Module 2: Lesson 4

Calibrating the Bates (1996) model

Outline

- Calibration of Bates (1996)

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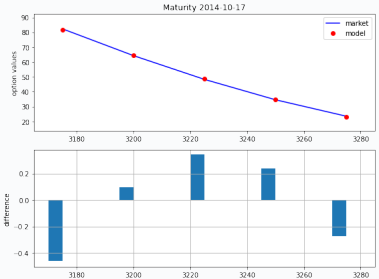
We have already dealt with model calibration extensively for the cases of the Heston (1993) and Merton (1976) models. However, the case of the Bates (1996) model is more subtle and needs to be done in steps:

1. Calibrate the basic stochastic volatility model (i.e., essentially calibrate Heston '93)
2. Calibrate the jump component (i.e., calibrate Merton '76 with parameters from previous calibration)
3. Take as inputs the results from the previous two calibrations and fully calibrate the general model.



Summary of Lesson 4

In Lesson 4, we have covered:

- Calibration of the Bates (1996) model

⇒ **References for this lesson:**

Hilpisch, Yves. *Derivatives Analytics with Python: Data Analysis, Models, Simulation, Calibration and Hedging*. John Wiley & Sons, 2015. (see Chapter 9.)

Bates, David S. "Jumps and Stochastic Volatility: Exchange Rate Processes Implicit in Deutsche Mark Options." *The Review of Financial Studies,* vol. 9, no. 1, 1996, pp. 69–107.

⇒ **TO DO NEXT**: In the notebook accompanying this lesson, you will see in detail how to properly calibrate the Bates (1996) model in practice in Python.

⇒ In the next module, we will study the Bakshi, Cao, and Chen model of 1997 (the BCC model), where we put together 3 different features: stochastic volatility, stochastic interest rates, and jumps.