Generalizing the Black-Scholes formula to multivariate contingent claims

Abstract:
This paper provides approximate formulas that generalize the Black-Scholes formula in all dimensions. Pricing and hedging of multivariate contingent claims are achieved by computing lower and upper bounds. These bounds are given in closed form in the same spirit as the classical one-dimensional Black-Scholes formula. Lower bounds perform remarkably well. Like in the onedimensional case, Greeks are also available in closed form. We discuss an extension to basket options with barrier.

V.Durrleman, R.Carmona 2006

http://www.cmap.polytechnique.fr/%7Evaldo/papers/multivariate.pdf
http://www.quant-press.com

Heterogeneous Basket Options Pricing Using Analytical Approximations

Abstract:
This paper proposes the use of analytical approximations to price an heterogeneous basket option combining commodity prices, foreign currencies and zero-coupon bonds. We examine the performance of three moment matching approximations: inverse gamma, Edgeworth expansion around the lognormal and Johnson family distributions. Since there is no closed-form formula for basket options, we carry out Monte Carlo simulations to generate the benchmark values. We perform a simulation experiment on a whole set of options based on a random choice of parameters. Our results show that the lognormal and Johnson distributions give the most accurate results

G.Dionne, G.Gauthier, N.Ouertani, N.Tahani 2006

http://neumann.hec.ca/gestiondesrisques/06-01.pdf
http://www.quant-press.com

Markovian Projection Method for Volatility Calibration

Abstract:
We present the Markovian projection method, a method to obtain closed-form approximations to European option prices on various underlyings that, in principle, is applicable to any (diffusive) model. Successful applications of the method have already appeared in the literature, in particular for interest rate models (short rate and forward Libor models with stochastic volatility), and interest rate/FX hybrid models with FX skew. The purpose of this note is thus not to present other instances where the Markovian projection method is applicable (even though more examples are indeed given) but to distill the essence of the method into a conceptually simple plan of attack, a plan that anyone who wants to obtain European option approximations can follow.

V.Piterbarg 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=906473
http://www.quant-press.com

Pricing of Arithmetic Basket Options by Conditionning

Abstract:
Determining the price of a basket option is not a trivial task, because there is no explicit analytical expression available for the distribution of the weighted sum of prices of the the assets in the basket. However, by using a conditioning variable, this price can be decomposed in two parts, one of which can be computed exactly. For the remaining part we first derive a lower and an upper bound based on comonotonicity, and another upper bound equal to that lower bound plus an error term. Secondly, we derive an approximation by applying some moment matching method. Keywords: basket option; comonotonicity; analytical bounds; moment matching; Asian basket option; Black & Scholes model

G.Deelstra,J.Liinev, M.Vanmaele 2004

http://users.ugent.be/~mvmaele/Publicaties/basket_DeelstraLiinevVanmaele.pdf
http://www.quant-press.com

Reconstruction of Volatility: Pricing Index Options by the Steepest Descent Approximation

Abstract:
We propose a formula for calculating the implied volatility of index options based on the volatility skews of the options on the underlying stocks and on a given correlation matrix for the basket. The derivation uses the steepest-descent approximation for the multivariate probability distribution function of forward prices. A simple financial justification is provided. We apply the formula to compute the implied volatilities of liquidly-traded options on exchange-traded funds (ETF) across different strikes. Our theoretical results were found to be in good agreement with contemporaneous quotes on the Chicago Board of Options Exchange (CBOE) and the American Stock Exchange (AMEX).

M.Avellaneda, D.Boyer-Olson 2002

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=316399
http://www.quant-press.com

Pricing Asian and Basket Options Via Taylor Expansion

Abstract:
Asian options belong to the so-called path-dependent derivatives. They are among the most di±cult to price and hedge both analytically and numerically. Basket op- tions are even harder to price and hedge because of the large number of state variables. Several approaches have been proposed in the literature, including Monte Carlo simula- tions, tree-based methods, partial di®erential equations, and analytical approximations among others. The last category is the most appealing because most of the other meth- ods are very complex and slow. Our method belongs to the analytical approximation class. It is based on the observation that though the weighted average of lognormal vari- ables is no longer lognormal, it can be approximated by a lognormal random variable if the ¯rst two moments match the true ¯rst two moments. To have a better approx- imation, we consider the Taylor expansion of the ratio of the characteristic function of the average to that of the approximating lognormal random variable around zero volatility. We include terms up to ¾6 in the expansion. The resulting option formulas are in closed form. We treat discrete Asian option as a special case of basket options. Formulas for continuous Asian options are obtained from their discrete counterpart. Numerical tests indicate that the formulas are very accurate. Comparisons with all other leading analytical approximations show that our method has performed the best overall in terms of accuracy for both short and long maturity options. Furthermore, unlike some other methods, our approximation treats basket (portfolio) and Asian op- tions in a uni¯ed way. Lastly, in the appendix we point out a serious mathematical error of a popular method of pricing Asian options in the literature.

N.Ju 2002

http://ihome.ust.hk/~nengjiu/JuJCF.pdf
http://www.quant-press.com

Approximated Moment-Matching Dynamics for Basket-Options Simulation

Abstract:
The aim of this paper is to present two moment matching procedures for basketoptions pricing and to test its distributional approximations via distances on the space of probability densities, the Kullback-Leibler information (KLI) and the Hellinger distance (HD). We are interested in measuring the KLI and the HD between the real simulated basket terminal distribution and the distributions used for the approximation, both in the lognormal and shifted-lognormal families. We isolate influences of instantaneous volatilities and instantaneous correlations, in order to assess which configurations of these variables have a major impact on the KLI and HD and therefore on the quality of the approximation.

D. Brigo, F. Mercurio, F. Rapisarda, R. Scotti 2001

http://www.damianobrigo.it/basketkli.pdf
http://www.quant-press.com

Valuing Exotic Options by Approximating the SPD with Higher Moments

Abstract:
The financial economic No Arbitrage assumption implies that in a complete market the price of any derivative security is the discounted value of its payoff function integrated against the appropriate state-price density (SPD). For most exotic path dependent payoffs, it is quite difficult to obtain a closed form expression for the state-price density, thus eliminating the prized possibility of an analytic expression for the option in question. In this article we value exotic options by matching moments to an approximating SPD from a very general, robust, and convenient class of density functions, known in the statistical literature as the Johnson (1949) family. The end result is an analytic expression for a wide variety of European style exotic options. Our formula is tested on Asian and Basket options and is found to be extremely robust when compared with Monte Carlo simulations and other numerical techniques

S.E.Posner, M.A.Milevsky 1998

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=108539
http://www.quant-press.com

Is Multi-Factor Really Necessary to Price European Options in Commodity?

Abstract:
The main result of this article is the presentation of the Distribution Match Method. This method applies to a general multi-factor pricing model under assumption of normal law drift. The idea is to find an equivalent one-factor model for European options. The equivalent model admits a weak solution, which has the same one-dimensional marginal probability distribution. Moreover, the one-dimensional distribution can be explicitly calculated under certain condition. This result can consequently induct closed formula for the future price and European option price. We apply these results to two well known commodity models, the Gabillon and the Gibson Schwartz model, to provide the price for the future price and a closed formula for the European options.

E. Benhamou, Z. Wang, A.G. Galli 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1310624
http://www.quant-press.com

Markov Models for Commodity Futures: Theory and Practice

Abstract:

L.Andersen 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1138782
http://www.quant-press.com

Unspanned Stochastic Volatility and the Pricing of Commodity Derivatives

Abstract:

A.B.Trolle, E.S.Schwartz 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=966390
http://www.quant-press.com

A dependence model for pairs of commodity forward curves: application to the US natural gas

and oil markets

Abstract:

S.Ohana 2007

http://www.bbk.ac.uk/cfc/acadpapers/ohana.pdf
http://www.quant-press.com

Arbitrage free cointegrated models in gas and oil future markets

Abstract:
In this article we present a continuous time model for natural gas and crude oil future prices. Its main feature is the possibility to link both energies in the long term and in the short term. For each energy, the future returns are represented as the sum of volatility functions driven by motions. Under the risk neutral probabil- ity, the motions of both energies are correlated Brownian motions while under the historical probability, they are cointegrated by a Vectorial Error Correction Model. Our approach is equivalent to defining the market price of risk. This model is free of arbitrage: thus, it can be used for risk management as well for option pricing issues. Calibration on European market data and numerical simulations illustrate well its behavior.

G.Benmenzer, E.Gobet, C.Jerusalem 2007

http://hal.archives-ouvertes.fr/docs/00/20/04/22/PDF/BenmenzerGobetJerusalemGasOilVECM0911.pdf
http://www.quant-press.com

On the Pricing and Hedging of Options on Commodity Forward and Futures Contracts - A Note

Abstract:

V.Zakamouline 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=946369
http://www.quant-press.com

Optimal quantization for the pricing of swing options

Abstract:

O.Bardou, S.Bouthamy, G.Pagès 2007

http://arxiv.org/abs/0705.2110
http://www.quant-press.com

A Multi-factor Jump-Diffusion Model for Commodities

Abstract:

J. Crosby 2006

http://www-cfr.jbs.cam.ac.uk/archive/PRESENTATIONS/seminars/2005/JohnCrosby_QF_version2_PDF.pdf
http://www.quant-press.com

Valuing Real Options using Implied Binomial Trees and Commodity Futures Options

Abstract:

T. Arnold, T. Falcon Crack, A. Schwartz 2005

http://www.fma.org/Chicago/Papers/IMPTREECFO.pdf
http://www.quant-press.com

Calibration of the multi-factor HJM model for energy market

Abstract:
The purpose of this paper is to show that using the toolkit of interest rate theory, already well known in financial engineering as the HJM model [D. Heath, R. Jarrow, A. Morton, Econometrica 60, 77 (1992)], it is possi ble to derive explicite option pricing formula and calibrate the theoretical model to the empirical electricity market. The analysis is illustrated by numerical cases from the European Energy Exchange (EEX) in Leipzig. The multifactor versus onefactor HJM models are compared.

E. Broszkiewicz-Suwaj, A. Weron 2005

http://www.bbk.ac.uk/cfc/acadpapers/ohana.pdf
http://www.quant-press.com

A Numerical Method for Pricing Electricity Derivatives for Jump-Diffusion Processes Based on Continuous Time Lattices

Abstract:

C.Albanese, H.Lo, S.Tompaidis 2005

http://www.level3finance.com/ENERGY.pdf
http://www.quant-press.com

Stochastic Behavior of Spot and Futures Commodity Prices: Theory and Evidence

Abstract:

J. Casassus 2004

http://faculty.haas.berkeley.edu/casassus/research/cas04thesis.pdf
http://www.quant-press.com

A Two-Factor Model for Commodity Prices and Futures Valuation

Abstract:

D.R.Ribeiro, S.D.Hodges 2004

http://www2.warwick.ac.uk/fac/soc/wbs/research/wfri/wpaperseries/pp_04.132.pdf
http://www.quant-press.com

A bootstrap approach to the price uncertainty of weather derivatives

Abstract:

O. Roustant, J.-P. Laurent, X. Bay, L. Carraro 2003

http://laurent.jeanpaul.free.fr/bootstrap_approach_price_uncertainty_weather_derivatives.pdf
http://www.quant-press.com

Spot Convenience Yield Models for Energy Assets

Abstract:

M.Ludkovski, R.Carmona 2003

http://www.pstat.ucsb.edu/faculty/ludkovski/utahproc.pdf
http://www.quant-press.com

COMMODITY PRICE MODELING THAT MATCHES CURRENT OBSERVABLES: A NEW APPROACH

Abstract:
We develop a stochastic model of the spot commodity price and the spot convenience yield such that the model matches the current term structure of forward and futures prices, the current term structure of forward and futures volatilities, and the inter-temporal pattern of the volatility of the forward and futures prices. We let the underlying commodity price be a geometric Brownian motion and we let the spot convenience yield have a mean-reverting structure. The flexibility of the model, which makes it possible to simultaneously obtain all these goals, comes from allowing the volatility of the spot commodity price, the speed of mean-reversion parameter, the mean-reversion parameter, and the diffusion parameter of the spot convenience yield all to be time-varying deterministic functions.

K.R.Miltersen 2002

http://www.nhh.no/Admin/Public/DWSDownload.aspx?File=/Files/Filer/institutter/for/papers/miltersen/2602.pdf
http://www.quant-press.com

Pricing Electricity Forwards Under Stochastic Volatility

Abstract:

B.P.Kellerhals 2001

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=274788
http://www.quant-press.com

Valuing Energy Options in a One Factor Model Fitted to Forward Prices

Abstract:
In this paper we develop a single-factor modeling framework which is consistent with market observable forward prices and volatilities. The model is a special case of the multi-factor model developed in Clewlow and Strickland [1999b] and leads to analytical pricing formula for standard options, caps, floors, collars and swaptions. We also show how American style and exotic energy derivatives can be priced using trinomial trees, which are constructed to be consistent with the forward curve and volatility structure. We demonstrate the application of the trinomial tree to the pricing of a European and American Asian option. The analysis in this paper extends the results in Schwartz [1997] and Amin, et al. [1995].

L.Clewlow, C.Strickland 1999

http://www.business.uts.edu.au/qfrc/research/research_papers/rp10.pdf
http://www.quant-press.com

Introduction to Weather Derivative Pricing

Abstract:

S.Jewson 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=557831
http://www.quant-press.com

Weather Derivatives: A New Class of Financial Instruments

Abstract:

M.Cao, A.Li, J.Z.Wei 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1016123
http://www.quant-press.com

The Black-Scholes Equation for Weather Derivatives

Abstract:

S.Jewson, M.Zervos 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=436282
http://www.quant-press.com

A bootstrap approach to the price uncertainty of weather derivatives

Abstract:

O. Roustant, J.-P. Laurent, X. Bay, L. Carraro 2003

http://laurent.jeanpaul.free.fr/bootstrap_approach_price_uncertainty_weather_derivatives.pdf
http://www.quant-press.com

A Fourier transform method for spread option pricing

Abstract:
Spread options are a fundamental class of derivative contract written on multiple assets,and are widely used in a range of financial markets. There is a long history of approximationmethods for computing such products, but as yet there is no preferred approach thatis accurate, efficient and flexible enough to apply in general models. The present paperintroduces a new formula for general spread option pricing based on Fourier analysis of thespread option payoff function. Our detailed investigation proves the effectiveness of a fastFourier transform implementation of this formula for the computation of prices. It is foundto be easy to implement, stable, efficient and applicable in a wide variety of asset pricingmodels.

T.R.Hurd, Z.Zhou 2009

http://arxiv.org/PS_cache/arxiv/pdf/0902/0902.3643v1.pdf
http://www.quant-press.com

Analytic Approximations for Spread Options

Abstract:
Even in the simple case that two price processes follow correlated geometric Brownian motions with constant volatility no analytic formula for the price of a standard European spread option has been derived, except when the strike is zero in which case the option becomes an exchange option. This paper expresses the price of a spread option as the price of a compound exchange option and hence derives a new analytic approximation for its price and hedge ratios. This approximation has several advantages over existing analytic approximations, which have limited validity and an indeterminacy that renders them of little practical use. Simulations quantify the accuracy of our approach and demonstrate the indeterminacy and inaccuracy of other analytic approximations. The American spread option price is identical to the European option price when the two price processes have identical drifts, and otherwise we derive an expression for the early exercise premium. A practical illustration of the model calibration uses market data on American crack spread options.

C.Alexander, A.Venkatramanan 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1012521
http://www.quant-press.com

PRICING AND HEDGING SPREAD OPTIONS IN A LOG-NORMAL MODEL

Abstract:
This paper deals with the pricing of spread options on the difference between correlatedlog-normal underlying assets. We introduce a new pricing paradigm based on a set of precise lowerbounds. We also derive closed form formulae for the Greeks and other sensitivities of the prices. Indoing so we prove that the price of a spread option is a decreasing function of the correlation parameter,and we analyze the notion of implied correlation. We use numerical experiments to provide an extensiveanalysis of the performance of these new pricing and hedging algorithms, and we compare the resultswith those of the existing methods.

R.Carmona, V.Durrleman 2000

http://orfe.princeton.edu/~rcarmona/download/fe/spread.pdf
http://www.quant-press.com

When are Swing options bang-bang and how to use it?

Abstract:
In this paper we investigate a class of swing options with firm constraints in view of the modeling of supply agreements. We show, for a fully general payoff process, that the premium, solution to a stochastic control problem, is concave and piecewise affine as a function of the global constraints of the contract. The existence of bang-bang optimal controls is established for a set of constraints which generates by affinity the whole premium function. When the payoff process is driven by an underlying Markov process, we propose a quantization based recursive backward procedure to price these contracts. A priori error bounds are established, uniformly with respect to the global constraints.

O. Bardou, S. Bouthemy, G. Pages 2007

http://arxiv.org/PS_cache/arxiv/pdf/0705/0705.0466v1.pdf
http://www.quant-press.com

CDS with Counterparty Risk in a Markov Chain Copula Model with Joint Defaults

Abstract:
In this paper we study the counterparty risk on a payer CDS in a Markov chain model of two reference credits, the firm underlying the CDS and the protection seller in the CDS. We first state few preliminary results about pricing and CVA of a CDS with counterparty risk in a general set-up. We then introduce a Markov chain copula model in which wrong way risk is represented by the possibility of joint defaults between the counterpart and the firm underlying the CDS. In the set-up thus specified we have semi-explicit formulas for most quantities of interest with regard to CDS counterparty risk like price, CVA, EPE or hedging strategies. Model calibration is made simple by the copula property of the

model. Numerical results show adequation of the behavior of EPE and CVA in the model with stylized features.

S.Crepey, M.Jeanblanc, B.Zargari 2009

http://www.maths.univ-evry.fr/pages_perso/jeanblanc/pubs/cjz_counter.pdf
http://www.quant-press.com

Bilateral Counterparty Risk Valuation with Stochastic Dynamical Models and Application to Credit Default Swaps

Abstract:
We introduce the general arbitrage-free valuation framework for counterparty risk adjustments in presence of bilateral default risk, including default of the investor. We illustrate the symmetry in the valuation and show that the adjustment involves a long position in a put option plus a short position in a call option, both with zero strike and written on the residual net value of the contract at the relevant default times. We allow for correlation between the default times of the investor, counterparty and underlying portfolio risk factors. We use arbitrage-free stochastic dynamical models. We then specialize our analysis to Credit Default Swaps (CDS) as underlying portfolio, generalizing the work of Brigo and Chourdakis (2008) [5] who deal with unilateral and asymmetric counterparty risk. We introduce stochastic intensity models and a trivariate copula function on the default times exponential variables to model default dependence. Similarly to [5], we ¯nd that both default correlation and credit spread volatilities have a relevant and structured impact on the adjustment. Di®erently from [5], the two parties will now agree on the credit valuation adjustment. We study a case involving British Airways, Lehman Brothers and Royal Dutch Shell, illustrating the bilateral adjustments in concrete crisis situations.

D.Brigo, A.Capponi 2009

http://www.damianobrigo.it/#counterpartybilateral
http://www.quant-press.com

Counterparty Risk for Credit Default Swaps: Impact of spread volatility and default correlation

Abstract:

D.Brigo, K.Chourdakis 2008

http://www.damianobrigo.it/CDS_Counterparty_fitchsolutions.pdf
http://www.quant-press.com

Pricing Constant Maturity Credit Default Swaps Under Jump Dynamics

Abstract:

H.Jonsson, W.Schoutens 2008

http://perswww.kuleuven.be/~u0009713/cmcds.pdf
http://www.quant-press.com

Arbitrage-free pricing of Credit Index Options. The no-armageddon pricing measure and the role of correlation after the subprime crisis

Abstract:

D. Brigo, M. Morini 2007

http://www.damianobrigo.it/creditindexoptions.pdf
http://www.quant-press.com

Credit Derivatives Pricing with a Smile-Extended Jump Stochastic Intensity Model

Abstract:

D. Brigo, N. El-Bachir 2006

http://www.damianobrigo.it/brigoelbachirjcirpp.pdf
http://www.quant-press.com

CDS Market Formulas and Models

Abstract:

D. Brigo, M. Morini 2005

http://www2.warwick.ac.uk/fac/soc/wbs/research/wfri/rsrchcentres/forc/conferences/18thconf/morini205.pdf
http://www.quant-press.com

Credit Default Swap Calibration and Equity Swap Valuation under Counterparty Risk with a Tractable Structural Model

Abstract:

D. Brigo, M. Tarenghi 2005

http://www.greta.it/credit/credit2005/Thursday/08_Brigo_Tarenghi.pdf
http://www.quant-press.com

Candidate Market Models and the Calibrated CIR++ Stochastic Intensity Model for Credit Default Swap Options and Callable Floaters

Abstract:

D. Brigo 2005

http://www.damianobrigo.it/cdsmm.pdf
http://www.quant-press.com

A Comparison between the stochastic intensity SSRD Model and the Market Model for CDS Options Pricing

Abstract:

D. Brigo, L. Cousot 2004

http://www.damianobrigo.it/ssrdvsmm.pdf
http://www.quant-press.com

Credit Default Swaps Calibration and Option Pricing with the SSRD Stochastic Intensity and Interest-Rate Model

Abstract:

D. Brigo, A. Alfonsi 2004

http://www.damianobrigo.it/cirppcredit.pdf
http://www.quant-press.com

The Valuation of Credit Default Swap Options

Abstract:

J.Hull, A.White 2003

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/HullWhiteCDSoptionspaper.pdf
http://www.quant-press.com

VALUATION OF CREDIT DEFAULT SWAPS AND SWAPTIONS

Abstract:
This paper presents a conceptual framework for valuation of single-name credit derivatives, and recuperates, in some cases generalizing, a few of known results in credit risk theory. Valuation is viewed with respect to a given state price and relative to a general numeraire. Survival probabilities and default recoveries are considered as processes adapted to a subfiltration, following Jeanblanc and Rutosksy [JR], or, in the special case of Cox processes, Lando [L]. A result of Duffie and Singleton [DS] on pricing bonds with recovery in terms of loss ratio is reproduced. The notion of coadapted change of numeraire is introduced, and its invariants identified and studied. The concept of a credit claim is formalized by introducing notions of T-claims, _ -claims, and T -streams. Application is made to credit default swaps and swaption, and a known Black-Scholes approximation for the latter is derived.

F.Jamshidian 2002

http://www.maths.univ-evry.fr/mathfi/Jamshidian.pdf
http://www.quant-press.com

Valuing Credit Defaut Swaps I: No Counterparty Default Risk

Abstract:

J.Hull, A.White 2000

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/CredDefSw1.pdf
http://www.quant-press.com

Valuing Credit Defaut Swaps II: Modelling Default Correlations

Abstract:

J.Hull, A.White 2000

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/CredDefSw2.pdf
http://www.quant-press.com

Bilateral counterparty risk valuation for interest-rate products: impact of volatilities and correlations

Abstract:
The purpose of this paper is introducing rigorous methods and formulas for bilateral counterparty risk credit valuation adjustments (CVA's) on interest-rate portfolios. In doing so, we summarize the general arbitrage-free valuation framework for counterparty risk adjustments in presence of bilateral default risk, as developed more in detail in Brigo and Capponi (2008), including the default of the investor. We illustrate the symmetry in the valuation and show that the adjustment involves a long position in a put option plus a short position in a call option, both with zero strike and written on the residual net present value of the contract at the relevant default times. We allow for correlation between the default times of the investor and counterparty, and for correlation of each with the underlying risk factor, namely interest rates. We also analyze the often neglected impact of credit spread volatility. We include Netting in our examples, although other agreements such as Margining and Collateral are left for future work.

D.Brigo, A.Pallavicini, V.Papatheodorou 2009

http://arxiv.org/pdf/0911.3331v1
http://www.quant-press.com

The Risk of Tranches Created from Residential Mortgages

Abstract:
This paper examines the risk in the tranches of ABSs and ABS CDOs that were created from residential mortgages between 2000 and 2007. Using the criteria of the rating agencies, it tests how wide the AAA tranches can be under different assumptions about the correlation model and recovery rates. It concludes that the AAA ratings assigned to the senior tranches of ABSs were not unreasonable. However, the AAA ratings assigned to tranches of Mezz ABS CDOs cannot be justified. The risk of a Mezz ABS CDO tranche depends critically on the correlation between mortgage pools as well as on the correlation model and the thickness of the underlying BBB tranches. The BBB tranches of ABSs cannot be considered equivalent to BBB bonds for the purposes of subsequent securitizations.

