

APPROXIMATION OF THE HDD AND CDD TEMPERATURE FUTURES PRICES DYNAMICS

ABSTRACT. We provide an expression for future price contracts written on the aggregated amount of heating-degree days (HDD) and cooling-degree days (CDD). CDD and HDD are indexes where the daily average temperature of a certain location at a certain time is involved. We model the daily average temperature by means of a seasonal function $\Lambda(t)$ and a CAR(p)-process $Y(t) = \mathbf{e}_1 \mathbf{X}(t)$ where $\mathbf{X}(t)$ is the solution of a multivariate Ornstein-Uhlenbeck process. We have also developed approximative formulas for these futures prices that are easier to handle, as they become linear expressions on $\mathbf{X}(t)$. We use the future price contracts and the approximative future price contracts to price call options. Finally we consider derivatives of the future price contracts and the call option prices with respect the coordinates of $\mathbf{X}(t)$ to analyse the influence that they have on the result.