







Q

Home ► All Journals ► Economics, Finance & Business ► Quantitative Finance ► List of Issues ► Volume 9, Issue 1 ► Estimating risk-neutral density with par

Quantitative Finance >

Volume 9, 2009 - Issue 1

 $\begin{array}{c|c} 457 & 16 & & 0 \\ \text{Views} & \text{CrossRef citations to date} & \text{Altmetric} \end{array}$

Research Papers

Estimating risk-neutral density with parametric models in interest rate markets

Frank J. Fabozzi , Radu Tunaru & George Albota

Pages 55-70 | Received 29 Aug 2007, Accepted 09 Jun 2008, Published online: 11 Feb 2009

Sample our
Mathematics & Statistics
Journals

>> Sign in here to start your access to the latest two volumes for 14 days











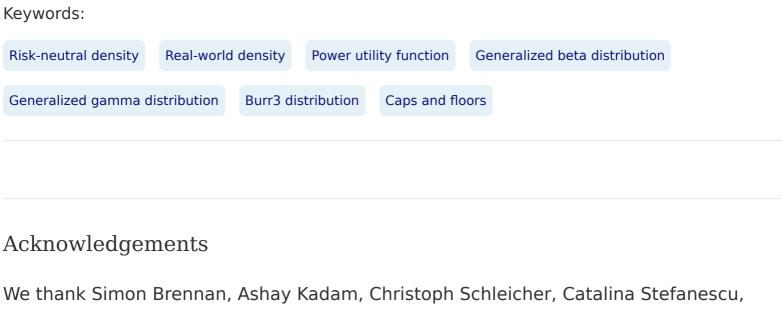


Read this article



Abstract

The departure in modelling terms from the log-normal distribution for option pricing has been largely driven by empirical observations on skewness. In recent years, the Weibull and generalized beta distributions have been used to fit the risk-neutral density from option prices. In this article, we also propose the use of the generalized gamma distribution for recovering the risk-neutral density. In terms of complexity, this distribution, having three parameters, falls between the Weibull and generalized beta distributions. New option pricing formulas for European call and put options are derived under the generalized gamma distribution. The empirical evidence based on a set of interest rate derivatives data indicates that this distribution is capable of producing the same type of performance as the Weibull, generalized beta, and Burr3 distributions. In addition, we analyze the effect of July 2005 bombings in London on interest rate markets under the best fitting distribution. Our results indicate that there was very little impact on the volatility of these markets.



Giovanni Urga, two referees and seminar participants at Cass Business School, City University, for helpful comments on earlier versions of this paper.

The results and the views expressed in this paper are those of the authors and should not be thought to represent those of the Bank of America or any of its subsidiaries.

Notes

†Brunner and Hafner (2003) use the estimated RND to price a digital option.

†See for details Campa et al. (1997, 1998), Melick and Thomas (1997), Soderlind and Swensson (1997), Soderlind (2000), and Markose and Alentorn (2005).

‡For example, Ait-Sahalia and Lo (2000), Jackwerth (2000), Rosenberg and Engle (2002), and Giamouridis (2005).

§A review of this literature is beyond the scope of this paper. The reader is referred to the literature reviews provided in Jackwerth (<u>1999</u>, <u>2004</u>) and Anagnou et al. (<u>2005</u>).

†Dutta and Babbel (2005) derive formulas for pricing these instruments but we believe that on page 850 there is an error in their derivation of formula (23).

†See, for example, Melick and Thomas (1997) and Markose and Alentorn (2005).

Related Research Data

Nonparametric option pricing under shape restrictions

Source: Journal of Econometrics

How Useful are Implied Distributions?

Source: The Journal of Derivatives

Minimum-Relative-Entropy Calibration of Asset-Pricing Models

Source: International Journal of Theoretical and Applied Finance

A new approach to modeling the dynamics of implied distributions: Theory and

evidence from the S&P 500 options

Source: Journal of Banking & Finance

Arbitrage-free estimation of the risk-neutral density from the implied volatility smile

Source: The Journal of Computational Finance

Recovering Probability Distributions from Option Prices

Source: The Journal of Finance

A generalization of the beta distribution with applications

Source: Journal of Econometrics

Related research 1



People also read

Recommended articles

Cited by 16

Information for

Authors

R&D professionals

Editors

Librarians

Societies

Opportunities

Reprints and e-prints

Advertising solutions

Accelerated publication

Corporate access solutions

Open access

Overview

Open journals

Open Select

Dove Medical Press

F1000Research

Help and information

Help and contact

Newsroom

All journals

Books

Keep up to date

Register to receive personalised research and resources by email



Sign me up











Accessibility



Copyright © 2025 Informa UK Limited Privacy policy Cookies Terms & conditions



Registered in England & Wales No. 01072954 5 Howick Place | London | SW1P 1WG