J.Hull, A.White 2009

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/AAArisk.pdf
http://www.quant-press.com

Burnout from pools to loans: Modeling refinancing prepayments as a self-selection process

Abstract:
In this paper we present compelling evidence from a detailed analysis of historical prepayment data to demonstrate that a mortgage cohort remem- bers the level of the previous mortgage rate troughs experienced by the co- hort. This is a general property, observed ubiquitously, that inescapably leads to refinancing models with a continuous distribution of refinancing incentive thresholds (elbows). We present such a new refinancing model, derived from the rst principle, based on a single assumption that each loan has an in- centive threshold above which its borrower will refinance. In this model, the refinancing prepayment of a cohort is a dynamic self-selection process that evolves by itself according to the encountered mortgage rate environment with the cohort concurrently acquiring its memory along the way.

Junwu Gan 2009

articles/SelfSelectRefi_w_figs_20090531.pdf
http://www.quant-press.com

Up And Down Credit Risk

Abstract:

T.Bielicki, S.Crepey, M.Jeanblanc 2008

http://www.maths.univ-evry.fr/pages_perso/crepey/papers/up_and_down_credit_risk.pdf
http://www.quant-press.com

Mortality Fluctuations Modelling with a Shared Frailty Approach

Abstract:

J.P.Laurent, S.Fulla 2008

http://laurent.jeanpaul.free.fr/Mortality_Fluctuations_Frailty_Fulla_Laurent.pdf
http://www.quant-press.com

The Credit Crunch of 2007: What Went Wrong? Why? What Lessons Can Be Learned?

Abstract:

J.C.Hull 2008

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/CreditCrunch.pdf
http://www.quant-press.com

Credit Risk Models

Abstract:

J.P.Laurent 2008

http://laurent.jeanpaul.free.fr/Credit%20risk%20models_updated.pdf
http://www.quant-press.com

Credit Risk Models

Abstract:

M.Jeanblanc, T.R.Bielecki, M.Rutkowski 2007

http://www.maths.univ-evry.fr/pages_perso/jeanblanc/cours/BJR-Lectures-Dec6.pdf
http://www.quant-press.com

Reduced form modelling for credit risk

Abstract:

M.Jeanblanc, Y.Le Cam 2007

http://www.maths.univ-evry.fr/pages_perso/jeanblanc/pubs/jl_reduc.pdf
http://www.quant-press.com

Credit Risk

Abstract:

M.Jeanblanc 2006

http://www.maths.univ-evry.fr/pages_perso/jeanblanc/conferences/lisbon.pdf
http://www.quant-press.com

Merton's Model, Credit Risk, and Volatility Skews

Abstract:

J.Hull, A.White, I.Nelken 2004

http://www.rotman.utoronto.ca/%7Ehull/DownloadablePublications/MertonsModelandVolatilitySkews.pdf
http://www.quant-press.com

A Comparative Analysis of Current Credit Risk Models

Abstract:

M.Crouhy, D.Galai, R.Mark 2000

http://www.gloriamundi.org/detailpopup.asp?ID=453056455
http://www.quant-press.com

Pricing Credit Risk Derivatives

Abstract:

P. J. Schšnbucher 1998

http://www.schonbucher.de/papers/crdfo.pdf
http://www.quant-press.com

Dynamic Factor Copula Model

Abstract:
an factor copula model is the market standard model for multi-name credit derivatives. Its main drawback is that factor copula models exhibit correlation smiles when calibrating against market tranche quotes. We introduce a multi-period factor copula model to overcome the calibration deficiency of factor copula models by allowing the factor loadings to be time-dependent. Usually, multi-period factor copula models require multi-dimensional integration, typically computed by Monte Carlo simulation, which makes calibration extremely time consuming. In our model, the portfolio loss of a completely homogeneous pool possesses the Markov property, thus we can compute the portfolio loss distribution analytically without multi-dimensional integration. Numerical results demonstrate the efficiency and flexibility of our model to match market quotes.

K.Jackson, A.Kreinin, W.Zhang 2009

http://www.defaultrisk.com/pp_corr134.htm
http://www.quant-press.com

A Simple Dynamic Model for Pricing and Hedging Heterogenous CDOs

Abstract:
We present a simple bottom-up dynamic credit model that can be calibrated simultaneously to the market quotes on CDO tranches and individual CDSs constituting the credit portfolio. The model is most suitable for the purpose of evaluating the hedge ratios of CDO tranches with respect to the underlying credit names. Default intensities of individual assets are modeled as deterministic functions

of time and the total number of defaults accumulated in the portfolio. To overcome numerical difficulties, we suggest a semi-analytic approximation that is justified by the large number of portfolio members. We calibrate the model to the recent market quotes on CDO tranches and individual CDSs and find the hedge ratios of tranches. Results are compared with those obtained within the static Gaussian Copula model.

A.V. Lopatin 2009

http://andrei.lopatin.googlepages.com/MultiName_Dynamic_Credit_Model.pdf
http://www.quant-press.com

Geometrical Loss Model

Abstract:

Charaf Ech-Chatbi 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1337553
http://www.quant-press.com

Climbing Down from the Top: Single name dynamics in credit top down models

Abstract:

I.Halperin, P.Tomecek 2008

http://www.maths.univ-evry.fr/pages_perso/crepey/papers/up_and_down_credit_risk.pdf
http://www.quant-press.com

A simple dynamic model for pricing and hedging heterogenous CDOs

Abstract:

A. V. Lopatin 2008

http://andrei.lopatin.googlepages.com/MultiName_Dynamic_Credit_Model.pdf
http://www.quant-press.com

Forward Equations for Portfolio Credit Derivatives

Abstract:

R. Cont, I. A. Savescu 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1124954
http://www.quant-press.com

Arbitrage-free Loss Surface Closest to Base Correlations

Abstract:

A.GreenBerg 2008

http://www.geocities.com/moomichek/papers/BaseCorrLossDist-Pub0.pdf
http://www.quant-press.com

Hedging default risks of CDOs in Markovian contagion models

Abstract:

J.-P. Laurent, A. Cousin, J.-D. Fermanian 2008

http://laurent.jeanpaul.free.fr/Hedging_CDOs_in_copula_and_contagion_models_9_April_2008.pdf
http://www.quant-press.com

The Discrete Gamma Pool model

Abstract:

P. Jäckel 2008

http://www.btinternet.com/%7Epjaeckel/DiscreteGammaPoolModel.pdf
http://www.quant-press.com

The Implementation of the Discrete Gamma Pool model

Abstract:

P. Jäckel 2008

http://www.btinternet.com/%7Epjaeckel/ImplementationOfTheDiscreteGammaPoolModel.pdf
http://www.quant-press.com

Dynamic Models of Portfolio Credit Risk: A Simplified Approach

Abstract:

J.Hull, A.White 2008

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/Dynamic_Model.pdf
http://www.quant-press.com

Calibration of CDO Tranches with the Dynamical Generalized-Poisson Loss Model

Abstract:

D. Brigo, A. Pallavicini, R. Torresetti 2007

http://www.damianobrigo.it/gpl.pdf
http://www.quant-press.com

Forwards and European Option On CDO Tranches

Abstract:

J.Hull, A.White 2007

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/CDOOptions.pdf

http://www.quant-press.com

BSLP: Markovian Bivariate Spread-Loss Model for Portfolio Credit Derivatives

Abstract:

M. Arnsdorf, I. Halperin 2007

http://www.igorhalperin.com/CreditPortfolios/BSLP_pub.pdf
http://www.quant-press.com

Two-Dimensional Markovian Model for Dynamics of Aggregate Credit Loss

Abstract:

A.V.Lopatin, T.Misirpashaev 2007

http://andrei.lopatin.googlepages.com/local_stoch_loss.pdf
http://www.quant-press.com

An Implied Loss Model

Abstract:

M.Van Der Voort 2007

http://www.martijnvandervoort.com/papers/impliedLossModel.pdf
http://www.quant-press.com

Dynamic Conditioning and Credt Correlation Baskets

Abstract:

C.Albanese, A.Vidler 2007

http://www.level3finance.com/CDO3.pdf
http://www.quant-press.com

Background Filtrations and Canonical Loss Processes for Top-Down Models of Portfolio Credit Risk

Abstract:

P.Elhers, P.J.Schonbucher 2006

http://www.math.ethz.ch/~schonbuc/papers/ES_H_canonical.pdf
http://www.quant-press.com

On the term structure of loss distributions - a forward model approach

Abstract:

J. Sidenius 2006

http://jakobsidenius.com/papers/forwardcopula.pdf
http://www.quant-press.com

A New Framework for Dynamic Credit Portfolio Loss Modelling

Abstract:

J. Sidenius, V. Piterbarg, L. Andersen 2006

http://jakobsidenius.com/papers/spa_vp_1.pdf
http://www.quant-press.com

Portfolio Losses and the Term Structure of Loss Transition Rates: A New Methodology for the Pricing of Portfolio Credit Derivatives

Abstract:

P. Schönbucher 2006

http://www.schonbucher.de/papers/cdo_loss_transition_rates.pdf
http://www.quant-press.com

Portfolio Losses in Factor Models : Term Structures and Intertemporal Loss Dependence

Abstract:

L. Andersen 2006

http://www.moodys.com/cust/content/Content.ashx?source=staticcontent/Free%20Pages/CreditRiskConference/Conf07/conf07files/fact_new.pdf
http://www.quant-press.com

The Forward Loss Model: A Dynamic Term Structure Approach For The Pricing of Portfolio Credit Derivatives

Abstract:

N.Bennani 2005

http://sc.iam.metu.edu.tr/amamef/papers/Bennani_Norddine.pdf
http://www.quant-press.com

Pricing CDOs with State Dependent Stochastic Recovery Rates

Abstract:
Up to the 2007 crisis, research within bottom-up CDO models mainly concentrated on the dependence between defaults. However, due to the substantial increase in the market price of systemic credit risk protection, more attention has been paid to recovery rate assumptions. In this paper, we focus first on deterministic recovery rates in a factor copula framework. We use stochastic orders theory to assess the impact of a recovery markdown on CDOs and show that it leads to an increase of the expected loss on senior tranches, even though the expected loss on the portfolio is kept fixed. This result applies to a wide range of latent factor models. We then suggest introducing stochastic recovery rates in such a way that the conditional on the factor expected loss (or equivalently the large portfolio approximation) is the same as in the recovery markdown case. However, granular portfolios behave differently. We show that a markdown is associated with riskier portfolios that when using the stochastic recovery rate framework. As a consequence, the expected loss on a senior tranche is larger in the former case,

whatever the attachment point. We also deal with implementation and numerical issues related to the pricing of CDOs within the stochastic recovery rate framework. Due to differences across names regarding the conditional (on the factor) losses given default, the standard recursion approach becomes problematic. We suggest approximating the conditional on the factor loss distributions, through expansions around some base distribution. Finally, we show that the independence and comonotonic cases provide some easy to compute bounds on expected losses of senior or equity tranches.

S.Amroui, L.Cousot, S.Hitier, J.P.Laurent 2009

http://laurent.jeanpaul.free.fr/Stochastic%20recovery%20rates_9_September_2009.pdf
http://www.quant-press.com

A Spot Recovery Rate Extension of the Gaussian Copula

Abstract:
The market evolution since the end of 2007 has been characterized by an increase of the systemic risk and a high number of defaults. Realized recovery rates have been very dispersed and different from standard assumptions, while 60%-100% super-senior tranches on standard indices have started to trade with significant spread levels. This has triggered a growing interest for stochastic recovery modelling. This paper presents an extension to the standard Gaussian copula framework that introduces a consistent modelling of stochastic recovery. We choose to model directly the spot recovery, which allows to preserve time consistency, and compare this approach to the standard ones, defined in terms of recovery to maturity. Taking a specific form of the spot recovery function, we show that the model is flexible and tractable, and easy to calibrate to both individual credit spread curves and index tranche markets. Through practical numerical examples, we analyze specific model properties, focusing on default risk.

N.Bennani, J.Maetz 2009

http://www.defaultrisk.com/pp_cdo_82.htm
http://www.quant-press.com

Credit models and the crisis, or: How I learned to stop worrying and love the CDOs

Abstract:
We follow a long path for Credit Derivatives and Collateralized Debt Obligations (CDOs) in particular, from the introduction of the Gaussian copula model and the related implied correlations to the introduction of arbitrage-free dynamic loss models capable of calibrating all the tranches for all the maturities at the same time. En passant, we also illustrate the implied copula, a method that can consistently account for CDOs with different attachment and detachment points but not for different maturities. The discussion is abundantly supported by market examples through history. The dangers and critics we present to the use of the Gaussian copula and of implied correlation had all been published by us, among others, in 2006, showing that the quantitative community was aware of the model limitations before the crisis. We also explain why the Gaussian copula model is still used in its base correlation formulation, although under some possible extensions such as random recovery. Overall we conclude that the modeling effort in this area of the derivatives market is unfinished, partly for the lack of an operationally attractive single-name consistent dynamic loss model, and partly because of the diminished investment in this research area.

D.Brigo, A.Pallavicini, R.Torreseti 2009

http://arxiv.org/PS_cache/arxiv/pdf/0912/0912.5427v2.pdf
http://www.quant-press.com

A simple dynamic model for pricing and hedging heterogenous CDOs

Abstract:

A. V. Lopatin 2008

http://andrei.lopatin.googlepages.com/MultiName_Dynamic_Credit_Model.pdf
http://www.quant-press.com

CDS and CDO Pricing with Stochastic Recovery

Abstract:

Charaf Ech-Chatbi 2008

http://sharaf.ifrance.com/CDO/RecovSto.pdf
http://www.quant-press.com

Pricing distressed CDOs with Base Correlation and Stochastic Recovery

Abstract:

M.Krekel 2008

http://mitglied.lycos.de/martinkrekel/papers/CDOStochasticRecovery.pdf
http://www.quant-press.com

Optimal Stochastic Recovery for Base Correlation

Abstract:

S.Amraoui, S.Hitier 2008

http://www.geocities.com/salahamraoui/OSRBCorrelation.pdf
http://www.quant-press.com

Credit Portfolio Modelling with Elliptically Contoured Distributions

Abstract:

C. Prestele 2007

http://www.google.fr/url?sa=t&source=web&ct=res&cd=7&url=http%3A%2F%2Fvts.uni-ulm.de%2Fdocs%2F2007%2F6093%2Fvts_6093_8209.pdf&ei=Tg6OSZbWJpWV_gb7_KG1DA&usg=AFQjCNFb5lTNnQLgxU9OzGS812Zu2aJ3Tg&sig2=f24comXxa_Kkdubdm292ow
http://www.quant-press.com

Credit Risk Models IV: Understanding and pricing CDOs

Abstract:

A.Elizalde 2006

ftp://ftp.cemfi.es/wp/06/0608.pdf
http://www.quant-press.com

Credit Risk: Modeling and Application

Abstract:

Z.Wei 2006

http://www.stanford.edu/~zhenwei/papers/CR.pdf
http://www.quant-press.com

Valuing Credit Derivatives Using an Implied Copula Approach

Abstract:

J. Hull, A. White 2006

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/ImpliedCopulaPaper.pdf
http://www.quant-press.com

Valuation of a CDO and an nth to Default CDS Without Monte Carlo Simulation

Abstract:

J.Hull, A.White 2003

http://www.rotman.utoronto.ca/%7Ehull/DownloadablePublications/HullWhiteCDOPaper.pdf
http://www.quant-press.com

Basket Default Swaps, CDOs and Factor Copulas

Abstract:

J.-P. Laurent, J. Gregory 2003

http://laurent.jeanpaul.free.fr/basket_cdo_factor_copula_2003.pdf
http://www.quant-press.com

A Comparative Analysis of Basket Default Swaps Pricing Using the Stein Method

Abstract:

E.Benhamou, D.Bastide, M.Ciuca 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1064381&rec=1&srcabs=1099585
http://www.quant-press.com

Higher Order Large Deviation Approximations Applied to Cdo Pricing

Abstract:

L.Veilex 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1116884
http://www.quant-press.com

Saddlepoint approximation method for pricing CDOs

Abstract:

J.Yang 2006

http://www.math.mcmaster.ca/tom/SaddlepointCDOfinal.pdf
http://www.quant-press.com

A Fast Algorithm for Computing Expected Loan Portfolio Tranche Loss in the Gaussian Factor Model

Abstract:

P.Okunev 2005

http://arxiv.org/PS_cache/math/pdf/0506/0506125v2.pdf
http://www.quant-press.com

Using Hermite Expansions for Fast and Arbitrarily Accurate Computation of the Expected Loss of a Loan Portfolio Tranche in the Gaussian Factor Model

Abstract:

P.Okunev 2005

http://www.creditquant.biz/HermitePaper.pdf
http://www.quant-press.com

Tail Approximations for Portfolio Credit Risk

Abstract:

P.Glasserman 2004

http://www2.gsb.columbia.edu/faculty/pglasserman/Other/tail_approx.pdf
http://www.quant-press.com

An Improved Implied Copula Model and its Application to the Valuation of Bespoke CDO Tranches

Abstract:

J.Hull, A.White 2008

http://www.rotman.utoronto.ca/%7Ehull/DownloadablePublications/BespokePaper.pdf
http://www.quant-press.com

A Comparative analysis of CDO pricing models

Abstract:

X. Burtschell, J. Gregory, J.-P. Laurent 2008

http://laurent.jeanpaul.free.fr/comparative%20analysis%20CDO%20pricing%20models.pdf
http://www.quant-press.com

The Normal Inverse Gaussian Distribution for Synthetic CDO Pricing

Abstract:

A.Kalemanova, B.Schmid, R.Werner 2007

http://www.risklab.de/Dokumente/Aufsaetze/JoD_Kalemanova_et_all%5B07%5D-TheNormalInverseGaussianDistributionForSyntheticCDOPricing.pdf
http://www.quant-press.com

Levy Base Correlation

Abstract:

J.Garcia, S.Goossens, V.Masob, W.Schoutens 2007

http://perswww.kuleuven.be/~u0009713/LevyBC.pdf
http://www.quant-press.com

Pricing CDOs with Correlated Variance Gamma Distributions

Abstract:

T.Mossbrucker 2006

http://www.cfr-cologne.de/download/kolloquium/2006/Moosbrucker%20-%20041102.pdf
http://www.quant-press.com

Intensity Gamma: A New Approach to Pricing Portfolio Credit Derivatives

Abstract:

M.Joshi, A.M.Stacey 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=907384
http://www.quant-press.com

CDO Pricing with Factor Models: Survey and Comments

Abstract:

L.Andersen, J.Sidenius 2005

http://jakobsidenius.com/papers/factormodels2.pdf
http://www.quant-press.com

Synthetic CDO pricing using the double normal inverse Gaussian copula with stochastic factor loadings

Abstract:

A.Luescher 2005

http://www.msfinance.ch/pdfs/AnnelisLuescher.pdf
http://www.quant-press.com

Extensions to the Gaussian Copula: Random Recovery and Random Factor Loadings

Abstract:

L.Andersen, J.Sidenius 2004

http://jakobsidenius.com/papers/GaussExtensions6.pdf
http://www.quant-press.com

Advanced Monte Carlo methods for barrier and related exotic options

Abstract:
In this work, we present advanced Monte Carlo techniques applied to the pricing of barrier options and other related exotic contracts. It covers in particular the Brown- ian bridge approaches, the barrier shifting techniques (BAST) and their extensions as well. We leverage the link between discrete and continuous monitoring to de- sign efficient schemes, which can be applied to the Black-Scholes model but also to stochastic volatility or Merton's jump models. This is supported by theoretical results and numerical experiments.

E. Gobet 2008

http://hal.archives-ouvertes.fr/docs/00/31/99/47/PDF/GobetBarrierHandbook.pdf
http://www.quant-press.com

Valuing double barrier options with time-dependent parameters by Fourier series expansion

Abstract:
Based upon the Fourier series expansion, we propose a simple and easy-to-use approach for computing accurate estimates of Black-Scholes double barrier option prices with time-dependent parameters. This new approach is also able to provide tight upper and lower bounds of the exact barrier option prices. Furthermore, this approach can be straightforwardly extended to the valuation of standard European options with specified moving boundaries as well

C.F. Lo, C. H. Hui 2007

http://www.iaeng.org/IJAM/issues_v36/issue_1/IJAM_36_1_1.pdf
http://www.quant-press.com

Pricing double barrier Parisian Options using Laplace transforms

Abstract:
In this work, we study a double barrier version of the standard Parisian options. We give closed formulae for the Laplace transforms of their prices with respect to the maturity time. We explain how to invert them numerically and prove a result on the accuracy of the numerical inversion.

C. Labart, J. Lelong 2006

http://cermics.enpc.fr/reports/CERMICS-2006/CERMICS-2006-328.pdf
http://www.quant-press.com

Barrier option pricing for assets with Markov-modulated dividends

Abstract:
We present a simple methodology to price single and double barrier options when the dividend process of the underlying is a Markov-modulated log-Brownian motion, and the stock is priced in equilibrium by a CRRA representative agent. In particular, we show how to derive the Laplace transform (in time) of the barrier price, by solving a system of ODEs. The method proposed is extremely simple to implement but also extremely e®ective. Pricing of double barrier option in the classical Black and

Scholes framework arises as a special case of the model presented in the paper

G. Di Graziano, L.C.G. Rogers 2005

http://www.statslab.cam.ac.uk/~chris/papers/mmb2.pdf
http://www.quant-press.com

Close Form Pricing of Plain and Partial Outside Double Barrier

Abstract:
Outside Double Barrier Options are two-asset options where the payoff is defined on one asset and the barrier is defined on another asset. This paper gives the formulas for Outside Double Barrier Options where the barrier is either plain or partially monitored at the front, rear and middle. Since the corresponding Outside Single Barrier Options prices can be written down by taking the corresponding upper (lower) barrier to infinity (zero), the formulas in this paper can be also used as a reference for Outside Single Barrier Options

P. Banerjee 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=379121
http://www.quant-press.com

Hedging Complex Barrier Options

Abstract:
We show how several complex barrier options can be hedged using a portfolio of standard European options. These hedging strategies only involve trading at a few times during the option's life. Since rolling, ratchet, and lookback options can be decomposed into a portfolio of barrier options, our hedging results also apply

P. Carr, A. Chou 2002

http://www.math.nyu.edu/research/carrp/papers/pdf/multipl3.pdf
http://www.quant-press.com

Analytic Method for Pricing Double Barrier Options in the Presence of Stochastic Volatility

Abstract:
While there exist closed-form solutions for vanilla options in the presence of stochastic volatility for nearly a decade [Heston, 1993], practitioners still depend on numerical methods ? in particular the Finite Difference and Monte Carlo methods ? in the case of double barrier options. It was only recently that Lipton [2001] proposed (semi-)analytical solutions for this special class of path-dependent options. Although he presents two different approaches to derive these solutions, he restricts himself in both cases to a less general model, namely one where the correlation and the interest rate differential are assumed to be zero. Naturally the question arises, if these methods are still applicable for the general stochastic volatility model without these restrictions. In this paper we show that such a generalization fails for both methods. We will explain why this is the case and discuss the consequences of our results

O. Faulhaber 2002

http://www.oliverfaulhaber.de/diplomathesis/HestonBarrierAnalytic.pdf
http://www.quant-press.com

Static Replication of Barrier Options: Some General Results

Abstract:
This paper presents a number of new theoretical results for replication of barrier options through a static portfolio of European put and call options. Our results are valid for options with completely general knock-out/knock-in sets, and allow for time- and state-dependent volatility as well as discontinuous asset dynamics. We illustrate the theory with numerical examples and discuss the

practical implementation.

