

Valuation of Asian Quanto-Basket Options

(Initial presentation)

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Työn saa tallentaa ja julkistaa Aalto-yliopiston avoimilla verkkosivuilla.
Muilta osin kaikki oikeudet pidätetään.

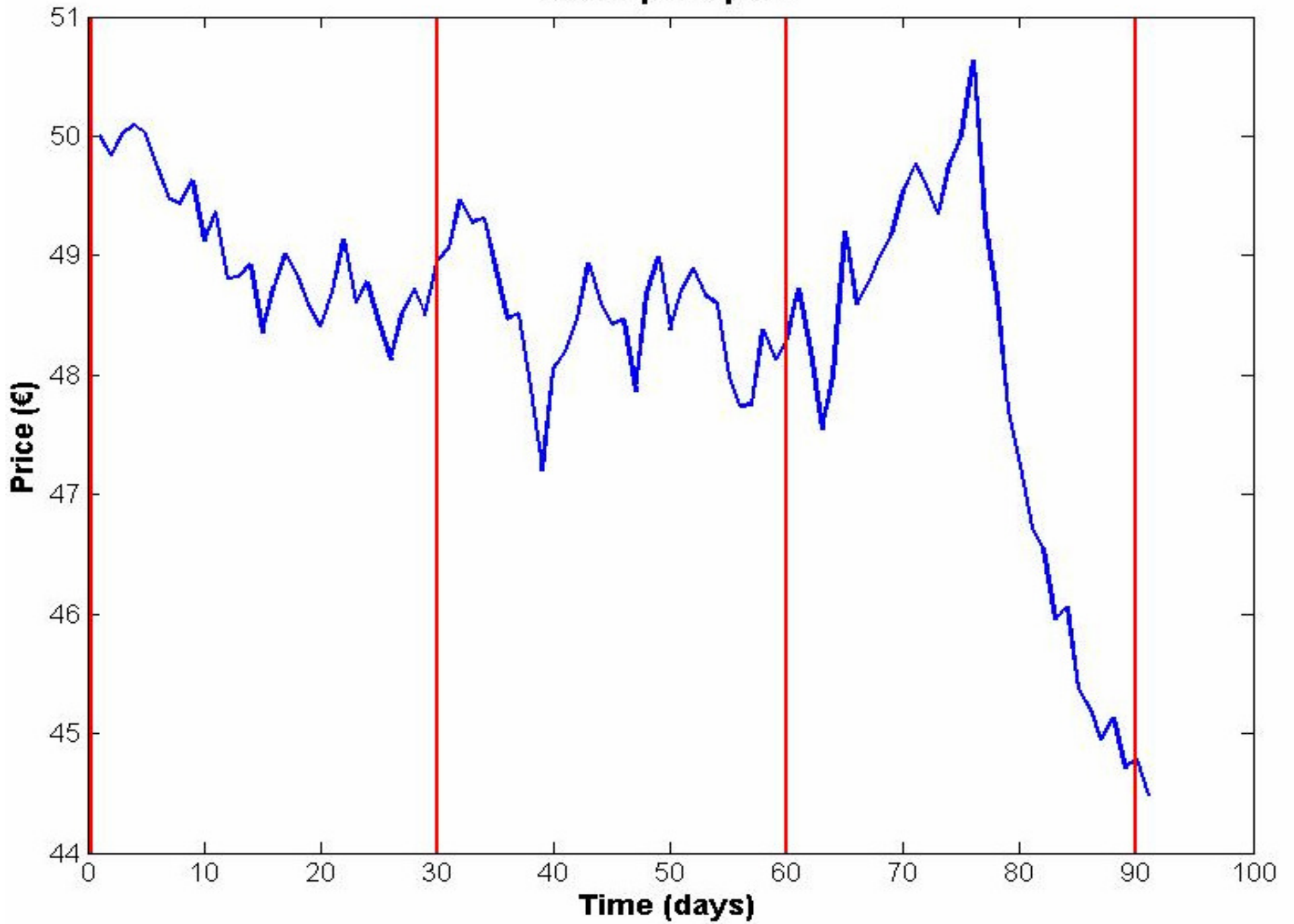
Systeemianalyysin

Laboratorio
Teknillinen korkeakoulu

Ville Viitasaari

Systemitieteiden kandidaattiseminaari – Syksy 2011

Stock price path



Background

- ❑ Asian options appeared due to a need to avoid market manipulation near maturity.
- ❑ Today, Asian-style options are an important derivative class in both listed and over-the-counter markets.
- ❑ For example, many structured and commodity products are Asian-style.

