

[Help](#)

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#include "lmm1d_exoi.h"
#include "pnl/pnl_basis.h"
#include "math/mc_lmm_glassermanzhao.h"
#include "enums.h"

#if defined(PremiaCurrentVersion) && PremiaCurrentVersion < (2011+2) //The "#els
static int CHK_OPT(MC_LongstaffSchwartz_CallableCMSSpread)(void *Opt, void *Mod)
{
    return NONACTIVE;
}
int CALC(MC_LongstaffSchwartz_CallableCMSSpread)(void *Opt, void *Mod, PricingMe
{
    return AVAILABLE_IN_FULL_PREMIA;
}
#else

static int MC_CIF_LongstaffSchwartz(double l0, double sigma_const, int nb_factor
{
    Volatility *ptVol;
    Libor *ptLib;
    int init_mc;
    int Nbr_Maturities;
    char *CouponFlag = "CallableCMSSpread";
    PnlVect *ContractParams = pnl_vect_create(4);

    LET(ContractParams, 0) = Cap;
    LET(ContractParams, 1) = Floor;
    LET(ContractParams, 2) = CMSMat1;
    LET(ContractParams, 3) = CMSMat2;

    Nbr_Maturities = pnl_iround(last_payment_date / tenor);

    mallocLibor(&ptLib , Nbr_Maturities, tenor, l0);
    mallocVolatility(&ptVol , nb_factors, sigma_const);

    init_mc = pnl_rand_init(generator, nb_factors, NbrMCsimulation);
    if (init_mc != OK) return init_mc;

    MC_ExoticProduct_LongstaffSchwartz(CouponFlag, ContractParams, swaption_price,
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    freeLibor(&ptLib);
    freeVolatility(&ptVol);
    pnl_vect_free(&ContractParams);

    return init_mc;
}

int CALC(MC_LongstaffSchwartz_CallableCMSSpread)(void *Opt, void *Mod, PricingMe
{
    TYPEOPT *ptOpt = (TYPEOPT *)Opt;
    TYPEMOD *ptMod = (TYPEMOD *)Mod;

    return MC_CIF_LongstaffSchwartz(ptMod->l0.Val.V_PDOUBLE,
                                    ptMod->Sigma.Val.V_PDOUBLE,
                                    ptMod->NbFactors.Val.V_ENUM.value,
                                    ptOpt->LastPaymentDate.Val.V_DATE - ptMod->T.V
                                    ptOpt->FirstExerciseDate.Val.V_DATE - ptMod->T.V
                                    ptOpt->Nominal.Val.V_PDOUBLE,
                                    ptOpt->Cap.Val.V_PDOUBLE,
                                    ptOpt->Floor.Val.V_PDOUBLE,
                                    ptOpt->CMSMat1.Val.V_PDOUBLE,
                                    ptOpt->CMSMat2.Val.V_PDOUBLE,
                                    ptOpt->ResetPeriod.Val.V_DATE,
                                    Met->Par[0].Val.V_LONG,
                                    Met->Par[1].Val.V_ENUM.value,
                                    Met->Par[2].Val.V_ENUM.value,
                                    Met->Par[3].Val.V_INT,
                                    Met->Par[4].Val.V_INT,
                                    Met->Par[5].Val.V_ENUM.value,
                                    &(Met->Res[0].Val.V_DOUBLE));
}

static int CHK_OPT(MC_LongstaffSchwartz_CallableCMSSpread)(void *Opt, void *Mod)
{
    if ((strcmp(((Option *)Opt)->Name, "CallableCMSSpread") == 0))
        return OK;
    else
        return WRONG;
}

```

```

#endif //PremiaCurrentVersion

static int MET(Init)(PricingMethod *Met, Option *Opt)
{
    if (Met->init == 0)
    {
        Met->init = 1;

        Met->Par[0].Val.V_LONG = 50000;
        Met->Par[1].Val.V_ENUM.value = 0;
        Met->Par[1].Val.V_ENUM.members = &PremiaEnumRNGs;
        Met->Par[2].Val.V_ENUM.value = 0;
        Met->Par[2].Val.V_ENUM.members = &PremiaEnumBasis;
        Met->Par[3].Val.V_INT = 10;
        Met->Par[4].Val.V_INT = 1;
        Met->Par[5].Val.V_ENUM.value = 0;
        Met->Par[5].Val.V_ENUM.members = &PremiaEnumAfd;

    }

    return OK;
}

PricingMethod MET(MC_LongstaffSchwartz_CallableCMSSpread) =
{
    "MC_LongstaffSchwartz_Callable_CMS_Spread",
    {
        {"N Simulation", LONG, {100}, ALLOW},
        {"RandomGenerator", ENUM, {100}, ALLOW},
        {"Basis", ENUM, {100}, ALLOW},
        {"Dimension Approximation", INT, {100}, ALLOW},
        {"Nbr discretisation step per periode", INT, {100}, ALLOW},
        {"Martingale Measure", ENUM, {100}, ALLOW},
        {" ", PREMIA_NULLTYPE, {0}, FORBID}
    },
    CALC(MC_LongstaffSchwartz_CallableCMSSpread),
    { {"Price", DOUBLE, {100}, FORBID},
      {" ", PREMIA_NULLTYPE, {0}, FORBID}
    },
    CHK_OPT(MC_LongstaffSchwartz_CallableCMSSpread),

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    CHK_ok,  
    MET(Init)  
};
```