L.Andersen, J.Andreasen, D.A.Eliezer 2000

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=220010
http://www.quant-press.com

Closed Form Valuation of American Barrier Options

Abstract:
Closed form formulae for European barrier options are well known from the literature. This is not the case for American barrier options, for which no closed form formulae have been published. One has therefore had to resort to numerical methods. Using lattice models like a binomial or a trinomial tree for valuation of barrier options is known to converge extremely slowly, compared to plain vanilla options. Methods for improving the algorithms have been described by several authors. However, these are still numerical methods that are quite computer intensive. In this paper we show how American barrier options can be valued analytically in a very simple way. This speeds up the valuation dramatically as well as give new insight into barrier option valuation

E.G.Haug 1999

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=151315
http://www.quant-press.com

Robust Hedging of Barrier Options

Abstract:

H. Brown, D. Hobson, L.C.G. Rogers 1998

http://www.statslab.cam.ac.uk/~chris/papers/barriers.pdf
http://www.quant-press.com

A Continuity Correction For Discrete Barrier Options

Abstract:
Explanation of shift barrier correction for continuous barrier

M.Broadie, P.Glasserman, S.Kou 1997

http://www.columbia.edu/~mnb2/broadie/Assets/bgk_mf.pdf
http://www.quant-press.com

One-Touch Double Barrier Binary Option Values

Abstract:
The valuation and applications of one-touch double barrier binary options that include features of knock-out, knock-in, European and American style are described. Using a conventional Black-Scholes option-pricing environment, analytical solutions of the options are derived. The relationships among different types of one-touch double barrier binary options are discussed. An investor having a particular view on values of foreign exchanges, equities or commodities can use the options as directional trades or structured products in financial market.

C. H. Hui 1996

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=984808
http://www.quant-press.com

Two Extensions to Barrier Option Valuation

Abstract:
We first present a brief but essentially complete survey of the literature on barrier option pricing. We then present two extensions of European up-and-out call option valuation. The first allows for an initial protection period during which the option cannot be knocked out. The second considers an option which is only knocked out if a second asset touches an upper barrier. Closed form solutions, detailed derivations, and the economic rationale for both types of options are provided.

P. Carr 1995

http://www.math.nyu.edu/research/carrp/papers/pdf/barrier2.pdf
http://www.quant-press.com

Enhanced Numerical Methods for Options with Barriers

Abstract:
In this paper we analyze the biases implicit in valuing options with barriers on a lattice. We then suggest a method for enhancing the numerical solution of boundary value problems on a lattice that helps to correct these biases. It seems to work well in practice.

E.Derman, I.Kani, D.Ergener, I.Bardhan 1995

http://www.ederman.com/new/docs/gs-numerical_methods.pdf
http://www.quant-press.com

Dynamics of implied volatility surfaces

Abstract:
The prices of index options at a given date are usually represented via the corresponding implied volatility surface, presenting skew/smile features and term structure which several models have attempted to reproduce. However, the implied volatility surface also changes dynamically over time in a way that is not taken into account by current modelling approaches, giving rise to ‘Vega’ risk in option portfolios. Using time series of option prices on the SP500 and FTSE indices, we study the deformation of this surface and show that it may be represented as a randomly fluctuating surface driven by a small number of orthogonal random factors. We identify and interpret the shape of each of these factors, study their dynamics and their correlation with the underlying index. Our approach is based on a Karhunen–Lo`eve decomposition of the daily variations of implied volatilities obtained from market data. A simple factor model compatible with the empirical observations is proposed. We illustrate how this approach models and improves the well known ‘sticky moneyness’ rule used by option traders for updating implied volatilities. Our approach gives a justification for use of ‘Vega’s for measuring volatility risk and provides a decomposition of volatility risk as a sum of contributions from empirically identifiable factors.

R. Cont, J. da Fonséca 2009

http://www.proba.jussieu.fr/pageperso/ramacont/papers/dynamics.pdf
http://www.quant-press.com

Pricing Forward Start Options in Models based on (time-changed) Lévy Processes

Abstract:
Options depending on the forward skew are very popular. One such option is the forward starting call option - the basic building block of a cliquet option. Widely applied models to account for the forward skew dynamics to price such options include the Heston model, the Heston-Hull-White model and the Bates model. Within these models solutions for options including forward start features are available using (semi) analytical formulas. Today exponential (subordinated) Levy models being increasingly popular for modelling the asset dynamics. While the simple exponential Levy model imply the same forward volatility surface for all future times the subordinated models do not. Depending on the subordinator the dynamic of the forward volatility surface and therefore stochastic volatility can be modelled. Analytical pricing formulas based on the charcteristic function and Fourier transform

methods are available for the class of these models. We extend the applicability of analytical pricing to options including forward start features. To this end we derive the forward characteristic functions which can be used in Fourier transform based methods. As examples we consider the Variance Gamma model and the NIG model subordinated by a Gamma Ornstein Uhlenbeck process and respectively by an Cox-Ingersoll-Ross process. We check our analytical results by applying Monte Carlo methods. These results can for instance be applied to calibration of the forward volatility surface.

P. Beyer, J. Kienitz 2009

articles/BeyKie_FwdStart09.pdf
http://www.quant-press.com

Saddlepoint Methods for Option Pricing

Abstract:
Saddle point method

P. Carr, D.P. Madan 2008

http://www.math.nyu.edu/research/carrp/papers/pdf/TCPSP.pdf
http://www.quant-press.com

Lecture 5: Static Hedging and Implied Distributions

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture5.pdf
http://www.quant-press.com

Lecture 4: Arbitrage Bounds, Problems with Valuation, Models

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture4.pdf
http://www.quant-press.com

On the qualitative effect of volatility and duration on prices of Asian options

Abstract:
We show that under the Black Scholes assumption the price of an arithmetic average Asian call option with fixed strike increases with the level of volatility . This statement is not trivial to prove and for other models in general wrong. In fact we demonstrate that in a simple binomial model no such relationship holds. Under the Black-Scholes assumption however, we give a proof based on the maximum principle for parabolic partial differential equations. Furthermore we show that an increase in the length of duration over which the average is sampled also increases the price of an arithmetic average Asian call option, if the discounting effect is taken out. To show this, we use the result on volatility and the fact that a reparametrization in time corresponds to a change in volatility in the Black-Scholes model. Both results are extremely important for the risk management and risk assessment of portfolios that include Asian options.

P.Carr, C.O.Ewald, Y.Xiao 2008

http://www.math.nyu.edu/research/carrp/papers/pdf/volatility_and_asian_options_revised.pdf
http://www.quant-press.com

Put-Call Symmetry: Extensions and Applications

Abstract:
Classic put-call symmetry relates the prices of puts and calls at strikes on opposite sides of the forward price. We extend put-call symmetry in several directions. Relaxing the assumptions, we generalize to unified local/stochastic volatility models and time-changed L´evy processes, under a symmetry condition. Further relaxing the assumptions, we generalize to various asymmetric dynamics. Extending the conclusions, we take an arbitrarily given payoff of European style or single/double/sequential-barrier style, and we construct a conjugate European-style claim of equal value, and thereby a semi-static hedge of the given payoff.

P. Carr, R. Lee 2007

http://www.math.nyu.edu/research/carrp/papers/pdf/PCSR22.pdf
http://www.quant-press.com

Markov Functional Modeling of Equity, Commodity and other Assets

Abstract:
In this short note we show how to setup a one dimensional single asset model, e.g. equity model, which calibrates to a full (two dimensional) implied volatility surface. We show that the efficient calibration procedure used in LIBOR Markov functional models may be applied here too. In a addition to the calibration to a full volatility surface the model allows the calibration of the joint asset-interest rate movement (i.e. local interest rates) and forward volatility. The latter allows the calibration of compound or Bermudan options. The Markov functional modeling approach consists of a Markovian driver process x and a mapping functional representing the asset states S(t) as a function of x(t). It was originally developed in the context of interest rate models, see [7]. Our approach however is similar to the setup of the hybrid Markov functional model in spot measure, as considered in [5]. For equity models it is common to use a deterministic Numéraire, e.g. the bank account with deterministic interest rates. In our approach we will choose the asset itself as Numéraire. This is a subtle, but crucial difference to other approaches considering Markov functional modeling. Choosing the asset itself as Numéraire will allow for a very efficient numerically calibration procedure. As a consequence interest rates have to be allowed to be stochastic, namely as a functional of x too. The Black-Scholes model with deterministic interest rates is a special case of such a Markov functional model. The most general form of this modeling approach will allow for a simultaneous calibration to a full two dimensional volatility smile, a prescribed joint movement of interest rates and a given forward volatility structure.

C. P. Fries 2006

http://www.christian-fries.de/finmath/markovfunctionaleqmodel/MarkovFunctionalEQModel.pdf
http://www.quant-press.com

Hedging Exotic Options in Stochastic Volatility and Jump Diffusion Models

Abstract:

K. Detlefsen 2005

http://edoc.hu-berlin.de/master/detlefsen-kai-2005-01-27/PDF/detlefsen.pdf
http://www.quant-press.com

Pricing discretely sampled path-dependent exotic options using replication methods

Abstract:
A semi-static replication method is introduced for pricing discretely sampled path-dependent options. It depends upon buying and selling options at the reset times of the option but does not involve trading at intervening times. The method is model independent in that it only depends upon the existence of a

pricing function for vanilla call options which depends purely on current time, time to expiry, spot and strike. For the special case of a discrete barrier, an alternative method is developed which involves trading only at the initial time and the knockout time or expiry of the option.

M.Joshi 2005

http://www.quarchome.org/exoticreplication.pdf
http://www.quant-press.com

Cliquet Options: Pricing and Greeks in Deterministic and Stochastic Volatility Models

Abstract:
This paper presents a method to determine the price of a cliquet option, as well as its sensitivity to changes in the market, the Greeks, for deterministic (also incorporating skews) and stochastic (Hestonian) volatility and, lognormal and jump-diffusion asset price - processes, with almost machine precision in a fraction of a second. In the pricing algorithms we make use of a new Laplace transform inversion technique, which guarantees fast and numerically stable pricing. The computation of the Greeks is based on a Girsanov type drift adjustment.

P.D.Iseger, E.Oldenkamp 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1013510
http://www.quant-press.com

Numerical Methods and Volatility Models for Valuing Cliquet Options

Abstract:
Several numerical issues for valuing cliquet options using PDE methods are investigated. The use of a running sum of returns formulation is compared to an average return formulation. Methods for grid construction, interpolation of jump conditions, and application of boundary conditions are compared. The effect of various volatility modelling assumptions on the value of cliquet options is also studied. Numerical results are reported for jump diffusion models, calibrated volatility surface models, and uncertain volatility models.

H.A.Windcliff, P.A.Forsyth, K.R.vetzal 2005

http://www.cs.uwaterloo.ca/~paforsyt/cliquet.pdf
http://www.quant-press.com

Stocks paying discrete dividends: modelling and option pricing

Abstract:
In the Black-Scholes model, any dividends on stocks are paid continu- ously, but in reality dividends are always paid discretely, often after some announcement of the amount of the dividend. It is not entirely clear how such discrete dividends are to be handled; simple perturbations of the Black-Scholes model often fall into contradictions. Our approach here is to recognise the stock price as the net present value of all future dividends, and to model the (discrete) dividend process directly. The stock price process is then deduced, and various option-pricing formulae derived. The Black-Scholes model with continuous dividend payments results as a limit as the time between dividend payments goes to zero. 1 I

R. Korn, L.C.G. Rogers 2004

http://www.statslab.cam.ac.uk/~chris/papers/RK081004.pdf
http://www.quant-press.com

Accounting for Biases in Black-Scholes

Abstract:
Prices of currency options commonly differ from the Black-Scholes formula along two dimensions:

implied volatilities vary by strike price (volatility smiles) and maturity (implied volatility of at-the-money options increases, on average, with maturity). We account for both using Gram-Charlier expansions to approximate the conditional distribution of the logarithm of the price of the underlying security. In this setting, volatility is approximately a quadratic function of moneyness, a result we use to infer skewness and kurtosis from volatility smiles. Evidence suggests that both kurtosis in currency prices and biases in Black-Scholes option prices decline with maturity.

K. Backus, L. Wu, S. Foresi 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=585623
http://www.quant-press.com

On the Pricing of Cliquet Options with Global Floor and Cap

Abstract:
In this thesis we present two methods for the pricing and hedging of cliquet options with global floor and/or cap within a Black-Scholes market model with fixed dividends and time dependent volatilities and interest rates. The first is a Fourier transform method giving integral formulas for the price and the greeks. A numerical integration scheme is proposed for the evaluation of these formulas. Using Ito's Lemma it is proved that the vanilla Black-Scholes PDE is valid. In addition to giving us the gamma for free, it forms the basis for an explicit finite difference method. Both methods outperform Monte Carlo simulation in terms of computational time, with the Fourier method in most cases being the faster one for a given level of accuracy. This tendency is amplified as the number of reset periods increases. Potential future research includes local volatility models and early exercise features for the finite difference method and Levy-process market models for the Fourier method.

M.Kjaer 2004

http://www.math.chalmers.se/Math/Research/Preprints/2004/3.pdf
http://www.quant-press.com

Financial Engineering with Reverse Cliquet Options

Abstract:
Index-linked securities are offered by banks, financial institutions and building societies to investors looking for downside risk protection whilst still providing upside equity index participation. This article explores how reverse cliquet options can be integrated into the structure of a guaranteed principal bond. Pricing problems are discussed under the standard Black-Scholes model and under the constant-elasticity-of-variance model. Forward start options are the main element of this structure and new closed formulae are obtained for these options under the latter model. Risk management issues are also discussed. An example is described showing how this structure can be implemented and how the financial engineer may forecast the coupon payment that will be made to investors buying this product without exposing the issuing institution to risk of loss.

B.A.Eales, R.Tunaru 2004

http://www.cass.city.ac.uk/conferences/mmf2004/files/Tunaru&Eales.pdf
http://www.quant-press.com

Bessel processes, the integral of geometric Brownian motion, and Asian options

Abstract:
This paper is motivated by questions about averages of stochastic processes which originate in mathematical finance, originally in connection with valuing the so-called Asian options. Starting with [Y], these questions about exponential functionals of Brownian motion have been studied in terms of Bessel processes using the Hartman-Watson theory of [Y80]. Consequences of this approach for valuing Asian options proper have been spelled out in [GY] whose Laplace transform results were in fact regarded as a noted advance. Unfortunately, a number of difficulties with the key results of this last paper have surfaced which are now addressed in this paper. One of them in particular is of a principal nature and originates with the Hartman-Watson approach itself: this approach is in general

applicable without modifications only if it does not involve Bessel processes of negative indices. The main mathematical contribution of this paper is the developement of three principal ways to overcome these restrictions, in particular by merging stochastics and complex analysis in what seems a novel way, and the discussion of their consequences for the valuation of Asian options proper.

P. Carr, M. Schroder 2003

http://arxiv.org/PS_cache/math/pdf/0311/0311280v1.pdf
http://www.quant-press.com

Pricing Forward Start Options under the CEV Model With Applications in Financial Engineering

Abstract:
Index-linked securities are offered by banks, financial institutions and building societies to investors looking for downside risk protection whilst still providing upside equity index participation. This article explores how reverse cliquet options can be integrated into the structure of a guaranteed principal bond. Pricing problems are discussed under the constant-elasticity-of-variance model. Forward start options are the main element of this structure and new closed formulae are obtained for these options under the square-root process model. Risk management issues are also discussed. An example is described showing how this structure can be implemented and how the financial engineer may forecast the coupon payment that will be made to investors buying this product.

Unknown 2002

http://www.fma.org/Siena/Papers/410109.pdf
http://www.quant-press.com

Unified Pricing of Asian Options

Abstract:
A simple and numerically stable 2-term partial differential equation characterizing the price of any type of arithmetically averaged Asian option is given. The approach includes both continuously and discretely sampled options and it is easily extended to handle continuous or discrete dividend yields. In contrast to present methods, this approach does not require to implement jump conditions for sampling or dividend days.

J.Vecer 2002

http://www.stat.columbia.edu/~vecer/asian-vecer.pdf
http://www.quant-press.com

Robust Numerical Methods for PDE Models of Asian Options

Abstract:
We explore the pricing of Asian options by numerically solving the the associated partial differential equations We demonstrate that numerical PDE techniques commonly used in finance for standard options are inaccurate in the case of Asian options and illustrate mod indications which alleviate this problem In particular the usual methods generally produce solutions containing spurious oscillations We adapt flux limiting techniques originally de veloped in the field of computational fluid dynamics in order to rapidly obtain accurate solutions We show that flux limiting methods are total variation diminishing and hence free of spurious oscillations for non conservative PDEs such as those typically encountered in finance for fully explicit and fully and partially implicit schemes We also modify the van Leer flux limiter so that the second order total variation diminishing property is preserved for non uniform grid spacing

R. Zvan, P.A. Forsyth, K.R. Vetzal 2000

http://www.cs.uwaterloo.ca/research/tr/1996/28/CS-96-28.pdf
http://www.quant-press.com

Pricing Exotics under the Smile

Abstract:
The volatility implied from the market prices of vanilla options, using the Black Scholes formula, is seen to vary with both maturity and strike price. This surface is known as the volatility smile. It can be considered as a correction for second order effects where the market departs in practice from the assumptions underlying the Black Scholes model. Recent years have seen a surge in the market for exotic path dependent options. Both the liquidity and the volumes of trades of products such as barrier options, compound options and range notes have increased dramatically. These products can have large second order exposures and their traded prices can be significantly offset from the theoretical values calculated under the Black Scholes assumptions. Considerable research effort has been focused on the search for a consistent framework to value both european and exotic options. The objective being to find a methodology which can be practically implemented in a risk management system. This paper details the Exotic Smile model which has been developed and implemented within J. P. Morgan. The paper begins with discussion of the market conditions that are behind the volatility smile. The theoretical framework for the model is then presented, leading to a description of the practical implementation. The results from the model are then compared with market exotic prices. Finally, we discuss the implications of the model to the risk management of exotic products.

M. Jex, R. Henderson, D. Wang 1999

http://www.smartquant.com/references/OptionPricing/option14.pdf
http://www.quant-press.com

Option Valuation Using Fast Fourier Transforms

Abstract:

P.Carr, D.Madan 1999

http://www.imub.ub.es/events/sssf/vgfrier7.pdf
http://www.quant-press.com

Pricing Parisian-Style Options with a Lattice Method

Abstract:

M. Avellaneda, L. Wu 1998

http://www.math.nyu.edu/faculty/avellane/ParisOptions.pdf
http://www.quant-press.com

Static Options Replication

Abstract:
This paper presents a method for replicating or hedging a target stock option with a portfolio of other options. It shows how to construct a replicating portfolio of standard options with varying strikes and maturities and fixed portfolio weights. Once constructed, this portfolio will replicate the value of the target option for a wide range of stock prices and times before expiration, without requiring further weight adjustments. We call this method static replication. It makes no assumptions beyond those of standard options theory. You can use the technique to construct static hedges for exotic options, thereby minimizing dynamic hedging risk and costs. You can use it to structure exotic payoffs from standard options. Finally, you can use it as an aid in valuing exotic options, since it lets you approximately decompose the exotic option into a portfolio of standard options whose market prices and bid-ask spreads may be better known.

E.Derman, I.Kani 1994

http://www.ederman.com/new/docs/gs-options_replication.pdf
http://www.quant-press.com

A Class of Levy Process Models with almost exact calibration of both barrier and vanilla FX options

Abstract:
Vanilla (standard European) options are actively traded on many underlying asset classes, such as equities, commodities and foreign exchange. The market quotes for these options are typically used by exotic options traders to calibrate the parameters of the (risk-neutral) stochastic process for the underlying asset. Barrier options, of many different types, are also widely traded in all these markets but one important of the FX Options market is that barrier options, especially Double-no-touch (DNT) options, are now so activley traded that they are o longer considered, in ay way, exotic options. Instead, traders would, in principle, like ot use them as instruments to which they can calibrate their model. The desirability of doing this has been highlighted by talks at practitioner conferences but, to our best knowledge (at least within the realm of the published literature), there have been no models which are specifically designed to cater for this. In this paper, we indtoruce such a model. It allows for calibration in a two-stage process. The first stage fits to DNT options (or other types of double barrier options). The seocnd stage fits to vanilla options. The model allows for jumps (ether finite activity or infinite activity) and also for stochastic volatility. Hence, not only can it give a good fit to the market prices of options, it can also allow for realistic dynamics of the underlying FX rate and realistic future volatility smiles and skews. En route, we significantly extend existing results in the literature by providing closed form (up to Laplace inversion) expressions for the prices of several types of barrier options as well as results related to the distribution of first passage times and of the ``overshoot'.

P.Carr, J.Crosby 2009

http://www.math.nyu.edu/research/carrp/papers/pdf/DNTLevy.pdf
http://www.quant-press.com

FX Volatility Smile Construction

Abstract:
The foreign exchange options market is one of the largest and most liquid OTC derivative markets in the world. Surprisingly, very little is known in the aca- demic literature about the construction of the most important object in this market: The implied volatility smile. The smile construction procedure and the volatility quoting mechanisms are FX specific and differ significantly from other markets. We give a detailed overview of these quoting mechanisms and introduce the resulting smile construction problem. Furthermore, we provide a new formula which can be used for an efficient and robust FX smile construction.

U.Wystup, D.Reiswich 2009

http://www.mathfinance.de/wystup/papers/CPQF_Arbeits20.pdf
http://www.quant-press.com

A Class of Levy Process Models with almost exact calibration of both barrier and vanilla FX options

Abstract:
Vanilla (standard European) options are actively traded on many underlying asset classes, such as equities, commodities and foreign exchange. The market quotes for these options are typically used by exotic options traders to calibrate the parameters of the (risk-neutral) stochastic process for the underlying asset. Barrier options, of many different types, are also widely traded in all these markets but one important of the FX Options market is that barrier options, especially Double-no-touch (DNT) options, are now so activley traded that they are o longer considered, in ay way, exotic options. Instead, traders would, in principle, like ot use them as instruments to which they can calibrate their model. The desirability of doing this has been highlighted by talks at practitioner conferences but, to our best knowledge (at least within the realm of the published literature), there have been no models which are

specifically designed to cater for this. In this paper, we indtoruce such a model. It allows for calibration in a two-stage process. The first stage fits to DNT options (or other types of double barrier options). The seocnd stage fits to vanilla options. The model allows for jumps (ether finite activity or infinite activity) and also for stochastic volatility. Hence, not only can it give a good fit to the market prices of options, it can also allow for realistic dynamics of the underlying FX rate and realistic future volatility smiles and skews. En route, we significantly extend existing results in the literature by providing closed form (up to Laplace inversion) expressions for the prices of several types of barrier options as well as results related to the distribution of first passage times and of the ``overshoot'.

P.Carr, J.Crosby 2009

http://www.math.nyu.edu/research/carrp/papers/pdf/DNTLevy.pdf
http://www.quant-press.com

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The foreign exchange options market is one of the largest and most liquid OTC derivative markets in the world. Surprisingly, very little is known in the aca- demic literature about the construction of the most important object in this market: The implied volatility smile. The smile construction procedure and the volatility quoting mechanisms are FX specific and differ significantly from other markets. We give a detailed overview of these quoting mechanisms and introduce the resulting smile construction problem. Furthermore, we provide a new formula which can be used for an efficient and robust FX smile construction.

U.Wystup, D.Reiswich 2009

http://www.mathfinance.de/wystup/papers/CPQF_Arbeits20.pdf
http://www.quant-press.com

Quanto Skew

Abstract:
We assess the effect of an implied volatility skew for an FX rate on quanto forwards and quanto options of an asset that itself is sub ject to an implied volatility skew using a simplistic double displaced diffusion models.

P.Jaeckel 2009

http://www.awdz65.dsl.pipex.com/QuantoSkew.pdf
http://www.quant-press.com

An arbitrage-free method for smile extrapolation

Abstract:
We introduce a method for extrapolating smiles beyond an "observable" region that is consistent with no arbitrage. The extrapolation is not unique, but can be tuned e.g., to different power-law decays. This method has important applications in various areas such as the calculation of CMS rates, inverse FX options etc.

