

[Help](#)

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extern "C" {
#include "variancegamma1d_lim.h"
#include "enums.h"
}
#include "math/levy_fd.h"
extern "C" {

#ifdef PREMIA_CURRENT_VERSION && PREMIA_CURRENT_VERSION < (2007+2) //The "#els
static int CHK_OPT(FD_ImpExpDownOut)(void *Opt, void *Mod)
{
    return NONACTIVE;
}
int CALC(FD_ImpExpDownOut)(void *Opt, void *Mod, PricingMethod *Met)
{
    return AVAILABLE_IN_FULL_PREMIA;
}
#else

static int ImpExpDownOut(int am, double S0, NumFunc_1 *p, double l_down, double l_up)
{
    double price0, delta0;
    int flag_callput, flag_stdbarrier;

    double ldownlog = log(l_down / S0);
    if (dx > fabs(ldownlog) / 2.)
        dx = fabs(ldownlog) / 2.;
    int N1 = (int)ceil(fabs(ldownlog) / dx);
    dx = fabs(ldownlog) / N1;

    double A1 = ldownlog + dx;
    /*Construction of the model*/
    VG_measure measure(theta, sigma, kappa, dx);
    double k = 3;
    double Ar = log(2.) + r * T + k * sqrt(T * measure.varX1);

    if (Ar > 30) Ar = 30;
    int N = (int) ceil((Ar - ldownlog) / dx);
    Ar = ldownlog + N * dx;
}
}

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double K = p->Par[0].Val.V_DOUBLE;

flag_stdbarrier = 3;

/*Price Computation*/
if ((p->Compute) == &Put)
{
    flag_callput = 2;
    if (flag_scheme == 1)
        vector<double> u = price2(am, measure, flag_callput, flag_stdbarrier,
    else
        vector<double> u = price2c(am, measure, flag_callput, flag_stdbarrier,
    /*Price */
    *ptprice = price0;

    /*Delta */
    *ptdelta = delta0;
}
else if ((p->Compute) == &Call)
{

    flag_callput = 1;
    if (flag_scheme == 1)
        vector<double> u = price2(am, measure, flag_callput, flag_stdbarrier,
    else
        vector<double> u = price2c(am, measure, flag_callput, flag_stdbarrier,
    /*Price */
    *ptprice = price0;

    /*Delta */
    *ptdelta = delta0;
}

return OK;
}

int CALC(FD_ImpExpDownOut)(void *Opt, void *Mod, PricingMethod *Met)
{
    TYPEOPT *ptOpt = (TYPEOPT *)Opt;
    TYPEMOD *ptMod = (TYPEMOD *)Mod;

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double r, divid, limit, rebate;

r = log(1. + ptMod->R.Val.V_DOUBLE / 100.);
divid = log(1. + ptMod->Divid.Val.V_DOUBLE / 100.);
limit = ((ptOpt->Limit.Val.V_NUMFUNC_1)->Compute)((ptOpt->Limit.Val.V_NUMFUN
rebate = ((ptOpt->Rebate.Val.V_NUMFUNC_1)->Compute)((ptOpt->Rebate.Val.V_NUM

return ImpExpDownOut(ptOpt->EuOrAm.Val.V_BOOL, ptMod->S0.Val.V_PDOUBLE,
                    ptOpt->PayOff.Val.V_NUMFUNC_1, limit, rebate, ptOpt->Ma
}

static int CHK_OPT(FD_ImpExpDownOut)(void *Opt, void *Mod)
{
    Option *ptOpt = (Option *)Opt;
    TYPEOPT *opt = (TYPEOPT *) (ptOpt->TypeOpt);

    if ((opt->OutOrIn).Val.V_BOOL == OUT)
        if ((opt->DownOrUp).Val.V_BOOL == DOWN)
            if ((opt->EuOrAm).Val.V_BOOL == EURO)
                if ((opt->Parisian).Val.V_BOOL == FALSE)
                    return OK;

    return WRONG;
}
#endif //PremiaCurrentVersion

static int MET(Init)(PricingMethod *Met, Option *Opt)
{
    static int first = 1;

    if (first)
    {
        Met->HelpFilenameHint = "FD_ImpExpdownout_vg";
        Met->Par[0].Val.V_PDOUBLE = 0.001;
        Met->Par[1].Val.V_INT2 = 400;
        Met->Par[2].Val.V_ENUM.value = 1;
        Met->Par[2].Val.V_ENUM.members = &PremiaEnumExpPart;
        first = 0;
    }

    return OK;
}

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}

PricingMethod MET(FD_ImpExpDownOut) =
{
    "FD_ImpExpDownOut",
    { {"Space Discretization Step", DOUBLE, {500}, ALLOW}, {"TimeStepNumber", IN
        {"Explicit Part", ENUM, {100}, ALLOW},
        {" ", PREMIA_NULLTYPE, {0}, FORBID}
    },
    CALC(FD_ImpExpDownOut),
    {{"Price", DOUBLE, {100}, FORBID}, {"Delta", DOUBLE, {100}, FORBID}, {" ", P
    CHK_OPT(FD_ImpExpDownOut),
    CHK_split,
    MET(Init)
};

}
```