0,n}(T_0) - K, 0\right)|F_0\right]$$

Replacing $C_{0,n}$ and C_m , we get

$V(0) =$

$$C_{0,n}(0)E_{\hat{Q}^m}\left[\frac{\sum_{i=1}^{n}(T_i - T_{i-1})\cdot\bar{P}(T_0,T_i)\cdot Q\left(\tau > T_0|F_{T_0}\right) \Big/ \sum_{i=1}^{n}(T_i - T_{i-1})\cdot\bar{P}(0,T_i)\cdot Q(\tau > 0|F_0)}{(T_i - T_{i-1})\cdot\bar{P}(T_0,T_m)\cdot Q\left(\tau > T_0|F_{T_0}\right) \Big/ (T_i - T_{i-1})\cdot\bar{P}(0,T_m)\cdot Q(\tau > 0|F_0)} \right. max\left(S_{0,n}(T_0) -\right.$$

$K,0|F0$,

Arranging the above formula, we thus can obtain

$$V(0) = \bar{P}(0, T_m) \cdot E_{\hat{Q}^m}\left[\frac{\sum_{i=1}^{n}(T_i - T_{i-1})\cdot\bar{P}(T_0,T_i)}{\bar{P}(T_0,T_m)} max\left(S_{0,n}(T_0) - K, 0\right)|F_0\right].$$