S.Benaim, M.Dodgson, D. Kainth 2009

http://www.quarchome.org/RiskTailsPaper_v5.pdf
http://www.quant-press.com

On the Valuation of Fader and Discrete Barrier Options in Heston s Stochastic Volatility Model

Abstract:

U.Wystup, S.Griebsch 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1310422
http://www.quant-press.com

Pricing Formulae for Foreign Exchange Options

Abstract:

U.Wystup 2008

http://www.mathfinance.de/wystup/papers/wystup_fxpricingformulae_eqf.pdf
http://www.quant-press.com

Vanna-Volga Pricing

Abstract:

U.Wystup 2008

http://www.mathfinance.de/wystup/papers/wystup_vannavolga_eqf.pdf
http://www.quant-press.com

Modelling the FX Skew

Abstract:

D.Kainth, N.Saravanamuttu 2007

http://www.quarchome.org/FXSkew2.ppt
http://www.quant-press.com

Coupling Smiles

Abstract:

V.Durrleman, N.El Karoui 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1005332
http://www.quant-press.com

Pricing Multivariate Currency Options with Copula

Abstract:

M.Salmon, C.Schleicher 2006

http://www2.warwick.ac.uk/fac/soc/wbs/subjects/finance/finance_faculty/mark_s/christoph.pdf
http://www.quant-press.com

FX Basket Options

Abstract:

U.Haslet 2006

http://www.msfinance.ch/pdfs/Thesis2005_HaslerUrs.pdf
http://www.quant-press.com

Using Copulas to Construct Bivariate Foreign Exchange Distributions with an Application to the Sterling Exchange Rate Index

Abstract:

M.Hurd, M.Salmon, C.Schleicher 2006

http://www2.warwick.ac.uk/fac/soc/wbs/research/wfri/rsrchcentres/ferc/wrkingpaprseries/wp05-20.pdf
http://www.quant-press.com

Consistent Pricing of FX Options

Abstract:

A. Castagna, F. Mercurio 2006

http://www.fabiomercurio.it/consistentfxsmile.pdf
http://www.quant-press.com

Consistent pricing and hedging of an FX options book

Abstract:

L. Bisesti, A. Castagna, F. Mercurio 2005

http://www.fabiomercurio.it/fxbook.pdf
http://www.quant-press.com

A Multi-currency Model with FX Volatility Skew

Abstract:

V. Piterbarg 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=685084
http://www.quant-press.com

A Stochastic Volatility Model for Risk-Reversals in Foreign Exchange

Abstract:

C.Albanese, A.Mijatovic 2005

http://www.level3finance.com/fxreversals.pdf
http://www.quant-press.com

Stochastic Skew in Currency Options

Abstract:

P.Carr, L.Wu 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=559404
http://www.quant-press.com

Fx Barriers With Smile Dynamics

Abstract:

G.Baker, R.Beneder, A.zliber 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=964627
http://www.quant-press.com

FX Barriers with Smile Dynamics

Abstract:

G.baker, R.Beneder, A.Zilber 2004

http://staff.science.uva.nl/~spreij/stieltjes/zilber.pdf
http://www.quant-press.com

Pricing cross-currency forward options

Abstract:

A.Fordyce 2003

http://web.wits.ac.za/NR/rdonlyres/148F4576-FF31-4B50-AD7C-D1885988AA7F/0/alex.pdf
http://www.quant-press.com

On the Valuation of Fader and Discrete Barrier Options in Heston s Stochastic Volatility Model

Abstract:
We focus on closed-form option pricing in Heston s stochastic volatility model, where closed-form formulas exist only for a few option types. Most of these closed-form solutions are constructed from characteristic functions. We follow this closed-form approach and derive multivariate characteristic functions depending on at least two spot values for different points in time. The derived characteristic functions are used as building blocks to set up (semi-) analytical pricing formulas for exotic options with payoffs depending on finitely many spot values such as fader options and discretely monitored barrier options. We compare our result with different numerical methods and examine accuracy and computational times.

U.Wystup, S.Griebsch 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1310422
http://www.quant-press.com

FX Basket Options

Abstract:

J.Hakala, U.Wystup 2008

http://www.mathfinance.de/wystup/papers/CPQF%2015_wystup_hakala_basket.pdf
http://www.quant-press.com

Foreign Exchange Symmetries

Abstract:

U.Wystup 2008

http://www.mathfinance.de/wystup/papers/wystup_symmetries_eqf.pdf
http://www.quant-press.com

Quanto Options

Abstract:

U.Wystup 2008

http://www.mathfinance.de/wystup/papers/wystup_quanto_eqf.pdf
http://www.quant-press.com

Fx Barriers With Smile Dynamics

Abstract:

G.Baker, R.Beneder, A.zliber 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=964627
http://www.quant-press.com

Quanto Lookback Options

Abstract:

M.Dai, H.Y.Wong, Y.K.Kwok 2001

http://www.csc.ust.hk/pub/YKKwok/QLO.pdf
http://www.quant-press.com

Valuing Convertible Bonds with Stock Price, Volatility, Interest Rate, and Default Risk

Abstract:

P. Kovalov, V. Linetsky 2008

http://www.fdic.gov/bank/analytical/cfr/2008/wp2008/CB12.pdf
http://www.quant-press.com

Convertible Bond in a Defaultable Diffusion Model

Abstract:

T.R.Bielecki, S.Crepey, M.Jeanblanc, M.Rutkowski 2007

http://www.maths.univ-evry.fr/pages_perso/jeanblanc/pubs/bcjr_CB3.pdf
http://www.quant-press.com

The Valuation of Convertible Bonds With Credit Risk

Abstract:

E. Ayache, P.A. Forsyth, K.R. Vetzal 2003

http://www.cs.uwaterloo.ca/~paforsyt/convert.pdf
http://www.quant-press.com

Convertible Bonds with Call Notice Periods

Abstract:

A.J. Grau, P.A. Forsyth, K.R. Vetzal 2003

http://www.cs.uwaterloo.ca/%7Epaforsyt/call_notice.pdf
http://www.quant-press.com

Calibration and Implementation of Convertible Bond Models

Abstract:

L. Andersen, D. Buffum 2002

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=355308
http://www.quant-press.com

Valuing Convertible Bonds as Derivatives

Abstract:

I. Bardhan, A. Bergier, E. Derman, C. Dosembet, I. Kani 1994

http://www.ederman.com/new/docs/gs-valuing_convertibles.pdf
http://www.quant-press.com

A Novel Simple But Empirically Consistent Model for Stock Price and Option Pricing

Abstract:
In this paper, we propose a novel simple but empirically very consistent stochastic model for stock price dynamics and option pricing, which not only has the same analyticity as log-normal and Black-Scholes model, but can also capture and explain all the main puzzles and phenomenons arising from empirical stock and option markets which log-normal and Black-Scholes model fail to explain. In addition, this model and its parameters have clear economic interpretations. Large sample empirical calibration and tests are performed and show strong empirical consistency with our model s assumption and implication. Immediate applications on risk management, equity and option evaluation and trading, etc are also presented.

H. Pang 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1374688&download=yes
http://www.quant-press.com

Time Changed Markov Processes in UnifiedCredit-Equity Modeling

Abstract:

P. Carr, V. Linetsky, R. Mendoza 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1113383
http://www.quant-press.com

Hybrid Pricing

Abstract:
This report presents different hybrid models and their application to the pricing of exotic products. A Market Model combining a risk-free term structure and a defaultable one for one underlying is first developped, with the application to the pricing of some exotic products, especially designed for the hedging needs of pension funds (1). Recalling the basis of the underlying HJM model (2) will then give us the possibility to extend some results to the modelling of the credit migration process (3), and to a multi-name framework (4). Along the lines, some links with Equity diffusions are covered.

S.Roland, L.Viet, M.Ciuca, E.Benhamou 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1298894
http://www.quant-press.com

Pricing Equity Derivatives Subject to Bankruptcy

Abstract:

V. Linetsky 2006

http://users.iems.northwestern.edu/%7Elinetsky/default.pdf
http://www.quant-press.com

The Influence of FX Risk on Credit Spreads

Abstract:

P.J.Schonbucher, P.Ehlers 2006

http://www.math.ethz.ch/%7Eehlers/FX_CreditSpreads.pdf
http://www.quant-press.com

Robust Replication of Default Contingent Claims

Abstract:

P. Carr, B. Flesaker 2006

http://www.london.edu/assets/documents/PDF/Peter_Carr_Paper.pdf
http://www.quant-press.com

Merton's Model, Credit Risk, and Volatility Skews

Abstract:

J.Hull, A.White, I.Nelken 2004

http://www.rotman.utoronto.ca/%7Ehull/DownloadablePublications/MertonsModelandVolatilitySkews.pdf
http://www.quant-press.com

Efficient Option Pricing with Multi-Factor Equity-Interest Rate Hybrid Models

Abstract:
In this article we discuss multi-factor equity-interest rate hybrid models with a full matrix of correlations. We assume the equity part to be modeled by the Heston model [Heston-1993] with as a short rate process either a Gaussian two-factor model [Brigo,Mercurio-2007] or a stochastic volatility short rate process of Heston type [Heidari, et al.-2007]. We develop an approximation for the discounted characteristic function. Our approximation scheme is based on the observation that $sqrt{sigma_t}$, with $sigma_t$ a stochastic quantity of CIR type [Cox, et al.-1985], can be well approximated by a normal distribution. Our approximate hybrid fits almost perfectly to the original model in terms of implied Black-Scholes [Black,Scholes-1973] volatilities for European options. Since fast integration techniques allow us to get European style option prices for a whole strip of strikes in a split second, the hybrid approximation can be directly used for model calibration.

L.A.Grzelak, K.Oosterlee, S.Van Weeren 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1434829
http://www.quant-press.com

A Hybrid Markov-Functional Model with Simultaneous Calibration to Interest Rate and FX Smile

Abstract:

C.P.Fries 2008

http://www.fabian-eckstaedt.de/Hybrid_Markov_Functional_Model.pdf
http://www.quant-press.com

A Multifactoral Cross-Currency LIBOR Market Model With a FX Volatility Skew

Abstract:

W.Benner, L.Zyapkov 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=983574
http://www.quant-press.com

The Asymptotic Expansion Formula of Implied Volatility for Dynamic SABR Model and FX Hybrid Model

Abstract:

Y.Osajima 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=965265
http://www.quant-press.com

Efficient Calibration to FX Options by Markovian Projection in Cross-Currency LIBOR Market Models

Abstract:

A.Antonov, T.Misirpashaev 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=936087
http://www.quant-press.com

An asymptotic FX option formula in the cross currency Libor market model

Abstract:

P.Jaeckel, A.Kawai 2006

http://www.btinternet.com/~pjaeckel/AnAsymptoticFXOptionFormulaInTheCrossCurrencyLiborMarketModel.pdf
http://www.quant-press.com

A Multi-currency Model with FX Volatility Skew

Abstract:

V.Piterbarg 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=685084
http://www.quant-press.com

Cross-Currency and Hybrid Markov-Functional Models

Abstract:

C.P.Fries, M.G.Rott 2004

http://www.christian-fries.de/finmath/PDF/Markov_Functional_CCY_Model.pdf
http://www.quant-press.com

Market Models for Inflation

Abstract:

F.Ahmad 2008

http://eprints.maths.ox.ac.uk/711/01/thesis_FA.pdf
http://www.quant-press.com

Pricing Inflation-Indexed Derivatives Using the Extended Vasicek Model of Hull and White

Abstract:

A.Stewart 2007

http://www.maths.ox.ac.uk/filemanager/active?fid=900
http://www.quant-press.com

Inflation-Linked Derivatives

Abstract:

M.Dodgson, D.Kainth 2006

http://www.quarchome.org/inflation/InflationLinkedDerivatives20060908.pdf
http://www.quant-press.com

Pricing Inflation-Indexed Options with Stochastic Volatility

Abstract:

F. Mercurio, N. Moreni 2005

http://www.fabiomercurio.it/stochinf.pdf
http://www.quant-press.com

Valuation of Inflation-Indexed Derivatives with three factor model

Abstract:

L.Malvaez 2005

http://eprints.maths.ox.ac.uk/212/01/malaevz.pdf
http://www.quant-press.com

Reconciling Year on Year and Zero Coupon Inflation Swap: A Market Model Approach

Abstract:

N.Belgrade, E.Benhamou 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=583641
http://www.quant-press.com

Impact of Seasonality in Inflation Derivatives Pricing

Abstract:

N.Belgrade, E.Benhamou 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=583642
http://www.quant-press.com

Pricing Inflation-Indexed Derivatives

Abstract:

F. Mercurio 2004

http://www.fabiomercurio.it/Inflation.pdf
http://www.quant-press.com

A Market Model for Inflation

Abstract:

E.Belgrade, E.Benhamou, E.Koehler 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=576081
http://www.quant-press.com

Pricing Treasury Inflation Protected Securities and Related Derivatives using an HJM Model

Abstract:

R.A.Jarrow, Y.Yildrim 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=585828
http://www.quant-press.com

Fast Delta Computations in the Swap-Rate Market Model

Abstract:
We develop an efficient algorithm to implement the adjoint method that computes sensitivities of an interest rate derivative (IRD) with respect to _different underlying rates in the co-terminal swap-rate market model. The order of computation per step of the new method is shown to be proportional to the number of rates times the number of factors, which is the same as the order in the LIBOR market model.

M.S.Joshi, C.Yang 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1401094
http://www.quant-press.com

LIBOR market model with SABR style stochastic volatility

Abstract:

P.Hagan, A.Lesniewski 2008

http://www.lesniewski.us/papers/working/SABRLMM.pdf
http://www.quant-press.com

Smooth Simultaneous Calibration of the LMM to Caplets and Coterminal Swaptions

Abstract:

M.Joshi, F.Ametrano 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1092665
http://www.quant-press.com

Pricing Bermudan Swaptions in the LIBOR Market Model

Abstract:

S.Hippler 2008

http://eprints.maths.ox.ac.uk/714/01/Dissertation_SteffenHippler.pdf
http://www.quant-press.com

Comparing Discretization of the LIBOR Market Model in the Spot Measure

Abstract:

M.Joshi, N.Denson, C.Beveridge 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1092267
http://www.quant-press.com

New and Robust Drift Approximations for the Libor Market Model

Abstract:

M.Joshi, A.M.Stacey 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=907385
http://www.quant-press.com

The Libor Market Model

Abstract:

N.Selic 2006

http://web.wits.ac.za/NR/rdonlyres/73193EF5-1635-46A8-8681-370ED77E9706/0/NevenaMSc.pdf
http://www.quant-press.com

Calibrating a Three Factors Libor Market Model

Abstract:

M.Lim 2004

http://homepages.nyu.edu/~mrl306/fichiers/rapporte.pdf
http://www.quant-press.com

Smile Modeling in the Libor Market Model

Abstract:

M.Meister supervised by Dr.Christian Fries 2004

http://www.christian-fries.de/finmath/diplomathesis/Meister%20-%20Smile%20Modeling%20in%20the%20LIBOR%20Market%20Model.pdf
http://www.quant-press.com

Interest Rate Model Calibration Using Semidefinite Programming

Abstract:

A. d Apresmont 2003

http://www.princeton.edu/~aspremon/CalibBGM.pdf
http://www.quant-press.com

A Practitioner s Guide to Pricing and Hedging Callable Libor Exotics in Forward Libor Models

Abstract:

V.Piterbarg 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=427084
http://www.quant-press.com

The Libor Market Model, Master s Thesis

Abstract:

R.Pieterz 2003

http://www.math.leidenuniv.nl/scripties/pietersz.pdf
http://www.quant-press.com

Calibration of the LIBOR Market Model: Three Prescriptions

Abstract:

D.Gatarek 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=359000"
http://www.quant-press.com

Risk Managing Bermudan Swaptions in the Libor BGM Model

Abstract:

R.Pieterz 2003

http://www.cmap.polytechnique.fr/%7Erama/bachelier/programmeBP/pietersz.pdf
http://www.quant-press.com

Interest Rate Model Calibration and Risk-Management Using Semidefinite Programming

Abstract:

A.d Apresmont 2003

http://www.princeton.edu/~aspremon/ThesisCalibrationSDP.pdf
http://www.quant-press.com

Fast drift approximated pricing in the BGM model

Abstract:

R.Pieterz 2002

http://www.business.uts.edu.au/qfrc/conferences/qmf2002/Pietersz_R.pdf"
http://www.quant-press.com

Interest Rate Theory, the BGM Model

Abstract:

I.Grubisic 2002

http://www.math.uu.nl/people/grubisic/Thesis.pdf"
http://www.quant-press.com

Different Covariance Parameterizations of the Libor Market Model and Joint Caps/Swaptions Calibration

Abstract:

D.Brigo, C.Capitani, F.Mercurio 2001

http://www.qfrc.uts.edu.au/conferences/qmf2001/Brigo_D.pdf
http://www.quant-press.com

Forward rate volatilities, swap rate volatilities, and the implementation of the LIBOR market model

Abstract:

J. Hull, A. White 1999

http://www.rotman.utoronto.ca/~amackay/fin/libormktmodel2.pdf
http://www.quant-press.com

LIBOR Market Models in Practice

Abstract:

J.Sidenius 1998

http://jakobsidenius.com/papers/MARKMODFINAL.pdf"
http://www.quant-press.com

Analytical Formulas for Pricing CMS Products in the LIBOR Market Model with the Stochastic Volatility

Abstract:
In this paper, we develop a series of approximations for a fast analytical pricing of European constant maturity swap (CMS) products, such as CMS swaps, CMS caps/floors, and CMS spread options, for the LIBOR Market Model (LMM) with stochastic volatility. The derived formulas can also be used for model calibration to the market, including European swaptions and CMS products. The first technical achievement of this work is related to the optimal calculation of the measure change. For single-rate CMS products, we have used the standard linear regression of the measure change, with optimally calculated coefficients. For the CMS spread options, where the linear procedure does not work, we propose a new effective extit{non-linear} measure change technique. The fit quality of the new results is confirmed numerically using Monte Carlo simulations. The second technical advance of the article is

a theoretical derivation of the generalized spread option price via two-dimensional Laplace transform presented in a closed form in terms of the complex Gamma-functions.

A.Antonov, M.Arneguy 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1352606
http://www.quant-press.com

Two Curves, One Price: Pricing & Hedging Interest Rate Derivatives Decoupling Discounting and Forwarding Yield Curves

Abstract:
In this paper we revisit the problem of pricing and hedging plain vanilla single-currency interest rate derivatives using different yield curves for market coherent estimation of discount factors and forward rates with different underlying rate tenors (e.g. Euribor 3 months, 6 months,.etc.). Within such double-curve-single-currency framework, adopted by the market after the liquidity crisis started in summer 2007, standard single-curve no arbitrage relations are no longer valid and can be formally recovered through the introduction of a basis adjustment. Numerical results show that the resulting basis adjustment curves may display an oscillating micro-term structure that may induce appreciable effects on the price of interest rate instruments. Recurring to the foreign-currency analogy we also derive no arbitrage double-curve market-like formulas for basic plain vanilla interest rate derivatives, FRAs, swaps, caps/floors and swaptions in particular. These expressions include a quanto adjustment typical of cross-currency derivatives, naturally originated by the change between the numeraires associated to the two yield curves, that carries on a volatility and correlation dependence. Numerical scenarios confirm that such correction can be non-negligible, thus making unadjusted double-curve prices, in principle, not arbitrage free.

M.Bianchetti 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1334356
http://www.quant-press.com

Post Credit Crunch Interest Rates: Formulas and Market Models

Abstract:

F. Mercurio 2009

articles/LMMpostcrunch5.pdf
http://www.quant-press.com

BOOTSTRAPPING THE ILLIQUIDITY

Abstract:
The large basis spreads observed on the interest rate mar- ket since the liquidity crisis of summer 2007 imply that di®erent yield curves are required for market coherent estimation of forward rates with different tenors (e.g. Euribor 3 months, Euribor 6 months, etc.). In this paper we review the methodology for bootstrapping multi- ple interest rate yield curves, each homogeneous in the underlying rate tenor, from non-homogeneous plain vanilla instruments quoted on the market, such as Deposits, Forward Rate Agreements, Futures, Swaps, and Basis Swaps. The approach includes turn of year e®ects and is ro- bust to deliver smooth yield curves and to ensure non-negative rates also in highly stressed market situations, characterized by crazy roller coaster shapes of the market quotations. The concrete EUR market case is analyzed in detail, using the open source QuantLib implementation of the proposed algorithms.

E. Gobet 2008

http://quantlib.svn.sourceforge.net/viewvc/quantlib/trunk/QuantLibXL/Workbooks/Drafts/YieldCurvePaper/paper/YieldCurve-v1.0.SSRN.pdf

http://www.quant-press.com

LIBOR market model with SABR style stochastic volatility

Abstract:

P.Hagan, A.Lesniewski 2008

http://www.lesniewski.us/papers/working/SABRLMM.pdf
http://www.quant-press.com

Libor Market Model with Local Volatility

Abstract:

M.P.A.Henrard 2007

http://www.globalriskguard.com/resources/fideriv/andersen3.pdf
http://www.quant-press.com

An Extended Libor Market Model With Nested Stochastic Volatility Dynamics

Abstract:

J.Zhu 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=955352
http://www.quant-press.com

Unifying the Bgm and Sabr Models: a Short Ride in Hyperbolic Geometry

Abstract:

P.Henry-Labordere 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=877762
http://www.quant-press.com

A Time-Homogeous, SABR-Consistent Extension of the LMM: Calibration And Numerical Results

Abstract:

R.Rebonato 2007

http://www3.imperial.ac.uk/pls/portallive/docs/1/14987697.PDF
http://www.quant-press.com

No-Arbitrage Dynamics for a Tractable SABR Term Structure Libor Model

Abstract:

M.Morini, F.Mercurio 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1018026
http://www.quant-press.com

A Note on the SABR Model

Abstract:

M.Morini, F.Mercurio 2006

http://caronte.dma.unive.it/QuantitativeFinance2007/viewpaper.php?id=82
http://www.quant-press.com

LIBOR Market Model with Stochastic Volatility

Abstract:

L.Wu, F.Zhang 2006

http://www.math.ust.hk/~malwu/Publ/LIBOR-sv.pdf
http://www.quant-press.com

LIBOR Market Model with Stochastic Volatility

Abstract:

S.Svoboda 2005

http://people.maths.ox.ac.uk/svoboda/other/TransferSimonaSvoboda-November2005.pdf
http://www.quant-press.com

Capturing the Skew in Interest Rate Derivatives : A Shifted Lognormal LIBOR Model with Uncertain Parameters

Abstract:

E. Errais, G. Mauri, F. Mercurio 2004

http://www.fabiomercurio.it/sllmup.pdf
http://www.quant-press.com

Cap and swaption approximations in Libor market models with jumps

Abstract:

P.Glasserman, N.Merener 2003

http://www2.gsb.columbia.edu/faculty/pglasserman/Other/swaption.pdf
http://www.quant-press.com

A Stochastic Volatility Model for Bermuda Swaptions and Callable CMS Swaps

Abstract:

C.Albanese, M.Trovato 2003

http://www.level3finance.com/cms.pdf
http://www.quant-press.com

A Stochastic Volatility Forward Libor Model With a Term Structure Of Volatility Smiles

Abstract:

V.Pitebarg 2003

http://www.javaquant.net/papers/piterbarg_2003_stochastic.pdf
http://www.quant-press.com

LIBOR Market Model with Stochastic Volatility

Abstract:

D.Gatarek 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=359001
http://www.quant-press.com

A stochastic-volatility, displaced-diffusion extension of the LIBOR Market Model

Abstract:

M.Joshi, R.Rebonato 2002

http://citeseer.ist.psu.edu/cache/papers/cs/25768/http:zSzzSzwww.rebonato.comzSzStochasticVolatilityBGMFin.pdf/a-stochastic-volatility-displaced.pdf
http://www.quant-press.com

Yield Curve Modelling with Skews and Stochastic Volatility

Abstract:

L.Andersen, J.Andreasen 2002

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1098420
http://www.quant-press.com

Extended Libor Market Models with Stochastic Volatility

Abstract:

L.Andersen, R.Brotherton-Ratcliffe 2001

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=294853
http://www.quant-press.com

Volatility Skews and Extensions of the Libor Market Model

Abstract:

L.Andersen, J.Andreasen 1998

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=111030
http://www.quant-press.com

An N-Dimensional Markov-Functional Interest Rate Model

Abstract:
This paper develops an n-dimensional Markov-functional interest rate model, i.e. a model driven by an n-dimensional state process and constructed using Markov-functional techniques. It is shown that this model is very similar to an n-factor LIBOR market model hence allowing intuition from the LIBOR market model to be transferred to the Markov-functional model. This generalizes the results of Bennett & Kennedy from one-dimensional to n-dimensional driving state processes. The model is suitable for pricing certain type of exotic interest rate derivative products whose payoffs depend on the LIBORs at their setting dates. Specifically we investigate the pricing of TARNs and find that the n-dimensional Markov-functional model is faster and can be calibrated more easily to a target correlation structure than an n-factor LIBOR market model.

L.Kaisajuntti, J.Kennedy 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1081337
http://www.quant-press.com

A Comparison of Markov-Functional and Market Models: The One-Dimensional Case

Abstract:
The LIBOR Markov-functional model is an efficient arbitrage-free pricing model suitable for callable interest rate derivatives. We demonstrate that the one-dimensional LIBOR Markov-functional model and the separable onefactor LIBOR market model are very similar. Consequently, the intuition behind the familiar SDE formulation of the LIBOR market model may be applied to the LIBOR Markov-functional model. The application of a drift approximation to a separable one-factor LIBOR market model results in an approximating model driven by a one-dimensional Markov process, permitting efficient implementation. For a given parameterisation of the driving process, we find the distributional structure of this model and the corresponding Markov-functional model are numerically virtually indistinguishable for short maturity tenor structures over a wide variety of market conditions, and both are very similar to the market model. A theoretical uniqueness result shows that any accurate approximation to a separable market model that reduces to a function of the driving process is effectively an approximation to the analogous Markov-functional model. Therefore, our conclusions are not restricted to our particular choice of driving process. Minor differences are observed for longer maturities, nevertheless the models remain qualitatively similar. These differences do not have a large impact on Bermudan swaption prices. Under stress-testing, the LIBOR Markov-functional and separable LIBOR market models continue to exhibit similar behaviour and Bermudan prices under these models remain comparable. However, the drift approximation model now appears to admit arbitrage that is practically significant. In this situation, we argue the Markov-functional model is a more appropriate choice for pricing.

M.N.Bennett, J.E.Kennedy 2005

http://www2.warwick.ac.uk/fac/sci/statistics/crism/research/2005/paper05-11/05-11w.pdf
http://www.quant-press.com

A Comparison of Single Factor Markov-functional and Multi Factor Market Models

Abstract:
We compare single factor Markov-functional and multi factor market models for hedging performance of Bermudan swaptions. We show that hedging performance of both models is comparable, thereby supporting the claim that Bermudan swaptions can be adequately risk-managed with single factor models. Moreover, we show that the impact of smile can be much larger than the impact of correlation. We use the constant exercise method for calculating risk sensitivities of callable products in market models, which is a modification of the least-squares Monte Carlo method. The hedge results show the

constant exercise method enables proper functioning of market models as risk-management tools.

R.Pietersz, A.J.Pelsser 2004

http://www1.fee.uva.nl/pp/bin/229fulltext.pdf
http://www.quant-press.com

Markov-Functional Interest Rate Models

Abstract:
We introduce a general class of interest rate models in which the value of pure discount bonds can be expressed as a functional of some (low-dimensional) Markov process. At the abstract level this class includes all current models of practical importance. By specifying these models inMarkov-functional form, we obtain a specification which is efficient to implement. An additional advantage of Markov-functional models is the fact that the specification of the model can be such that the forward rate distribution implied by market option prices can be fitted exactly, which makes these models particularly suited for derivatives pricing. We give examples of Markov-functional models that are fitted to market prices of caps/floors and swaptions.

P.J.Hunt, J.Kennedy, A.Pelsser 1999

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=49240
http://www.quant-press.com

Saddlepoint Methods for Option Pricing

Abstract:

P.Carr, D.P.Madan 2008

http://www.math.nyu.edu/research/carrp/papers/pdf/TCPSP.pdf
http://www.quant-press.com

Juggling Snowballs

Abstract:

M.S. Joshi, C. Beveridge 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1207482
http://www.quant-press.com

Local Time for the SABR Model: Connection with the Complex Black Scholes and Application toCMS and Spread Options

Abstract:

E. Benhamou, O. Croissant 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1064461
http://www.quant-press.com

Callable Swaps, Snowballs and Video Games

Abstract:

C.Albanese 2007

http://www.level3finance.com/irmodel.pdf
http://www.quant-press.com

No-arbitrage conditions for cash-settled swaptions

Abstract:

F. Mercurio 2007

http://www.fabiomercurio.it/cashsettled_note.pdf
http://www.quant-press.com

Smile-consistent CMS adjustments in closed form: introducing the Vanna-Volga approach

Abstract:

F.Mercurio, M.Morini 2007

http://www.fabiomercurio.it/CMSVV_30jan07.pdf
http://www.quant-press.com

Swaption Smile And CMS Adjustment

Abstract:

F.Mercurio 2006

http://www.fabiomercurio.it/RiskDRME.pdf
http://www.quant-press.com

A stochastic volatility model for callable CMS swaps and translation invariant path dependent derivatives

Abstract:

C.Albanese, M.Trovato 2006

http://www.level3finance.com/tarn.pdf
http://www.quant-press.com

Target Redemption Note

Abstract:

Y.Kuen Kwok, C.Chiu Chu 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=886944
http://www.quant-press.com

Swaption skews and convexity adjustments

Abstract:

F. Mercurio, A. Pallavicini 2005

http://www.fabiomercurio.it/sabrcms.pdf
http://www.quant-press.com

A Stochastic Volatility Model for Bermuda Swaptions and Callable CMS Swaps

Abstract:

C.Albanese, M.Trovato 2005

http://www.level3finance.com/cms.pdf
http://www.quant-press.com

Lecture 12: Jump Diffusion Models of the Smile

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture12.pdf
http://www.quant-press.com

Hedging under the Heston Model with Jump-to-Default

Abstract:

P.Carr, W.Schoutens 2007

http://perswww.kuleuven.be/~u0009713/HestonJtD.pdf
http://www.quant-press.com

Hedging with options in models with jumps

Abstract:

R.Cont, P.Tankov, E.Voltchkova 2007

http://www.cmap.polytechnique.fr/~rama/papers/abel.pdf
http://www.quant-press.com

Pricing Equity Derivatives Subject to Bankruptcy

Abstract:

V. Linetsky 2006

http://users.iems.northwestern.edu/~linetsky/default.pdf
http://www.quant-press.com

A jump to default extended CEV model: an application of Bessel processes

Abstract:

P. Carr, V. Linetsky 2006

http://users.iems.northwestern.edu/~linetsky/JDCEV.pdf
http://www.quant-press.com

Replicating Defaultable Bonds in Black Scholes with Jump To Default

Abstract:

P. Carr 2005

http://finmath.stanford.edu/seminars/documents/BSjtd.pdf
http://www.quant-press.com

Option Pricing Models With Jumps : Integro-Diferential Equations And Inverse Problems

Abstract:

R.Cont, P.Tankov, E.Voltchkova 2004

http://www.cmap.polytechnique.fr/~rama/papers/EccomasReview.pdf
http://www.quant-press.com

A Penalty Method for American Options with Jump Diffusion Processes

Abstract:

Y. d Halluin, P.A. Forsyth, G. Labahn 2003

http://www.cs.uwaterloo.ca/%7Epaforsyt/jump_amer.pdf
http://www.quant-press.com

Non-parametric calibration of jump diffusion option pricing models

Abstract:

R.Cont, P.Tankov 2002

http://www.cmap.polytechnique.fr/~rama/papers/entropy.pdf"
http://www.quant-press.com

Pricing Constant Maturity Credit Default Swaps Under Jump Dynamics

Abstract:

H.Jonsson, W.Schoutens 2008

http://perswww.kuleuven.be/~u0009713/cmcds.pdf
http://www.quant-press.com

Smart Expansion and Fast Calibration for Jump Diffusion Programming

Abstract:

E.Benhamou, E.Gobet, M.Miri 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1079627
http://www.quant-press.com

Constant Proportion Portfolio Insurance in Presence of Jumps in Asset Prices

Abstract:

R. Cont, P. Tankov 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1021084
http://www.quant-press.com

A Multi-factor Jump-Diffusion Model for Commodities

Abstract:

J.Crosby 2006

http://www-cfr.jbs.cam.ac.uk/archive/PRESENTATIONS/seminars/2005/JohnCrosby_QF_version2_PDF.pdf
http://www.quant-press.com

Hedging Exotic Options in Stochastic Volatility and Jump Diffusion Models

Abstract:

K. Detlefsen 2005

http://edoc.hu-berlin.de/master/detlefsen-kai-2005-01-27/PDF/detlefsen.pdf
http://www.quant-press.com

Option Pricing Under a Double Exponential Jump Diffusion Model

Abstract:

S.G. Kou, H. Wang 2004

http://www.columbia.edu/~sk75/KouWangMS.pdf.pdf
http://www.quant-press.com

A Jump-Diffusion Model for Option Pricing

Abstract:

S.G. Kou 2002

http://www.columbia.edu/~sk75/MagSci02.pdf
http://www.quant-press.com

Static Hedging of Standard Options

Abstract:

P. Carr, L. Wu 2002

http://www.math.nyu.edu/research/carrp/papers/pdf/statichedge14.pdf
http://www.quant-press.com

Jump-Diffusion Processes : Volatility Smile Fitting and Numerical Methods for Pricing

Abstract:

L. Andersen, J. Andreasen 1999

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=171438
http://www.quant-press.com

Monte Carlo simulation algorithms for the pricing of American options

Abstract:

P.BQ.Lin 2008

http://eprints.maths.ox.ac.uk/703/01/MonteCarlopeterlin.pdf
http://www.quant-press.com

Levy-Sheffer Systems and the Longstaff-Schwartz Algorithm for American Option Pricing

Abstract:

S.Gerhold 2008

http://arxiv.org/abs/0802.1831
http://www.quant-press.com

Conditional Analytic Monte Carlo Pricing Scheme for Auto-Callable Products

Abstract:

C.P. Fries, M.S. Joshi 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1125725
http://www.quant-press.com

A Perturbative Approach to Bermudan Options Pricing

Abstract:

R.Baviera, L.Giada 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=941318&rec=1&srcabs=977479
http://www.quant-press.com

General Duality for Perpetual American Options

Abstract:

A.Alfonsi, B.Jourdain 2006

http://cermics.enpc.fr/reports/CERMICS-2006/CERMICS-2006-333.pdf
http://www.quant-press.com

Number of paths versus number of basis functions in American option pricing

Abstract:

P.Glasserman, B.Yu 2005

http://arxiv.org/abs/math/0503556
http://www.quant-press.com

Simulation for American Options: Regression Now or Regression Later?

Abstract:

P.Glasserman, B.Yu 2004

http://www2.gsb.columbia.edu/faculty/pglasserman/Other/glasserman_yuR1.pdf
http://www.quant-press.com

Monte Carlo valuation of American options

Abstract:

L.C.G. Rogers 2002

http://www.statslab.cam.ac.uk/~chris/papers/mcamer.pdf
http://www.quant-press.com

Valuing American Options by Simulation : A Simple Least-Squares Approach

Abstract:

F.A. Longstaff, E.S. Schwartz 2001

http://www.iro.umontreal.ca/~lecuyer/ift6521/ls.pdf
http://www.quant-press.com

Just-In-Time Monte Carlo for Path Dependent American Options

Abstract:

S.K.Dutt, G.M.Welke 2001

http://www.quantal.com/Papers/RMC.pdf
http://www.quant-press.com

Quadratic convergence for valuing american options using a penalty method

Abstract:

P.A. Forsyth, K.R. Vetzal 2001

http://www.cs.uwaterloo.ca/~paforsyt/con7.pdf
http://www.quant-press.com

An Analysis of a Least Squares Regression Method for American Option Pricing

Abstract:

E.Clément, D.Lamberton, P.Protter 2001

http://people.orie.cornell.edu/~protter/WebPapers/lsmrDec.pdf
http://www.quant-press.com

Pricing American Options: A Comparison of Monte Carlo Simulation Approaches

Abstract:

M.C.Fu, S.B.Laprise, D.B.Mada, Y.Su, R.Wu 2000

http://www.rhsmith.umd.edu/faculty/mfu/fu_files/FLMSW01.pdf
http://www.quant-press.com

Numerical valuation of high dimensional multivariate American securities

Abstract:

J. Barraquand, D. Martineau 1995

http://www.hpl.hp.com/techreports/Compaq-DEC/PRL-RR-38.pdf
http://www.quant-press.com

Implementing Binomial Trees

Abstract:

M. Gilli, E. Schumann 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1341181
http://www.quant-press.com

The Convergence of Binomial Trees for Pricing the American Put

Abstract:

M.Joshi 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1030143"
http://www.quant-press.com

Achieving Higher Order Convergence for the Prices of European Options in Binomial Trees

Abstract:

M.Joshi 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=976561
http://www.quant-press.com

Achieving Smooth Asymptotics for the Prices of European Options in Binomial Trees

Abstract:

M.Joshi 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=928186
http://www.quant-press.com

Extended Binomial Tree Valuation when the Underlying Asset Distribution is Shifted Lognormal with Higher Moments

Abstract:

T.Haahtela 2006

http://realoptions.org/papers2006/Haahtela_Final.pdf"
http://www.quant-press.com

A binomial tree approach to stochastic volatility driven model of the stock price

Abstract:

I.Florescu, F.Viens 2005

http://inf.ucv.ro/~ami/volumes/2005/2005_15.pdf"
http://www.quant-press.com

Valuing Real Options using Implied Binomial Trees and Commodity Futures Options

Abstract:

T.Arnold, T.Falcon Crack, A.Schwartz 2005

http://www.fma.org/Chicago/Papers/IMPTREECFO.pdf"
http://www.quant-press.com

New Method for Calculating Greeks in a Binomial Tree Model

Abstract:

R. De Rozario 2004

http://www.u-cergy.fr/AFFI_2004/IMG/pdf/ROZARIO.pdf"
http://www.quant-press.com

Derivative Pricing, Numerical Methods

Abstract:

K.R. Vetzal 2003

http://www.wiley.com/legacy/wileychi/eqf/docs/Sample_long_article.pdf"
http://www.quant-press.com

Pricing American-style Basket Options By Implied Binomial Tree

Abstract:

H.wan 2002

http://www.haas.berkeley.edu/MFE/download/student_papers/mfe02_wan-pricing_basket_options.pdf"
http://www.quant-press.com

Asymptotics of the price oscillations of a vanilla option in a tree model

Abstract:

F. Diener, M. Diener 2001

http://www-math.unice.fr/%7Ediener/crre/crre.pdf"
http://www.quant-press.com

Stochastic Implied Trees : Arbitrage Pricing with Stochastic Term and Strike Structure of Volatility

Abstract:

E.Derman, I.Kani 1997

http://www.ederman.com/new/docs/ijtaf-implied_trees.pdf
http://www.quant-press.com

Enhanced Numerical Methods for Options with Barriers

Abstract:

E.Derman, I.Kani, D.Ergener, I.Bardhan 1995

http://www.ederman.com/new/docs/gs-numerical_methods.pdf
http://www.quant-press.com

The Volatility Smile and Its Implied Tree

Abstract:

E.Derman, I.Kani 1994

http://www.ederman.com/new/docs/gs-volatility_smile.pdf
http://www.quant-press.com

Flaming Logs

Abstract:
This paper extends the pathwise adjoint method for Greeks to the displaced-diffusion LIBOR market model and also presents a simple way to improve the speed of the method. The speed improvements of approximately 20% are achieved without using any additional approximations to those of Giles and Glasserman.

N.Denson, M.S.Joshi 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1411073
http://www.quant-press.com

Minimal Partial Proxy Simulation Schemes for Generic and Robust Monte-Carlo Greeks

Abstract:
In this paper, we present a generic framework known as the minimal partial proxy simulation scheme. This framework allows stable computation of the Monte-Carlo Greeks for financial products with trigger features via finite difference approximation. The minimal partial proxy simulation scheme can be considered as a special case of the partial proxy simulation scheme (Fries and Joshi, 2008b) as a measure change (weighted Monte Carlo) is performed to prevent path-wise discontinuities. However, our approach differs in term of how the measure change is performed. Specifically, we select the measure change optimally such that it minimises the variance of the Monte-Carlo weight. Our method can be applied to popular classes of trigger products including digital caplets, autocaps and target redemption notes. While the Monte-Carlo Greeks obtained using the partial proxy simulation scheme can blow up in certain cases, these Monte-Carlo Greeks remain stable under the minimal partial proxy simulation scheme. Standard errors for Vega are also significantly lower under the minimal partial proxy simulation scheme.

J.Hong Chan, M.S.Joshi 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1406368
http://www.quant-press.com

Efficient Greek Estimation in Generic Market Models

Abstract:
We first develop an efficient algorithm to compute Deltas of interest rate derivatives for a number of standard market models. The computational complexity of the algorithms is shown to be proportional to the number of rates times the number of factors per step. We then show how to extend the method to efficiently compute Vegas in those market models.

M.S.Joshi, C.Yang 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1437847
http://www.quant-press.com

Stable Monte-Carlo Sensitivities of Bermudan Callable Products

Abstract:
n this paper we discuss the valuation and sensitivities of financial products with early exercise rights (e.g., Bermudan options) using a Monte-Carlo simulation. The usual way to value early exercise rights is the backward algorithm. As we will point out, the Monte-Carlo version of the backward algorithm is given by an unconditional expectation of a random variable whose paths are discontinuous functions of the initial data. This results in noisy sensitivities, when sensitivities are calculated from finite differences of valuations. We present a simple localized smoothing of the Monte-Carlo backward algorithm which results in stable, variance reduced sensitivities. In contrast to other payoff smoothing methods, the smoothed backward algorithm will converge to the true Bermudan value in the Monte-Carlo limit. However, it looses the property of being a strict lower bound. The method is easy to

implement since it is a simple modification to the pricing algorithm and it is independent of the underlying model.

C.P.Fries 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1389190
http://www.quant-press.com

Sensitivity estimates for portfolio credit derivatives using Monte Carlo

Abstract:

P.Glasserman, Z.Chen 2008

http://www2.gsb.columbia.edu/faculty/pglasserman/Other/CreditGreeksPublished.pdf
http://www.quant-press.com

A Note on Monte Carlo Greeks using the Characteristic Function

Abstract:

J. Kienitz 2008

articles/MCGreeksLevy2.pdf
http://www.quant-press.com

A Note on Monte Carlo Greeks for Jump Diffusions and other Levy models

Abstract:

Jorg Kienitz 2008

articles/A_Note_on_Monte_Carlo_Greeks_for_Jump_Diffusions_and_other_Levy_models.pdf
http://www.quant-press.com

Localized Proxy Simulation Schemes for Generic and Robust Monte-Carlo Greeks

Abstract:

C.P.Fries 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=984744
http://www.quant-press.com

Malliavin Greeks without Malliavin Calculus

Abstract:

P.Glasserman, N.Chen 2006

http://www.cfe.columbia.edu/pdf-files/Glasserman_03.pdf
http://www.quant-press.com

Partial Proxy Simulation Schemes for Generic and Robust Monte-Carlo Greeks

Abstract:

C.P.Fries, M.S.Joshi 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=934012
http://www.quant-press.com

Proxy Simulation Schemes for generic robust Monte-Carlo sensitivities, process oriented importance sampling and high accuracy drift approximation (with applications to the LIBOR Market Model)

Abstract:
We consider a generic framework for generating likelihood ratio weighted Monte Carlo simu- lation paths, where we use one simulation scheme K? (proxy scheme) to generate realizations and then reinterpret them as realizations of another scheme K* (target scheme) by adjusting measure (via likelihood ratio) to match the distribution of K* such that EQ (f (K*) | Ft) = EQ (f (K?) · w | Ft). (1) This is done numerically in every time step, on every path. This makes the approach independent of the product (the function f in (1)) and even of the model, it only depends on the numerical scheme. The approach is essentially a numerical version of the likelihood ratio method [5] and Malliavin's Calculus [11, 18] reconsidered on the level of the discrete numerical simulation scheme. Since the numerical scheme represents a time discrete stochastic process sampled on a discrete probability space the essence of the method may be motivated without a deeper mathematical understanding of the time continuous theory (e.g. Malliavin's Calculus). The framework is completely generic and may be used for - high accuracy drift approximations, - process oriented importance sampling and the - robust calculation of partial derivatives of expectations w.r.t. model parameters (i.e. sen- sitivities, aka. Greeks) by applying finite differences by reevaluating the expectation with a model with shifted parameters. We present numerical results using a Monte-Carlo simulation of the LIBOR Market Model for benchmarking.

C.P.Fries, J.Kampen 2005

http://www.christian-fries.de/finmath/proxyscheme/Fries-Kampen-ProxySchemeMonteCarlo.pdf
http://www.quant-press.com

Smoking Adjoints : fast evaluation of Greeks in Monte Carlo calculations

Abstract:

M.B. Giles, P. Glasserman 2005

http://people.maths.ox.ac.uk/~gilesm/psfiles/NA-05-15.pdf
http://www.quant-press.com

Rapid And Accurate Development of Prices and Greeks for Nth To Default Credit Swaps in the Li Model

Abstract:

M.Joshi, D.Kainth 2004

http://www.quarchome.org/rapid.pdf
http://www.quant-press.com

Pricing and Deltas of Discretely-Monitored Barrier Options Using Stratified Sampling on the Hitting-Times to the Barrier

Abstract:

We develop new Monte Carlo techniques based on stratifying the stock s hitting-times to the barrier for the pricing and Delta calculations of discretely-monitored barrier options using the Black-Scholes model. We include a new algorithm for sampling an Inverse Gaussian random variable such that the sampling is restricted to a subset of the sample space. We compare our new methods to existing Monte Carlo methods and find that they can substantially improve convergence speeds.

M.S.Joshi, R.Tang 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1441142
http://www.quant-press.com

Monte Carlo evaluation of Greeks for multidimensional barrier and lookback options

Abstract:

E.Gobet, G.Bernis, A.Kohastu-Higa 2003

http://ljk.imag.fr/membres/Emmanuel.Gobet/paper/MalliavinLookback.pdf
http://www.quant-press.com

Malliavin Calculus for Monte Carlo Methods in Finances

Abstract:

E. Benhamou 2002

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=298084
http://www.quant-press.com

Malliavin Calculus applied to Finance

Abstract:

M.Montero, A.Kohatsu-Higa 2002

http://www.econ.upf.es/~kohatsu/papers/Malliavin.pdf
http://www.quant-press.com

An Introduction to Malliavin Calculus

Abstract:

P.K.Friz 2002

http://www.math.nyu.edu/phd_students/frizpete/malliavin/mall.pdf
http://www.quant-press.com

A Generalisation of Malliavin Weighted Scheme for Fast Computation of the Greeks

Abstract:

E.Benhamou 2001

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=265277
http://www.quant-press.com

Applications of Malliavin Calculus to Monte Carlo Methods in Finance

Abstract:

E.Fournie, JM.Lasry, J.Lebuchoux, PL.Lions, N.Touzi 1999

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=179553
http://www.quant-press.com

Uncertain Volatility Model: A Monte-Carlo Approach

Abstract:
The uncertain volatility model has long ago attracted the attention of practitioners as it provides worst-case pricing scenario for the sell-side. The valuation of a financial derivative based on this model requires solving a fully non-linear PDE. One can rely on finite difference schemes only when the number of variables (that is, underlyings and path-dependent variables) is small - in practice no more than three. In all other cases, numerical valuation seems out of reach. In this paper, we outline two accurate, easy-to-implement Monte-Carlo-like methods which hardly depend on dimensionality. The first method requires a parameterization of the optimal covariance matrix and consists in a series of backward low-dimensional optimizations. The second method relies heavily on a recently established connection between second-order backward stochastic differential equations and non-linear second-order parabolic PDEs. Both methods are illustrated by numerical experiments.

J.Guyon, P.H.Labordère 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1540043
http://www.quant-press.com

Monte Carlo Pricing using Operator Methods and Measure Changes

Abstract:
A large class of generic stochastic processes which are not necessarily analyti- cally solvable but are still numerically tractable can be described by giving transition probability kernels over a contiguous set of time intervals. From the numerical view- point, this procedure is highly effective on current microchip architectures as kernels can be conveniently evaluated using GPU co-processors and then used for scenario generation while storing them in CPU caches. This paper describes the pricing methodology and a mathematical framework for Finance based on direct kernel ma- nipulations, i.e. operator methods. We also discuss a number of techniques based on measure changes to accomplish tasks such as variance reduction and sensitivity calculations. Numerical experiments are included along with performance bench- marks. Source code is distributed separately online under GPL license in a library named OPLib.

C.Albanese, H.Li 2009

http://www.level3finance.com/change.pdf
http://www.quant-press.com

Quantitative Finance Collector

Abstract:
This document is an index with different piece of codes you can find on the web

2009

articles/QuantitativeFinanceCollector.pdf
http://www.quant-press.com

Efficient, Almost Exact Simulation of the Heston Stochastic Volatility Model

Abstract:

A.V.Haastrecht, A.Pelsser 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1131137
http://www.quant-press.com

Efficient Simulation of the Heston Stochastic Volatility Model

Abstract:

L.Andersen 2006

http://www.javaquant.net/papers/LeifAndersenHeston.pdf
http://www.quant-press.com

Fast strong approximation Monte-Carlo schemes for stochastic volatility models

Abstract:

C.Kahl, P.Jaeckel 2006

http://www.math.uni-wuppertal.de/~kahl/publications/FastStrongApproximationMonteCarloSchemesForStochasticVolatilityModels.pdf
http://www.quant-press.com

Monte-Carlo for the Newbies

Abstract:

S.Leger 2006

http://homepages.nyu.edu/~sl1544/MonteCarloNulsEn.pdf
http://www.quant-press.com

Monte-Carlo Methods : Paris 7

Abstract:

A.Millet 2005

http://www.proba.jussieu.fr/pageperso/millet/montecarlo.pdf
http://www.quant-press.com

Monte-Carlo Methods: ENSAI

Abstract:

N.Baud 2004

http://www.lamsade.dauphine.fr/~saunier/M2ISF/poly-ensai-mc.pdf
http://www.quant-press.com

Exact Simulation of Stochastic Volatility and other Affine Jump Diffusion Processes

Abstract:

M.Broadie, O.Kaya 2004

http://people.orie.cornell.edu/~xinguo/FEseminar/papers04/exact_sim_200409.pdf
http://www.quant-press.com

Honey, I Shrunk the Sample Covariance Matrix

Abstract:

O. Ledoit, M. Wolf 2003

http://www.iew.uzh.ch/chairs/wolf/team/wolf/publications/honey.pdf
http://www.quant-press.com

Adaptative Monte Carlo Method, A Variance Reduction Technique

Abstract:

B. Arouna 2003

http://cermics.enpc.fr/~arouna/Arouna.Bouhari.pdf
http://www.quant-press.com

Derivative Pricing, Numerical Methods

Abstract:

K.R. Vetzal 2003

http://www.wiley.com/legacy/wileychi/eqf/docs/Sample_long_article.pdf
http://www.quant-press.com

Efficient Monte Carlo Methods for Value-at-Risk

Abstract:

P.Glasserman, P.Heidelberger, P.Shahabuddin 2000

http://www.gloriamundi.org/detailpopup.asp?ID=453055765
http://www.quant-press.com

The law of the Euler scheme for stochastic differential equations: I. Convergence rate of the distribution function

Abstract:

V. Bally, D. Talay 1996

http://www-sop.inria.fr/members/Denis.Talay/fichiers-pdf/vladnew2.pdf

http://www.quant-press.com

The law of the Euler scheme for stochastic differential equations. II. Convergence rate of the density

Abstract:

V. Bally, D. Talay 1996

http://www-sop.inria.fr/members/Denis.Talay/fichiers-pdf/vladv2.pdf
http://www.quant-press.com

Finite Difference Scheme for Heston Model

Abstract:

S.Lin 2008

http://eprints.maths.ox.ac.uk/718/01/Sensen_Lin_thesis.pdf
http://www.quant-press.com

ADI finite difference schemes for option pricing in the Heston model with correlation

Abstract:

K.J.Hout, S.Foulon 2007

http://www.win.ua.ac.be/~kihout/HestonADI.pdf
http://www.quant-press.com

Partial differential equations in finance

Abstract:

Y.Achdou, O.Bokanowski, T.Lelievre 2007

http://people.math.jussieu.fr/~boka/enseignement/pdefinance2.pdf
http://www.quant-press.com

Numerical Methods for Controlled Hamilton-Jacobi-Bellman PDEs in Finance

Abstract:

P.A.Forsyth, G.Labahn 2007

http://www.cs.uwaterloo.ca/~glabahn/Papers/borrow-lend.pdf
http://www.quant-press.com

Pricing Equity Derivatives under Stochastic Volatility : A Partial Differential Equation Approach

Abstract:

R. Sheppard 2007

http://www.datasimfinancial.com/forum/files/roelof_190.pdf
http://www.quant-press.com

Finite Difference Methods for Option Valuation with Jump Processes

Abstract:

V.Surkov 2006

http://www.cs.toronto.edu/~vsurkov/presentations/finite_difference_methods_option_valuation_jumps_uoft_06.pdf
http://www.quant-press.com

Convergence analysis of Crank-Nicolson and Rannacher time-marching

Abstract:

M.B. Giles, R. Carter 2005

ftp://ftp.comlab.ox.ac.uk/pub/Documents/techreports/NA-05-16.pdf
http://www.quant-press.com

Singularity Removing Transformations for Partial Differential Equations in Finance

Abstract:

P. Raahauge 2005

http://www.cls.dk/caf/raahauge.pdf
http://www.quant-press.com

Convergence analysis of Crank-Nicolson and Rannacher time-marching

Abstract:

M.B. Giles, R. Carter 2005

ftp://ftp.comlab.ox.ac.uk/pub/Documents/techreports/NA-05-16.pdf
http://www.quant-press.com

Numerical Methods and Volatility Models for Valuing Cliquet Options

Abstract:

H.A.Windcliff, P.A.Forsyth, K.R.vetzal 2005

http://www.cs.uwaterloo.ca/~paforsyt/cliquet.pdf
http://www.quant-press.com

Derivative Pricing, Numerical Methods

Abstract:

K.R. Vetzal 2003

http://www.wiley.com/legacy/wileychi/eqf/docs/Sample_long_article.pdf
http://www.quant-press.com

Numerical solution of the Black-Scholes equation with a small number of grid points

Abstract:

C.C.W. Leentvaar 2003

http://ta.twi.tudelft.nl/users/vuik/numanal/leentvaar_afst.pdf
http://www.quant-press.com

A Penalty Method for American Options with Jump Diffusion Processes

Abstract:

Y. d Halluin, P.A. Forsyth, G. Labahn 2003

http://www.cs.uwaterloo.ca/%7Epaforsyt/jump_amer.pdf
http://www.quant-press.com

Why Be Backward? Forward Equations for American Options

Abstract:

P.Carr, A.Hirsa 2002

http://www.math.nyu.edu/research/carrp/papers/pdf/riskfwdPDE1.pdf
http://www.quant-press.com

Robust Numerical Methods for PDE Models of Asian Options

Abstract:

R. Zvan, P.A. Forsyth, K.R. Vetzal 2000

http://www.cs.uwaterloo.ca/research/tr/1996/28/CS-96-28.pdf
http://www.quant-press.com

A quantization tree algorithm: improvements and financial applications for swing options

Abstract:
In this paper, we suggest several improvements to the numerical implementation of the quantization method in order to get accurate premium estimations. This technique is applied to derivative pricing in energy markets. Several ways of modeling energy derivatives are described and finally numerical examples are provided to test the procedure accuracy.

A.L. Bronstein, B. Wilbertz, G. Pages 2008

http://arxiv.org/PS_cache/arxiv/pdf/0705/0705.2110v1.pdf
http://www.quant-press.com

Optimal quantization for the pricing of swing options

Abstract:
In this paper, we investigate a numerical algorithm for the pricing of swing options, relying on the so-called optimal quantization method. The numerical procedure is described in details and numerous simulations are provided to assert its efficiency. In particular, we carry out a comparison with the Longstaff-Schwartz algorithm.

O. Bardou, S. Bouthemy, G. Pages 2007

http://arxiv.org/PS_cache/arxiv/pdf/0705/0705.2110v1.pdf
http://www.quant-press.com

Pricing path-dependent options using optimized functional quantization

Abstract:
Presentation

G. Pages, J. Printems 2006

http://telechargement.maths-fi.fr/quantification/Pag_Pri_NMF06.pdf
http://www.quant-press.com

First-Order Schemes in the Numerical Quantization Method

Abstract:

V. Bally, G. Pagès, J. Printemps 2004

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=371395
http://www.quant-press.com

SIMD-oriented Fast Mersenne Twister: a 128-bit Pseudorandom Number Generator

Abstract:

M. Matsumoto, Nishimura T. 2008

http://www.math.sci.hiroshima-u.ac.jp/~m-mat/MT/ARTICLES/sfmt.pdf
http://www.quant-press.com

Improved Long-Period Generators Based on Linear Recurrences Modulo 2

Abstract:

F. Panneton, P. L Ecuyer, and M. Matsumoto 2006

http://www.iro.umontreal.ca/~lecuyer/myftp/papers/wellrng.pdf
http://www.quant-press.com

An Objected-Oriented Random-Number Package with Many Long Streams and Substreams

Abstract:

P. L Ecuyer, R. Simard, E. J. Chen, and W. D. Kelton 2002

http://www.iro.umontreal.ca/~lecuyer/myftp/papers/streams00.pdf
http://www.quant-press.com

Mersenne Twister: A 623-dimensionally equidistributed uniform pseudorandom number generator

Abstract:

M. Matsumoto and T. Nishimura 1998

http://www.math.sci.hiroshima-u.ac.jp/~m-mat/MT/ARTICLES/mt.pdf
http://www.quant-press.com

Random Numbers for Simulation

Abstract:

P. L Ecuyer 1990

http://www.iro.umontreal.ca/~lecuyer/myftp/papers/cacm90.pdf
http://www.quant-press.com

Quasi-monte carlo methods and pseudo-random numbers

Abstract:

H. Niederreiter 1978

http://www.ams.org/bull/1978-84-06/S0002-9904-1978-14532-7/S0002-9904-1978-14532-7.pdf
http://www.quant-press.com

Trinomial or Binomial: Accelerating American Put Option Price on Trees

Abstract:

J.H.Chan, M.S.Joshi, R.Tang, C.Yang 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1261745
http://www.quant-press.com

Efficient Calibration of Trinomial Trees for One-Factor Short Rate Models

Abstract:

M.Leippold, Z.Wiener 2003

http://finance.wharton.upenn.edu/~benninga/mma/leippold-wiener2003.pdf
http://www.quant-press.com

Algorithms Behind Term Structure Models of Interest Rates II: The Hull-White Trinomial Tree of Interest Rates

Abstract:

M.Leipold, Z.Viener 2000

http://finance.wharton.upenn.edu/~benninga/mma/hw.pdf"
http://www.quant-press.com

Implied Trinomial Trees of the Volatility Smile

Abstract:

E. Derman, I. Kani, N. Chriss 1996

http://www.smartquant.com/references/Volatility/vol14.pdf"
http://www.quant-press.com

Delta Hedging Works On Market Completeness for Diffusion Processes

Abstract:
We discuss market completeness for diffusion-driven financial models beyond the classic requirement that the volatility matrix of traded in- struments is invertible

H.Buehler 2009

http://www.quantitative-research.de/dl/DeltaHedgingWorks1.1.pdf
http://www.quant-press.com

A Note on Hedging with Local and Stochastic Volatility Models

Abstract:

F.Mecurio, M.Morini 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1294284
http://www.quant-press.com

No-Dynamic-Arbitrage and Market Impact

Abstract:

J. Gatheral 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1292353
http://www.quant-press.com

Risk Minimization in Stochastic Volatility Models: Model Risk and Empirical Performance

Abstract:

R.Poulsen, K.R.Schenk-Hoppe, C.O.Ewald 2008

http://www.math.ku.dk/~rolf/Klaus/pse.pdf
http://www.quant-press.com

A Stochastic Processes Toolkit for Risk Management

Abstract:

D.Brigo, A.Dalessandro, M.Neugebauer, F.Triki 2007

http://www.damianobrigo.it/toolboxweb.pdf
http://www.quant-press.com

Model risk and determination of economic capital in the Solvency 2 project

Abstract:

F. Planchet, P. Therond 2007

http://www.isfa.info/jwa/Documentation/1226.nsf/0/1040fbe8c709ecd6c125728c007ca702/$FILE/Article_v5_US.pdf
http://www.quant-press.com

Volatility Surfaces : Theory, Rules of Thumb, and Empirical Evidence

Abstract:

T. Daglish, J. White, W. Suo 2006

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/DaglishHullSuoRevised.pdf"
http://www.quant-press.com

Visual Portfolio Analysis

Abstract:

U.Wehrspohn 2003

http://www.gloriamundi.org/detailpopup.asp?ID=453056934
http://www.quant-press.com

The Basis Risk of Catastrophic-Loss Index Securities

Abstract:

J. D. Cummins, D. Lalonde & R. D. Phillips 2002

fic.wharton.upenn.edu/fic/papers/00/0022.pdf
http://www.quant-press.com

A methodology for assessing model risk and its application to the implied volatility function model

Abstract:

J. Hull, W. Suo 2001

http://www.rotman.utoronto.ca/~hull/DownloadablePublications/HullSuoPaper.pdf"
http://www.quant-press.com

Incorporating Stress Tests into Market Risk Modeling

Abstract:

J.R.Aragones, C.Blanco, K.Dowd 2001

http://www.gloriamundi.org/detailpopup.asp?ID=453055467
http://www.quant-press.com

Model Risk

Abstract:

E.Derman 1996

http://www.ederman.com/new/docs/gs-model_risk.pdf
http://www.quant-press.com

Securitization of catastrophe mortality risks

Abstract:

Y. Lin, S. H. Cox 2006

http://www.fma.org/SLC/Papers/MortmodelFMA.pdf
http://www.quant-press.com

Pricing death : Frameworks for the valuation and securitization of mortality risk

Abstract:

A. J. Cairns, D. Blake & K. Dowd 2006

http://www.ma.hw.ac.uk/~andrewc/papers/ajgc48.pdf
http://www.quant-press.com

Securitization of life insurance assets and liabilities

Abstract:

J. D. Cummins 2004

http://fic.wharton.upenn.edu/fic/papers/04/0403.pdf
http://www.quant-press.com

Risk Horizon and Rebalancing Horizon in Portfolio Risk Measurement

Abstract:
This paper analyzes portfolio risk and volatility in the presence of constraints on portfolio rebalancing frequency. This investigation is motivated by the incremental risk charge (IRC) introduced by the Basel Committee on Banking Supervision. In contrast to the standard market risk measure based on a ten-day value-at-risk calculated at 99% confidence, the IRC considers more extreme losses and is measured over a one-year horizon. More importantly, whereas ten-day VaR is ordinarily calculated with a portfolio's holdings held fixed, the IRC assumes a portfolio is managed dynamically to a target level of risk, with constraints on rebalancing frequency. The IRC uses discrete rebalancing intervals (e.g., monthly or quarterly) as a rough measure of potential illiquidity in underlying assets. We analyze the effect of these rebalancing intervals on the portfolio's profit and loss distribution over a risk-measurement horizon. We derive limiting results, as the rebalancing frequency increases, for the difference between discretely and continuously rebalanced portfolios; we use these to approximate the

loss distribution for the discretely rebalanced portfolio relative to the continuously rebalanced portfolio. Our analysis leads to explicit measures of the impact of discrete rebalancing under a simple model of asset dynamics.

P.Glasserman 2009

http://www2.gsb.columbia.edu/faculty/pglasserman/Other/rebalance.pdf
http://www.quant-press.com

Variance Risk Premia

Abstract:

P.Carr, L.Wu 2007

http://www.math.nyu.edu/research/carrp/papers/pdf/vsfinal.pdf
http://www.quant-press.com

The Use of GARCH Models in VaR Estimation

Abstract:

T. Angelidis, A. Benos, S. Degiannakis 2003

http://stat-athens.aueb.gr/~sdegia/papers/HFAA2003ft.pdf
http://www.quant-press.com

Dynamic Value-at-Risk

Abstract:

A.Rogachev 2002

http://www.gloriamundi.org/detailpopup.asp?ID=453056566
http://www.quant-press.com

Valuation and Risk Metrics

Abstract:

Comm of CROs 2002

http://www.gloriamundi.org/detailpopup.asp?ID=453056175
http://www.quant-press.com

An Empirical Evaluation of Value at Risk by Scenario Simulation

Abstract:

P.Abken 2000

http://www.gloriamundi.org/detailpopup.asp?ID=453055481
http://www.quant-press.com

Efficient Monte Carlo Methods for Value-at-Risk

Abstract:

P.Glasserman, P.Heidelberger, P.Shahabuddin 2000

http://www.gloriamundi.org/detailpopup.asp?ID=453055765
http://www.quant-press.com

Coherent measures of risk

Abstract:

P. Artzner & F. Delbaen & J. Eber & D. Heath 1998

www.math.ethz.ch/~delbaen/ftp/preprints/CoherentMF.pdf
http://www.quant-press.com

Incorporating Volatility Updating into The Historical Simulation Method for Value At Risk

Abstract:

J. Hull, A. White 1998

http://www.rotman.utoronto.ca/~amackay/fin/hwvar2.pdf
http://www.quant-press.com

Value At Risk when Daily Changes in Market Variables are not Normally Distributed

Abstract:

J. Hull, A. White 1997

http://www.rotman.utoronto.ca/~amackay/fin/hwvar1.pdf
http://www.quant-press.com

Pricing Interest Rate Exotics in Multi-Factor Gaussian Interest Rate Models

Abstract:
For many interest rate exotic options, for example options on the slope of the yield curve or American featured options, a one factor assumption for term structure evolution is inappropriate. These options derive their value from changes in the slope or curvature of the yield curve and hence are more realistically priced with multiple factor models. However, efficient construction of short rate trees becomes computationally intractable as we increase the number of factors and in particular as we move to non-Markovian models In this paper we describe a general framework for pricing a wide range of interest rate exotic options under a very general family of multi-factor Gaussian interest rate models. Our framework is based on a computationally efficient implementation of Monte Carlo integration utilising analytical approximations as control variates. These techniques extend the analysis of Clewlow, Pang, and Strickland [1997] for pricing interest rate caps and swaptions.

L. Clewlow, C. Strickland 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=128669
http://www.quant-press.com

Interest Rate Derivatives : Lecture notes

Abstract:

G. West 2007

http://www.finmod.co.za/ird.pdf
http://www.quant-press.com

A multifactor, stochastic volatility HJM model in a low dimensional markov representation: theory over view and implementation details

Abstract:

M.Dirkmann 2006

http://colloquium.mathfinance.de/papers/dirkmann.pdf
http://www.quant-press.com

Pricing Swaptions and Coupon Bond Options in Affine Term Structure Models

Abstract:

D.Schrager, A.Pelsser 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=927846
http://www.quant-press.com

On the discretization schemes for the CIR (and Bessel squared) processes

Abstract:

A.Alfonsi 2005

http://cermics.enpc.fr/~alfonsi/SC_preprint.pdf
http://www.quant-press.com

An Investigation of Various Interest Rate Models and their Calibration in the SA Market

Abstract:

S.Svoboda 2005

http://web.wits.ac.za/NR/rdonlyres/EC8B7EF6-E72C-4EA1-954D-A9D8180564CD/0/simonamsccomplete.zip
http://www.quant-press.com

Option Pricing in HJM Model using an Asymptotic Expansion Method

Abstract:

A.Takahashi, S.Matsushima 2004

http://www.fsa.go.jp/frtc/english/e_nenpou/2004/05.pdf
http://www.quant-press.com

Couverture des risques dans les marchés financiers

Abstract:

N. El karoui 2004

http://www.cmap.polytechnique.fr/~elkaroui/masterfin034.pdf
http://www.quant-press.com

Interest Rate Model Calibration and Risk-Management Using Semidefinite Programming

Abstract:

A.d Apresmont 2003

http://www.princeton.edu/~aspremon/ThesisCalibrationSDP.pdf
http://www.quant-press.com

Yield Curve Modelling with Skews and Stochastic Volatility

Abstract:

L.Andersen, J.Andreasen 2002

http://www.globalriskguard.com/resources/fideriv/andersen3.pdf
http://www.quant-press.com

Numerical Implementation of Hull-White Interest Rate Model: Hull-White Tree vs Finite Differences

Abstract:

A.Sepp 2002

http://avikram.freeshell.org/uploads/73.pdf
http://www.quant-press.com

On deterministic-shift extensions of short-rate models

Abstract:

D. Brigo, F. Mercurio 2001

http://www.fabiomercurio.it/deterministic_shift.pdf
http://www.quant-press.com

The General Hull-White Model and Super Calibration

Abstract:

J.Hull, A.White 2000

http://www.rotman.utoronto.ca/%7Ehull/DownloadablePublications/Generalized%20HW%20model%20and%20Super%20Calibration.pdf

http://www.quant-press.com

Markov-Functional Interest Rate Models

Abstract:

P.J.Hunt, J.Kennedy, A.Pelsser 1999

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=49240&rec=1&srcabs=1081337
http://www.quant-press.com

Markov Representation of the Heath-Jarrow-Morton Model

Abstract:

O. Cheyette 1999

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=6073
http://www.quant-press.com

Using Hull-White interest rate trees

Abstract:

J.Hull, A.White 1996

http://www.rotman.utoronto.ca/%7Eamackay/fin/USETREE1a.pdf
http://www.quant-press.com

The Displaced Diffusion as an Approximation of the CEV

Abstract:

S.Svoboda-Greenwood 2007

http://people.maths.ox.ac.uk/svoboda/other/SvobodaGreenwood28042007.pdf
http://www.quant-press.com

A jump to default extended CEV model: an application of Bessel processes

Abstract:

P. Carr, V. Linetsky 2006

http://users.iems.northwestern.edu/~linetsky/JDCEV.pdf
http://www.quant-press.com

Lookback options and diffusion hitting times : A spectral expansion approach

Abstract:

V. Linetsky 2004

http://users.iems.northwestern.edu/~linetsky/lookback.pdf

http://www.quant-press.com

Pricing Options on Scalar Diffusions : an Eigenfunction Expansion Approach

Abstract:

D. Davydov, V. Linetsky 2003

http://users.iems.northwestern.edu/~linetsky/eigenfunction.pdf
http://www.quant-press.com

Pricing Forward Start Options under the CEV Model With Applications in Financial Engineering

Abstract:

Unknown 2002

http://www.fma.org/Siena/Papers/410109.pdf
http://www.quant-press.com

Pricing and Hedging Path-Dependent Options Under the CEV Process

Abstract:

D. Davydov, V. Linetsky 2001

http://users.iems.northwestern.edu/~linetsky/cev.pdf
http://www.quant-press.com

Convergence Heston to SVI

Abstract:
By an appropriate change of variables, we prove here that the SVI implied volatility parameterisation proposed in [2] and the large-time asymptotic of the Heston implied volatility derived in [1] do agree algebraically, thus confirming a conjecture proposed by J. Gatheral in [2] as well as proposing a simpler expression for the asymptotic implied volatility under the Heston model.

J.Gatheral, A.Jacquier 2010

http://www.math.nyu.edu/fellows_fin_math/gatheral/SVIHESTON.pdf
http://www.quant-press.com

Efficient Simulation of the Double Heston Model

Abstract:
Stochastic volatility models have replaced Black-Scholes model since they are able to generate a volatility smile. However, standard models fail to capture the smile slope and level movements. The Double-Heston model provides a more flexible approach to model the stochastic variance. In this paper, we focus on numerical implementation of this model. First, following the works of Lord and Kahl, we correct the analytical call option price formula given by Christoffersen et al. Then, we compare numerically the discretization schemes of Andersen, Zhu and Alfonsi to the Euler scheme.

P. Gauthier, D. Possamai 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1434853
http://www.quant-press.com

Time Dependent Heston Model

Abstract:
The use of the Heston model is still challenging because it has a closed formula only when the parameters are constant [Hes93] or piecewise constant [MN03]. Hence, using a small volatility of volatility expansion and Malliavin calculus techniques, we derive an accurate analytical formula for the price of vanilla options for any time dependent Heston model (the accuracy is less than a few bps for various strikes and maturities). In addition, we establish tight error estimates. The advantage of this approach over Fourier based methods is its rapidity (gain by a factor 100 or more), while maintaining a competitive accuracy. From the approximative formula, we also derive some corollaries related first to equivalentHestonmodels (extending some work of Piterbarg on stochastic volatility models [Pit05b]) and second, to the calibration procedure in terms of ill-posed problems.

E. Benhamou, E. Gobet, M. Miri 2009

http://hal.archives-ouvertes.fr/docs/00/37/07/17/PDF/BenhamouGobetMiri_HestonModel.pdf
http://www.quant-press.com

On the Heston Model with Stochastic Interest Rates

Abstract:
In this article we discuss the Heston [17] model with stochastic interest rates driven by Hull-White [18] (HW) or Cox-Ingersoll-Ross [8] (CIR) processes. We define a so-called volatility compensator which guarantees that the Heston hybrid model with a non-zero correlation between the equity and interest rate processes is properly defined. Moreover, we propose an approximation for the characteristic function, so that pricing of basic derivative products can be efficiently done using Fourier techniques [12; 7]. We also discuss the effect of the approximations on the instantaneous correlations, and check the influence of the correlation between stock and interest rate on the implied volatilities.

L. A. Grzelak, K. Oosterlee 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1382902
http://www.quant-press.com

Gamma Expansion of the Heston Stochastic Volatility Model

Abstract:

P.Glasserman, K-K.Kim 2008

http://www2.gsb.columbia.edu/faculty/pglasserman/Other/GammaExpansion.pdf
http://www.quant-press.com

High order discretization schemes for the CIR process: application to Affine Term Structure and Heston models

Abstract:

A.Alfonsi 2008

http://hal.archives-ouvertes.fr/docs/00/28/88/11/PDF/2nd_order_ATSM.pdf
http://www.quant-press.com

Complex Logarithms in Heston-Like Models

Abstract:

R. Lord, C. Kahl 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1105998
http://www.quant-press.com

Efficient, Almost Exact Simulation of the Heston Stochastic Volatility Model

Abstract:

A.V.Haastrecht, A.Pelsser 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1131137
http://www.quant-press.com

Modern Logarithms for the Heston Model

Abstract:

I.Fahrner 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=954785
http://www.quant-press.com

Hedging under the Heston Model with Jump-to-Default

Abstract:

P.Carr, W.Schoutens 2007

http://perswww.kuleuven.be/~u0009713/HestonJtD.pdf
http://www.quant-press.com

American Options in the Heston Model With Stochastic Interest Rate

Abstract:

S.Boyarchenko, S.Levendorski 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1031282
http://www.quant-press.com

Models with time-dependent parameters using transform methods: application to Heston s model

Abstract:

A.Elices 2007

http://arxiv.org/abs/0708.2020
http://www.quant-press.com

Calibration Of the Heston Model with Application in Derivative Pricing and Hedging

Abstract:

C.Bin 2007

http://www.tbm.tudelft.nl/live/ServeBinary?id=70163a1a-37c1-4f78-8cb0-50653874a96b&binary=/doc/Rabo_report_st%20(final).pdf
http://www.quant-press.com

Markovian Projection Onto a Heston Model

Abstract:

V. Piterbarg, A.Antonov, T.Misirpashaev 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=997001
http://www.quant-press.com

Convexity of option prices in the Heston model

Abstract:

J.Wang 2007

http://www.math.uu.se/research/pub/Wang1.pdf
http://www.quant-press.com

ADI finite difference schemes for option pricing in the Heston model with correlation

Abstract:

K.J.Hout, S.Foulon 2007

http://www.win.ua.ac.be/~kihout/HestonADI.pdf
http://www.quant-press.com

Optimal Fourier inversion in semi-analytical option pricing

Abstract:
At the time of writing this article, Fourier inversion is the computational method of choice for a fast and accurate calculation of plain vanilla option prices in models with an analytically available characteristic function. Shifting the contour of integration along the complex plane allows for different representations of the inverse Fourier integral. In this article, we present the optimal contour of the Fourier integral, taking into account numerical issues such as cancellation and explosion of the characteristic function. This allows for robust and fast option pricing for almost all levels of strikes and maturities.

R. Lord, C. Kahl 2006

http://www.math.uni-wuppertal.de/~kahl/publications/optimalfourierinversion.pdf
http://www.quant-press.com

Efficient Simulation of the Heston Stochastic Volatility Model

Abstract:

L.Andersen 2006

http://www.javaquant.net/papers/LeifAndersenHeston.pdf
http://www.quant-press.com

The Little Heston Trap

Abstract:

H.Albrecher, P.Mayer, W.Schoutens, J.Tistaert 2006

http://perswww.kuleuven.be/~u0009713/HestonTrap.pdf
http://www.quant-press.com

Not-so-complex logarithms in the Heston model

Abstract:

C.Kahl, P.Jackel 2006

http://www.math.uni-wuppertal.de/~kahl/publications/NotSoComplexLogarithmsInTheHestonModel.pdf
http://www.quant-press.com

The Heston Model: A Practical Approach

Abstract:

N.Moodley 2005

http://math.nyu.edu/~atm262/fall06/compmethods/a1/nimalinmoodley.pdf
http://www.quant-press.com

On the discretization schemes for the CIR (and Bessel squared) processes

Abstract:

A. Alfonsi 2005

http://cermics.enpc.fr/reports/CERMICS-2005/CERMICS-2005-279.pdf
http://www.quant-press.com

Hedging Exotic Options in Stochastic Volatility and Jump Diffusion Models

Abstract:

K. Detlefsen 2005

http://edoc.hu-berlin.de/master/detlefsen-kai-2005-01-27/PDF/detlefsen.pdf
http://www.quant-press.com

Probability distribution of returns in the Heston model with stochastic volatility

Abstract:
We study the Heston model, where the stock price dynamics is governed by a geometrical (multiplicative) Brownian motion with stochastic variance. We solve the corresponding Fokker-Planck equation exactly and, after integrating out the variance, find an analytic formula for the time-dependent

probability distribution of stock price changes (returns). The formula is in excellent agreement with the Dow Jones index for time lags from 1 to 250 trading days. For large returns, the distribution is exponential in log-returns with a time-dependent exponent, whereas for small returns it is Gaussian. For time lags longer than the relaxation time of variance, the probability distribution can be expressed in a scaling form using a Bessel function. The Dow Jones data for 1982-2001 follow the scaling function for seven orders of magnitude.

A. Dragulescu, V.M. Yakovenko 2002

http://www2.physics.umd.edu/~yakovenk/papers/QuantFinance-2-443-2002.pdf
http://www.quant-press.com

Option Valuation Using Fast Fourier Transforms

Abstract:

P.Carr, D.Madan 1999

http://www.imub.ub.es/events/sssf/vgfrier7.pdf
http://www.quant-press.com

A Closed-Form Solution for Options with Stochastic Volatility with Applications to Bond and Currency Options

Abstract:

S. L. Heston 1993

http://www.javaquant.net/papers/Heston-original.pdf
http://www.quant-press.com

Asymptotics of Implied Volatility in Local Volatility Models

Abstract:
Using an expansion of the transition density function of a 1-dimensional time inhomogeneous diffusion, we obtain the ?rst and second order terms in the short time asymptotics of European call option prices. The method described can be generalized to any order. We then use these option prices approximations to calculate the ?rst order and second order deviation of the implied volatility from its leading value and obtain approximations which we numerically demonstrate to be highly accurate. The analysis is extended to degenerate diffusion's using probabilistic methods, i.e. the so called principle of not feeling the boundary.

J.Gatheral, E.P.Hsu, P.M.Laurence, C.Ouyang, T-H.Wang 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1542077
http://www.quant-press.com

A Practical Guide to Implied and Local Volatility

Abstract:
We consider a stochastic local volatility model with domestic and foreign stochastic interest rates such that the volatilitydecomposes into a deterministic local volatility plus some bias terms. Assuming a collapse process for the variance with the same random variable for all time and deterministic zero-coupon bond volatility functions, we are going to describe in detail the implementation of that model, focusing on the computation of a proper deterministic local volatility. To do so, we choose to generate an implied volatility surface without arbitrage in space and in time by parametrising a mixture of shifted lognormal densities under constraints and we use a Differential Evolution algorithm to calibrate the model's parameters to a finite set of option prices. We will therefore need to devise an evolutionary

algorithm that handle constraints in a simple and efficient way. Using some of the improvements made to the DE algorithm combined with simple and robust constraints handling mechanisms we will propose a modified algorithm for solving our optimisation problem under constraints which greatly improves its performances.

D.A.Bloch 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1538808
http://www.quant-press.com

Local Volatility Enhanced by a Jump to Default

Abstract:
A local volatility model is enhanced by the possibility of a single jump to default. The jump has a hazard rate that is the product of the stock price raised to a prespecified negative power and a deterministic function of time. The empirical work uses a power of -1.5. It is shown how one may simultaneously recover from the prices of credit default swap contracts and equity option prices both the deterministic component of the hazard rate function and revised local volatility. The procedure is implemented on prices of credit default swaps and equity options for GM and FORD over the period October 2004 to September 2007.

P.Carr, D.P.Madan 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1540874
http://www.quant-press.com

Analytical Formulas for Local Volatility Model with Stochastic Rates

Abstract:
This paper presents new approximation formulae of European options in a local volatility model with stochastic interest rates. This is a companion paper to our work on perturbation methods for local volatility models http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1275872 for the case of stochastic interest rates. The originality of this approach is to model the local volatility of the discounted spot and to obtain accurate approximations with tight estimates of the error terms. This approach can also be used in the case of stochastic dividends or stochastic convenience yields. We finally provide numerical results to illustrate the accuracy with real market data.

E.Benhamou, E.Gobet, M.Miri 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1492054
http://www.quant-press.com

Volatility and Dividends :Volatility Modelling with Cash Dividends and simple Credit Risk

Abstract:
This article shows how to incorporate cash dividends and credit risk into equity derivatives pricing and risk management. In essence, we show that in an arbitrage-free model the stock price process upon default must have the form St = (F *t - D t)Xt + Dt where X is a (local) martingale with X0 = 1, the curve F * is the risky forward and D is the floor imposed on the stock price process in the form of appropriately discounted future dividends. We show that the method presented is the only such method which is consistent with the assumption of cash dividends and simple credit risk. We discuss the implications for implied volatility, no-arbitrage conditions and we derive a version of Dupire's formula which handles cash dividend and credit risk properly. We discuss pricing and risk management of European options, PDE methods and in quite some detail variance swaps and related derivatives such as gamma swaps, conditional variance swaps and corridor variance swaps. Indeed, to the our best if our knowledge, this is the first article which shows the correct handling of cash dividends when pricing variance swaps.

H.Buelher 2009

http://www.quantitative-research.de/dl/Dividends_And_Volatility102.pdf
http://www.quant-press.com

Local Volatility Enhanced by a Jump to Default

Abstract:
A local volatility model is enhanced by the possibility of a single jump to default. The jump has a hazard rate that is the product of the stock price raised to a prespeciÖed negative power and a deterministic function of time. The empirical work uses a power of It is shown how one may simultaneously recover from the prices of credit default swap contracts and equity option prices both the deterministic component of the hazard rate function and revised local volatility. The procedure is implemented on prices of credit default swaps and equity options for GM and F ORD over the period October 2004 to S eptember 2007:

P.Carr 2009

http://www.math.nyu.edu/research/carrp/papers/pdf/lvjtdpaper.pdf
http://www.quant-press.com

Closed Forms for European Options in a Local Volatility Model

Abstract:
Because of its very general formulation, the local volatility model does not have an analytical solution for European options. In this article, we present a new methodology to derive closed form solutions for the price of any European options. The formula results from an asymptotic expansion, terms of which are Black-Scholes price and related Greeks. The accuracy of the formula depends on the payoff smoothness and it converges with very few terms.

E. Benhamou, E. Gobet, M. Miri 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1275872
http://www.quant-press.com

Incorporating an Interest Rate Smile in an Equity Local Volatility Model

Abstract:
The focus of this paper is on finding a connection between the interest rate and equity asset classes. We propose an equity interest rate hybrid model which preserves market observable smiles: the equity from plain vanilla products via a local volatility framework and the interest rate from caps and swaptions via the Stochastic Volatility Libor Market Model. We define a multi-factor short-rate process implied from the Libor Market Model via an arbitrage-free interpolation and combine it with the local volatility equity model for stochastic interest rates. We show that the interest rate smile has a significant impact on the equity local volatility. The model developed is intuitive and straightforward, enabling consistent pricing of related hybrid products. Moreover, it preserves the non-arbitrage Heath, Jarrow, Morton conditions.

L. A. Grzelak, N. Borovykh, S. V. Weeren, K. Oosterlee 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1295882
http://www.quant-press.com

Implied Levy Volatility

Abstract:

J.M.Corcuera, F.Guillaume, P.Leoni, W.Schoutens 2008

https://perswww.kuleuven.be/~u0009713/LevyImplied.pdf
http://www.quant-press.com

Stochastic Interest Rates for Local Volatility Hybrids Models

Abstract:

E.Benhamou, A.Rivoira, A.Gruz 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1107711
http://www.quant-press.com

Lecture 6: Extending Black-Scholes ; Local Volatility Models

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture6.pdf
http://www.quant-press.com

Lecture 7: Local Volatility Continued

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture7.pdf
http://www.quant-press.com

Lecture 8: Local Volatility Models ; Implication

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture8.pdf
http://www.quant-press.com

Lecture 9: Patterns of Volatility Change

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture9.pdf
http://www.quant-press.com

Option Pricing with Quadratic Volatility: A Revisit

Abstract:

L.Andersen 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1118399
http://www.quant-press.com

Hyp Hyp Hooray

Abstract:

P.Jaeckel 2008

http://www.math.uni-wuppertal.de/~kahl/publications/HypHypHooray.pdf
http://www.quant-press.com

Hyperbolic local volatility

Abstract:

P.Jaeckel 2007

http://www.btinternet.com/~pjaeckel/HyperbolicLocalVolatility.pdf
http://www.quant-press.com

Smile interpolation and calibration of the local volatility model

Abstract:

N.Kahale 2005

http://nkahale.free.fr/papers/Interpolation.pdf
http://www.quant-press.com

Local and Stochastic Volatility Models: An Investigation into the Pricing of Exotic Equity Options

Abstract:

L.Majmin 2005

http://web.wits.ac.za/NR/rdonlyres/C4D22C49-DDCD-40E7-8CBC-DC123FE4B736/0/lisamajmin.pdf
http://www.quant-press.com

Arbitrage-Free Smoothing of the Implied Volatility Surface

Abstract:

M.R. Fengler 2005

http://sfb649.wiwi.hu-berlin.de/papers/pdf/SFB649DP2005-019.pdf
http://www.quant-press.com

From Local Volatility to Local Levy Models

Abstract:

P.Carr, D.Madan, M.Yor, H.Geman 2004

http://www.ima.umn.edu/talks/workshops/4-12-16.2004/madan/locallevy3.pdf
http://www.quant-press.com

Pricing with a Smile

Abstract:

B. Dupire 2004

http://www.cmap.polytechnique.fr/~rama/dea/dupire.pdf
http://www.quant-press.com

Lecture 1: Stochastic Volatility and Local Volatility

Abstract:

J.Gatheral 2002

http://www.math.ku.dk/~rolf/teaching/ctff03/Gatheral.1.pdf
http://www.quant-press.com

Implied Volatility: Statics, Dynamics, and Probabilistic Interpretation

Abstract:
Given the price of a call or put option, the Black-Scholes implied volatility is the unique volatility parameter for which the Bulack-Scholes formula recovers the option price. This article surveys research activity relating to three theoretical questions: First, does implied volatility ad- mit a probabilistic interpretation? Second, how does implied volatility behave as a function of strike and expiry? Here one seeks to characterize the shapes of the implied volatility skew (or smile) and term structure, which together constitute what can be termed the statics of the implied volatility surface. Third, how does implied volatility evolve as time rolls forward? Here one seeks to characterize the dynamics of implied volatility.

R. Lee 2002

http://www.math.uchicago.edu/~rl/impvol.pdf
http://www.quant-press.com

Black-Scholes Goes Geometric

Abstract:

C.Albanese, G.Campolieti, P.Carr, A.Lipton 2001

http://www.level3finance.com/cantrisk.pdf
http://www.quant-press.com

Equivalent Black Volatilities

Abstract:

P.S.Hagan, D.E.Woodward 1998

http://www.nuclearphynance.com/User%20Files/138/EquivBlackVols.pdf
http://www.quant-press.com

Calibrating Volatility Surfaces via Relative-Entropy Minimization

Abstract:

M. Avellaneda, C. Friedman, R. Holmes, D. Samperi 1997

http://www.math.nyu.edu/faculty/avellane/EntropyVolSurface.pdf
http://www.quant-press.com

Trading and Hedging Local Volatility

Abstract:

E.Derman, I.Kani, M.Kamal 1996

http://www.ederman.com/new/docs/gs-trading_and_hedging.pdf
http://www.quant-press.com

The Local Volatility Surface Unlocking the Information in Index Option Prices

Abstract:

E.Derman, I.Kani, J.Z.Zou 1995

http://www.ederman.com/new/docs/gs-local_volatility_surface.pdf
http://www.quant-press.com

Options on Realized Variance and Convex Orders

Abstract:
Realized variance option and options on quadratic variation normalized to unit expectation are analyzed for the property of monotonicity in maturity for call options at a fixed strike. When this condition holds the risk neutral densities are said to be increasing in the convex order. For Lévy processes such prices decrease with maturity. A time series analysis of squared log returns on the S&P 500 index also reveals such a decrease. If options are priced to a slightly increasing level of acceptability then the resulting risk neutral densities can be increasing in the convex order. Calibrated stochastic volatility models yield possibilities in both directions. Finally we consider modelling strategies guaranteeing an increase in convex order for the normalized quadratic variation. These strategies model instantaneous variance as a normalized exponential of a Lévy process. Simulation studies suggest that other transformations may also deliver an increase in the convex order.

P.Carr, H.Géman, M.Yor, D.P.Madan 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1540805
http://www.quant-press.com

A Consistent Pricing Model for Index Options and Volatility Derivatives

Abstract:
We propose and study a flexible modeling framework for the joint dynamics of an index and a set of forward variance swap rates written on this index, allowing options on forward variance swaps and options on the underlying index to be priced consistently. Our model reproduces various empirically observed properties of variance swap dynamics and allows for jumps in volatility and returns. An affine specification using Lévy processes as building blocks leads to analytically tractable pricing formulas for options on variance swaps as well as efficient numerical methods for pricing of European options on the underlying asset. The model has the convenient feature of decoupling the vanilla skews from spot/volatility correlations and allowing for different conditional correlations in large and small

spot/volatility moves. We show that our model can simultaneously fit prices of European options on S&P 500 across strikes and maturities as well as options on the VIX volatility index. The calibration of the model is done in two steps, first by matching VIX option prices and then by matching prices of options on the underlying.

R.Cont, T.Kokholm 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1474691
http://www.quant-press.com

Multi-asset Stochastic Local Variance Contracts

Abstract:
Variance swaps now trade actively over-the-counter (OTC) on both stocks and stock indices. Also trading OTC are variations on variance swaps which localize the payoff in time, in the underlying asset price, or both. Given that the price of the underlying asset evolves continuously over time, it is well known that there exists a semi-robust hedge for these localized variance contracts. Remarkably, the hedge succeeds even though the stochastic process describing the instantaneous variance is never specified. In this paper, we present a generalization of these results to the case of two or more underlying assets.

P.Carr, P.Laurence 2009

http://www.math.nyu.edu/research/carrp/papers/pdf/MLVJan30-2009pl.pdf
http://www.quant-press.com

Hedging (Co)Variance Risk with Variance Swaps

Abstract:
In this paper we introduce a new criterion in order to measure the variance and covariance risks in financial markets. Unlike past literature, we quantify the (co)variance risk by comparing the spread between the initial wealths required to obtain the same final utility in an incomplete and completed market case. We provide explicit solutions for both cases in a stochastic correlation framework where the market is completed by introducing volatility products, namely Variance Swaps. Using real data on major indexes, we find that this criterion provides a better measure of the market risks with respect to the (misleading) traditional approach based on the hedging demand.

J.Da Fonseca, M.Grasselli, F.Ielpo 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1102521
http://www.quant-press.com

Pricing and Hedging Volatility Derivatives

Abstract:
This paper studies the pricing and hedging of variance swaps and other volatility derivatives, including volatility swaps and variance options, in the Heston stochastic volatility model. Pricing and hedging results are derived using partial differential equation techniques. We formulate an optimization problem to determine the number of options required to best hedge a variance swap. We propose a method to dynamically hedge volatility derivatives using variance swaps and a finite number of European call and put options.

M. Broadie, A. Jain 2008

http://www.columbia.edu/~mnb2/broadie/Assets/VolDerivatives_20080114.pdf
http://www.quant-press.com

Volatility and Dividends

Abstract:

This article revisits a simple and robust method on how to incorpo- rate the handling of cash dividends and credit risk into equity derivatives pricing and risk management. We will show that the method presented is the only such method which is consistent with the assumption of cash dividends and simple credit risk, and we will demonstrate the impact on the pricing of various derivatives: plain Europeans, American options, Barriers and ¯nally variance swaps and related derivatives. This article is mainly based on results discussed in the first chapter of in Equity Hybrid Derivatives", Overhaus et al, Wiley 2006 [10] and the IQPC presentation Options On Variance: Pricing And Hedging" given in 2006 [2].

H.Buehler 2008

http://www.quantitative-research.de/dl/Dividends_And_Volatility092.pdf
http://www.quant-press.com

Consistent Modeling of SPX and VIX options

Abstract:
This article revisits a simple and robust method on how to incorpo- rate the handling of cash dividends and credit risk into equity derivatives pricing and risk management. We will show that the method presented is the only such method which is consistent with the assumption of cash dividends and simple credit risk, and we will demonstrate the impact on the pricing of various derivatives: plain Europeans, American options, Barriers and ¯nally variance swaps and related derivatives. This article is mainly based on results discussed in the first chapter of in Equity Hybrid Derivatives", Overhaus et al, Wiley 2006 [10] and the IQPC presentation Options On Variance: Pricing And Hedging" given in 2006 [2].

J.Gatheral 2008

http://www.math.nyu.edu/fellows_fin_math/gatheral/Bachelier2008.pdf
http://www.quant-press.com

Realized Volatility and Variance: Options via Swaps

Abstract:
In this paper we develop strategies for pricing and hedging options on realized variance and volatility. Our strategies have the following features. * Readily available inputs: We can use vanilla options as pricing benchmarks and as hedging instruments. If variance or volatility swaps are available, then we use them as well. We do not need other inputs (such as parameters of the instantaneous volatility dynamics). * Comprehensive and readily computable outputs: We derive explicit and readily computable formulas for prices and hedge ratios for variance and volatility options, applicable at all times in the term of the option (not just inception). * Accuracy and robustness: We test our pricing and hedging strategies under skew-generating volatility dynamics. Our discrete hedging simulations at a one-year horizon show mean absolute hedging errors under 10%, and in some cases under 5%. * Easy modification to price and hedge options on implied volatility (VIX). Specifically, we price and hedge realized variance and volatility options using variance and volatility swaps. When necessary, we in turn synthesize volatility swaps from vanilla options by the Carr-Lee 4] methodology; and variance swaps from vanilla options by the standard log-contract methodology.

P.Carr, R.Lee 2007

http://www.math.uchicago.edu/~rl/OVSwithAppendices.pdf
http://www.quant-press.com

Moment Methods For Exotic Volatility Derivatives

Abstract:
The latest generation of volatility derivatives goes beyond variance and volatility swaps and probes our ability to price realized variance and sojourn times along bridges for the underlying stock price process. In this paper, we give an operator algebraic treatment of this problem based on Dyson expansions and moment methods and discuss applications to exotic volatility derivatives. The methods are quite

flexible and allow for a specification of the underlying process which is semi-parametric or even non-parametric, including state-dependent local volatility, jumps, stochastic volatility and regime switching. We find that volatility derivatives are particularly well suited to be treated with moment methods, whereby one extrapolates the distribution of the relevant path functionals on the basis of a few moments. We consider a number of exotics such as variance knockouts, conditional corridor variance swaps, gamma swaps and variance swaptions and give valuation formulas in detail.

C.Albanese, A.Osseiran 2007

http://www.level3finance.com/moments.pdf
http://www.quant-press.com

Variance Risk Premia

Abstract:
We propose a direct and robust method for quantifying the variance risk premium on financial assets. We show that the risk-neutral expected value of return variance, also known as the variance swap rate, is well approximated by the value of a particular portfolio of options. We propose to use the difference between the realized variance and this synthetic variance swap rate to quantify the variance risk premium. Using a large options data set, we synthesize variance swap rates and investigate the historical behavior of variance risk premia on five stock indexes and 35 individual stocks. 2

P.Carr, L.Wiu 2007

http://www.math.nyu.edu/research/carrp/papers/pdf/vsfinal.pdf
http://www.quant-press.com

Volatility Markets Consistent modeling, hedging and practical implementation

Abstract:
We propose a direct and robust method for quantifying the variance risk premium on financial assets. We show that the risk-neutral expected value of return variance, also known as the variance swap rate, is well approximated by the value of a particular portfolio of options. We propose to use the difference between the realized variance and this synthetic variance swap rate to quantify the variance risk premium. Using a large options data set, we synthesize variance swap rates and investigate the historical behavior of variance risk premia on five stock indexes and 35 individual stocks. 2

H.Buehler 2006

http://www.quantitative-research.de/dl/HansBuehlerDiss.pdf
http://www.quant-press.com

Consistent Variance Curve Models

Abstract:
We introduce a general approach to model a joint market of stock price and a term structure of variance swaps in an HJM-type framework. In such a model, strongly volatility-dependent contracts can be priced and risk-managed in terms of the observed stock and variance swap prices. To this end, we introduce equity forward variance term-structure models and derive the respective HJM-type arbitrage conditions. We then discuss ¯nite-dimensional Markovian representations of the ¯xed time-to-maturity forward variance swap curve and derive consistency results for both the standard case and for variance curves with values in a Hilbert space. For the latter, our representation also ensures non-negativity of the process. We then give a few examples of such variance curve functionals and discuss brie°y completeness and hedging in such models. As a further application, we show that the speed of mean-reversion in some standard stochastic volatility models should be kept constant when the model is recalibrated.

H.Buehler 2006

http://www.quantitative-research.de/dl/VarSwapCurves3622.pdf

http://www.quant-press.com

Pricing Options on Realized Variance

Abstract:
Models which hypothesize that returns are pure jump processes with independent increments have been shown to be capable of capturing the observed variation of market prices of vanilla stock options across strike and maturity. In this paper, these models are employed to derive in closed form the prices of derivatives written on future realized quadratic variation. Alternative work on pricing derivatives on quadratic variation has alternatively assumed that the underlying returns process is continuous over time. We compare the model values of derivatives on quadratic variation for the two types of models and find substantial differences.

P.Carr, D.P.Madan, M.Yor, H.Geman 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=684087
http://www.quant-press.com

Pricing Methods and Hedging Strategies for Volatility Derivatives

Abstract:
In this paper we investigate the behaviour and hedging of discretely observed volatility derivatives. We begin by comparing the effects of variations in the contract design, such as the differences between specifying log returns or actual returns, taking into consideration the impact of possible jumps in the underlying asset. We then focus on the difficulties associated with hedging these products. Naive delta-hedging strategies are ineffective for hedging volatility derivatives since they require very frequent rebalancing and have limited ability to protect the writer against possible jumps in the underlying asset. We investigate the performance of a hedging strategy for volatility swaps that establishes small, fixed positions in straddles and out-of-the-money strangles at each volatility observation.

H. Windcliff, P.A. Forsyth, K.R. Vetzal 2003

http://www.cs.uwaterloo.ca/~paforsyt/volswap.pdf
http://www.quant-press.com

Robust Replication of Volatility Derivatives

Abstract:
In this paper we investigate the behaviour and hedging of discretely observed volatility derivatives. We begin by comparing the effects of variations in the contract design, such as the differences between specifying log returns or actual returns, taking into consideration the impact of possible jumps in the underlying asset. We then focus on the difficulties associated with hedging these products. Naive delta-hedging strategies are ineffective for hedging volatility derivatives since they require very frequent rebalancing and have limited ability to protect the writer against possible jumps in the underlying asset. We investigate the performance of a hedging strategy for volatility swaps that establishes small, fixed positions in straddles and out-of-the-money strangles at each volatility observation.

P.Carr, R.Lee 2003

http://www.math.nyu.edu/research/carrp/papers/pdf/Voltradingoh1.pdf
http://www.quant-press.com

Towards a Theory of Volatility Trading

Abstract:
In this paper we investigate the behaviour and hedging of discretely observed volatility derivatives. We begin by comparing the effects of variations in the contract design, such as the differences between specifying log returns or actual returns, taking into consideration the impact of possible jumps in the underlying asset. We then focus on the difficulties associated with hedging these products. Naive delta-hedging strategies are ineffective for hedging volatility derivatives since they require very frequent

rebalancing and have limited ability to protect the writer against possible jumps in the underlying asset. We investigate the performance of a hedging strategy for volatility swaps that establishes small, fixed positions in straddles and out-of-the-money strangles at each volatility observation.

P. Carr, D. Madan 2002

http://www.math.nyu.edu/research/carrp/papers/pdf/twrdsfig.pdf
http://www.quant-press.com

More Than You Ever Wanted to Know About Volatility Swaps

Abstract:
Volatility swaps are forward contracts on future realized stock volatility. Variance swaps are similar contracts on variance, the square of future volatility. Both of these instruments provide an easy way for investors to gain exposure to the future level of volatility. Unlike a stock option, whose volatility exposure is contaminated by its stock-price dependence, these swaps provide pure exposure to volatility alone. You can use these instruments to speculate on future volatility levels, to trade the spread between realized and implied volatility, or to hedge the volatility exposure of other positions or businesses. In this report we explain the properties and the theory of both variance and volatility swaps, first from an intuitive point of view and then more rigorously. The theory of variance swaps is more straightforward. We show how a variance swap can be theoretically replicated by a hedged portfolio of standard options with suitably chosen strikes, as long as stock prices evolve without jumps. The fair value of the variance swap is the cost of the replicating portfolio. We derive analytic formulas for theoretical fair value in the presence of realistic volatility skews. These formulas can be used to estimate swap values quickly as the skew changes. We then examine the modifications to these theoretical results when reality intrudes, for example when some necessary strikes are unavailable, or when stock prices undergo jumps. Finally, we briefly return to volatility swaps, and show that they can be replicated by dynamically trading the more straightforward variance swap. As a result, the value of the volatility swap depends on the volatility of volatility itself.

E.Derman, K.Demeterfi, M.Kamal 1999

http://www.ederman.com/new/docs/gs-volatility_swaps.pdf
http://www.quant-press.com

Series Expansion of the SABR Joint Density

Abstract:
Under the SABR stochastic volatility model, pricing and hedging contracts that are sensitive to forward smile risk (e.g., forward starting options, barrier options) require the joint transition density. In this paper, we address this problem by providing closed-form representations, asymptotically, of the joint transition density. Specifically, we construct an expansion of the joint density through a hierarchy of parabolic equations after applying total volatility-of-volatility scaling and a near-Gaussian coordinate transformation. We then established an existence result to characterize the truncation error and provide explicit joint density formulas for the first three orders. Our approach inherits the same spirit of a small total volatility-of-volatility assumption as in in the original SABR analysis. Our results for the joint transition density serve as a basis for managing forward smile risk. Through numerical experiments, we illustrate the accuracy of our expansion in terms of joint density, marginal density, probability mass and implied volatilities for European call options

Q.Wu 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1367966
http://www.quant-press.com

Fitting the Smile, Smart Parameters for SABR and Heston

Abstract:
In this paper we revisit the problem of calibrating stochastic volatility models. By finding smart initial parameters, we improve robustness of Levenberg-Marquardt. Applying this technique to the SABR and

Heston models reduces calibration time by more than 90% compared to global optimization techniques such as Simplex or Differential Evolution.

P.Gauthier, P.H.Y, Rivaille 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1496982
http://www.quant-press.com

LIBOR market model with SABR style stochastic volatility

Abstract:

P.Hagan, A.Lesniewski 2008

http://www.lesniewski.us/papers/working/SABRLMM.pdf
http://www.quant-press.com

Local Time for the SABR Model: Connection with the Complex Black Scholes and Application to CMS and Spread Options

Abstract:

E.Benhamou, O.Croissant 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1064461
http://www.quant-press.com

A Stochastic Volatility Alternative to SABR

Abstract:

L.C.G.Rogers, L.A.M.Veraart 2008

http://www.statslab.cam.ac.uk/~chris/papers/Stochvol1.pdf
http://www.quant-press.com

Effective Parameters for Stochastic Volatility Models

Abstract:

Z.Wang 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1071768
http://www.quant-press.com

Unifying the Bgm and Sabr Models: a Short Ride in Hyperbolic Geometry

Abstract:

P.Henry-Labordere 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=877762
http://www.quant-press.com

A Time-Homogeous, SABR-Consistent Extension of the LMM: Calibration And Numerical

Results

Abstract:

R.Rebonato 2007

http://www3.imperial.ac.uk/pls/portallive/docs/1/14987697.PDF
http://www.quant-press.com

Fine-tune your smile: Correction to Hagan et al

Abstract:

J.Obloj 2007

http://arxiv.org/abs/0708.0998
http://www.quant-press.com

No-Arbitrage Dynamics for a Tractable SABR Term Structure Libor Model

Abstract:

M.Morini, F.Mercurio 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1018026
http://www.quant-press.com

The Asymptotic Expansion Formula of Implied Volatility for Dynamic SABR Model and FX Hybrid Model

Abstract:

Y.Osajima 2007

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=965265
http://www.quant-press.com

A Note on the SABR Model

Abstract:

M.Morini, F.Mercurio 2006

http://caronte.dma.unive.it/QuantitativeFinance2007/viewpaper.php?id=82
http://www.quant-press.com

Managing Smile Risk

Abstract:

P.S.Hagan, D.Kumar, A.Lesniewski, D.E.Woodwar 2004

http://www.math.columbia.edu/~lrb/sabrAll.pdf
http://www.quant-press.com

Prices Expansion in the Wishart Model

Abstract:
Using probability change techniques introduced by Drimus for Heston model, we derive a n-th order expansion formula of Wishart option price in terms of Black-Scholes price and Black-Scholes Greeks. Numerical results are given for the second order case. Thanks to this new approximation, the smile implied by Wishart model can be better understood. The sensitivity of Delta and Vega to the volatility (respectively Vanna and Volga) indeed appear explicitly in this formula. En route to our formula, we present a number of new - to our knowledge - results on Laplace transforms and moments of the integrated Wishart processes.

P. Gauthier, D. Possamai 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1475153
http://www.quant-press.com

Efficient Simulation of the Wishart Model

Abstract:
In financial mathematics, Wishart processes have emerged as an efficient tool to model stochastic covariance structures. Their numerical simulation may be quite challenging since they involve matrix processes. In this article, we propose an extensive study of financial applications of Wishart processes. First, we derive closed-form formulas for option prices in the single-asset case. Then, we show the relationship between Wishart processes and Wishart law. Finally, we review existing discretization schemes (Euler and Ornstein-Uhlenbeck) and propose a new scheme, adapted from Heston s QEM discretization scheme. Extensive numerical results support our comparison of these three schemes.

P. Gauthier, D. Possamai 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1474728
http://www.quant-press.com

Smile Dynamics IV

Abstract:
Smile Dynamics IVIn this paper we address the relationship between the smile that stochastic volatility models produce and the dynamics they generate for implied volatilities. We introduce a new quantity, which we call the Skew Stickiness Ratio and show how, at order one in the volatility of volatility, it is linked to the rate at which the at-the-money-forward skew decays with maturity. We then focus on short maturity skews and (a) show that the difference between realized and implied SSR can be materialized as the P&L of an option strategy, (b) introduce the notion of realized skew.

L.Bergomi 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1520443
http://www.quant-press.com

Asymptotic Methods for Computing Implied Volatilities Under Stochastic Volatility

Abstract:

A.N.Medvedev 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=667281
http://www.quant-press.com

Stochastic Models of Implied Volatility Surfaces

Abstract:

R.Cont, V.Durrleman, J.Da Fonseca 2008

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=317604
http://www.quant-press.com

Stochastic Local Volatility

Abstract:

C.Alexander, L.M.Nogueira 2008

http://www.icmacentre.ac.uk/pdf/437-078.pdf
http://www.quant-press.com

Risk Minimization in Stochastic Volatility Models: Model Risk and Empirical Performance

Abstract:

R.Poulsen, K.R.Schenk-Hoppe, C.O.Ewald 2008

http://www.math.ku.dk/~rolf/Klaus/pse.pdf
http://www.quant-press.com

Lecture 10: Stochastic Volatility Models

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture10.pdf
http://www.quant-press.com

Lecture 11: More on Stochastic Volatility Models of the Smile

Abstract:

E.Derman 2008

http://www.ederman.com/new/docs/smile-lecture11.pdf
http://www.quant-press.com

Hyp Hyp Hooray

Abstract:

P.Jaeckel 2008

http://www.btinternet.com/~pjaeckel/HypHypHooray.pdf
http://www.quant-press.com

Markovian Projection Method for Volatility Calibration

Abstract:

V. Piterbarg 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=906473
http://www.quant-press.com

Fast strong approximation Monte-Carlo schemes for stochastic volatility models

Abstract:

C.Kahl, P.Jaeckel 2006

http://www.math.uni-wuppertal.de/~kahl/publications/FastStrongApproximationMonteCarloSchemesForStochasticVolatilityModels.pdf
http://www.quant-press.com

Stochastic Volatility for Real

Abstract:

J.Andreasen 2006

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=898701
http://www.quant-press.com

A General Asymptotic Implied Volatility for Stochastic Volatility Models

Abstract:

P.Henry-Labordere 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=698601
http://www.quant-press.com

Moment Explosions in Stochastic Volatility Models

Abstract:

V. Piterbarg, L.Andersen 2005

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=559481
http://www.quant-press.com

Stochastic Volatility Model with Time-dependent Skew

Abstract:

V. Piterbarg 2005

http://www.nuclearphynance.com/User%20Files/3756/Vol_time_dep_skew_piterbarg.pdf
http://www.quant-press.com

Hedging Exotic Options in Stochastic Volatility and Jump Diffusion Models

Abstract:

K. Detlefsen 2005

http://edoc.hu-berlin.de/master/detlefsen-kai-2005-01-27/PDF/detlefsen.pdf
http://www.quant-press.com

Arbitrage-Free Smoothing of the Implied Volatility Surface

Abstract:

M.R. Fengler 2005

http://sfb649.wiwi.hu-berlin.de/papers/pdf/SFB649DP2005-019.pdf
http://www.quant-press.com

Local and Stochastic Volatility Models: An Investigation into the Pricing of Exotic Equity Options

Abstract:

L.Majmin 2005

http://web.wits.ac.za/NR/rdonlyres/C4D22C49-DDCD-40E7-8CBC-DC123FE4B736/0/lisamajmin.pdf
http://www.quant-press.com

Exact Simulation of Stochastic Volatility and other Affine Jump Diffusion Processes

Abstract:

M.Broadie, O.Kaya 2004

http://people.orie.cornell.edu/~xinguo/FEseminar/papers04/exact_sim_200409.pdf
http://www.quant-press.com

Mixture of Models: A Simple Recipe for a ... Hangover ?

Abstract:

V. Piterbarg 2003

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=393060
http://www.quant-press.com

Lecture 1: Stochastic Volatility and Local Volatility

Abstract:

J.Gatheral 2002

http://www.math.ku.dk/~rolf/teaching/ctff03/Gatheral.1.pdf

http://www.quant-press.com

A Risk-Neutral Stochastic Volatility Model

Abstract:

Y. Zhu, M. Avellaneda 1997

http://www.math.nyu.edu/faculty/avellane/StochasticVol.pdf
http://www.quant-press.com

Convergence of Heston to SVI

Abstract:
By an appropriate change of variables, we prove here that the SVI implied volatility parameterisation proposed in [2] and the large-time asymptotic of the Heston implied volatility derived in [1] do agree algebraically, thus confirming a conjecture proposed by J. Gatheral in [2] as well as proposing a simpler expression for the asymptotic implied volatility under the Heston model.

J.Gatheral, A.Jacquier 2010

http://www.math.nyu.edu/fellows_fin_math/gatheral/SVIHESTON.pdf
http://www.quant-press.com

Asymptotics of Implied Volatility in Local Volatility Models

Abstract:
Using an expansion of the transition density function of a 1-dimensional time inhomogeneous diffusion, we obtain the ?rst and second order terms in the short time asymptotics of European call option prices. The method described can be generalized to any order. We then use these option prices approximations to calculate the ?rst order and second order deviation of the implied volatility from its leading value and obtain approximations which we numerically demonstrate to be highly accurate. The analysis is extended to degenerate diffusion's using probabilistic methods, i.e. the so called principle of not feeling the boundary.

J.Gatheral, E.P.Hsu, P.M.Laurence, C.Ouyang, T-H.Wang 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1542077
http://www.quant-press.com

Series Expansion of the SABR Joint Density

Abstract:
Under the SABR stochastic volatility model, pricing and hedging contracts that are sensitive to forward smile risk (e.g., forward starting options, barrier options) require the joint transition density. In this paper, we address this problem by providing closed-form representations, asymptotically, of the joint transition density. Specifically, we construct an expansion of the joint density through a hierarchy of parabolic equations after applying total volatility-of-volatility scaling and a near-Gaussian coordinate transformation. We then established an existence result to characterize the truncation error and provide explicit joint density formulas for the first three orders. Our approach inherits the same spirit of a small total volatility-of-volatility assumption as in in the original SABR analysis. Our results for the joint transition density serve as a basis for managing forward smile risk. Through numerical experiments, we illustrate the accuracy of our expansion in terms of joint density, marginal density, probability mass and implied volatilities for European call options

Q.Wu 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1367966
http://www.quant-press.com

A Practical Guide to Implied and Local Volatility

Abstract:
We consider a stochastic local volatility model with domestic and foreign stochastic interest rates such that the volatilitydecomposes into a deterministic local volatility plus some bias terms. Assuming a collapse process for the variance with the same random variable for all time and deterministic zero-coupon bond volatility functions, we are going to describe in detail the implementation of that model, focusing on the computation of a proper deterministic local volatility. To do so, we choose to generate an implied volatility surface without arbitrage in space and in time by parametrising a mixture of shifted lognormal densities under constraints and we use a Differential Evolution algorithm to calibrate the model's parameters to a finite set of option prices. We will therefore need to devise an evolutionary algorithm that handle constraints in a simple and efficient way. Using some of the improvements made to the DE algorithm combined with simple and robust constraints handling mechanisms we will propose a modified algorithm for solving our optimisation problem under constraints which greatly improves its performances.

D.A.Bloch 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1538808
http://www.quant-press.com

Local Volatility Enhanced by a Jump to Default

Abstract:
A local volatility model is enhanced by the possibility of a single jump to default. The jump has a hazard rate that is the product of the stock price raised to a prespecified negative power and a deterministic function of time. The empirical work uses a power of -1.5. It is shown how one may simultaneously recover from the prices of credit default swap contracts and equity option prices both the deterministic component of the hazard rate function and revised local volatility. The procedure is implemented on prices of credit default swaps and equity options for GM and FORD over the period October 2004 to September 2007.

P.Carr, D.P.Madan 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1540874
http://www.quant-press.com

Options on Realized Variance and Convex Orders

Abstract:
Realized variance option and options on quadratic variation normalized to unit expectation are analyzed for the property of monotonicity in maturity for call options at a fixed strike. When this condition holds the risk neutral densities are said to be increasing in the convex order. For Lévy processes such prices decrease with maturity. A time series analysis of squared log returns on the S&P 500 index also reveals such a decrease. If options are priced to a slightly increasing level of acceptability then the resulting risk neutral densities can be increasing in the convex order. Calibrated stochastic volatility models yield possibilities in both directions. Finally we consider modelling strategies guaranteeing an increase in convex order for the normalized quadratic variation. These strategies model instantaneous variance as a normalized exponential of a Lévy process. Simulation studies suggest that other transformations may also deliver an increase in the convex order.

P.Carr, H.Géman, M.Yor, D.P.Madan 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1540805
http://www.quant-press.com

Uncertain Volatility Model: A Monte-Carlo Approach

Abstract:

The uncertain volatility model has long ago attracted the attention of practitioners as it provides worst-case pricing scenario for the sell-side. The valuation of a financial derivative based on this model requires solving a fully non-linear PDE. One can rely on finite difference schemes only when the number of variables (that is, underlyings and path-dependent variables) is small - in practice no more than three. In all other cases, numerical valuation seems out of reach. In this paper, we outline two accurate, easy-to-implement Monte-Carlo-like methods which hardly depend on dimensionality. The first method requires a parameterization of the optimal covariance matrix and consists in a series of backward low-dimensional optimizations. The second method relies heavily on a recently established connection between second-order backward stochastic differential equations and non-linear second-order parabolic PDEs. Both methods are illustrated by numerical experiments.

J.Guyon, P.H.Labordère 2010

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1540043
http://www.quant-press.com

Credit models and the crisis, or: How I learned to stop worrying and love the CDOs

Abstract:
We follow a long path for Credit Derivatives and Collateralized Debt Obligations (CDOs) in particular, from the introduction of the Gaussian copula model and the related implied correlations to the introduction of arbitrage-free dynamic loss models capable of calibrating all the tranches for all the maturities at the same time. En passant, we also illustrate the implied copula, a method that can consistently account for CDOs with different attachment and detachment points but not for different maturities. The discussion is abundantly supported by market examples through history. The dangers and critics we present to the use of the Gaussian copula and of implied correlation had all been published by us, among others, in 2006, showing that the quantitative community was aware of the model limitations before the crisis. We also explain why the Gaussian copula model is still used in its base correlation formulation, although under some possible extensions such as random recovery. Overall we conclude that the modeling effort in this area of the derivatives market is unfinished, partly for the lack of an operationally attractive single-name consistent dynamic loss model, and partly because of the diminished investment in this research area.

D.Brigo, A.Pallavicini, R.Torreseti 2009

http://arxiv.org/PS_cache/arxiv/pdf/0912/0912.5427v2.pdf
http://www.quant-press.com

Smile Dynamics IV

Abstract:
In this paper we address the relationship between the smile that stochastic volatility models produce and the dynamics they generate for implied volatilities. We introduce a new quantity, which we call the Skew Stickiness Ratio and show how, at order one in the volatility of volatility, it is linked to the rate at which the at-the-money-forward skew decays with maturity. We then focus on short maturity skews and (a) show that the difference between realized and implied SSR can be materialized as the P&L of an option strategy, (b) introduce the notion of realized skew.

L.Bergomi 2009

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1520443
http://www.quant-press.com