Basket option

- Final payoff depends on the weighted average of a set of underlying assets:

$$\text{Payoff} = \max(A_{\text{basket}} - K_{\text{basket}}, 0).$$

- The correlation structure of underlying assets affects pricing.

Quanto option

- The underlying asset is quoted in different currency than the final payoff.

$X_0 = \text{Pre-defined exchange rate}$

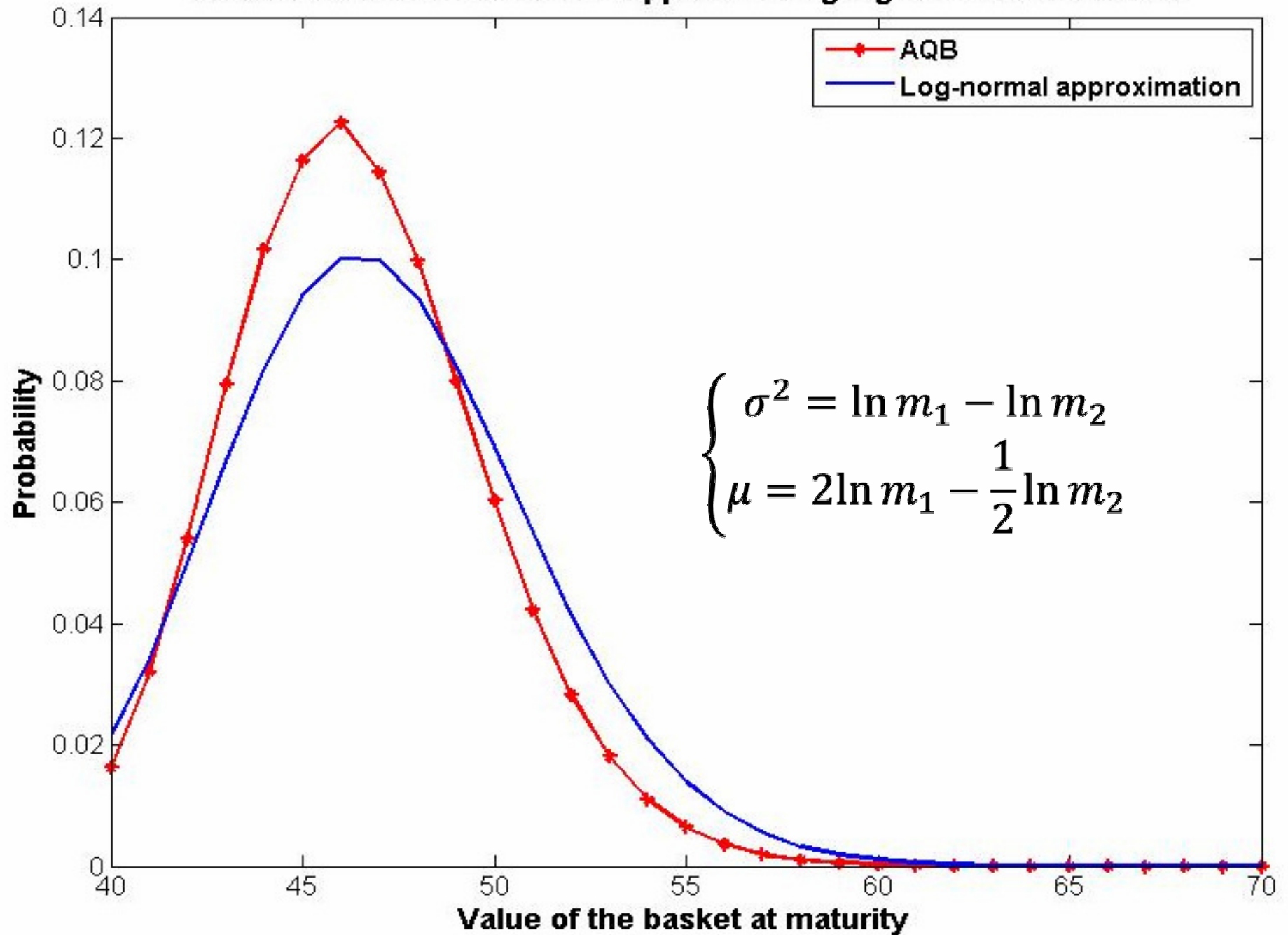
$S = \text{The price of the underlying}$

$K_f = \text{Strike in the underlying currency}$

$\text{Payoff} = X_0 \max(S - K_f, 0)$

- The quanto feature does affect pricing.

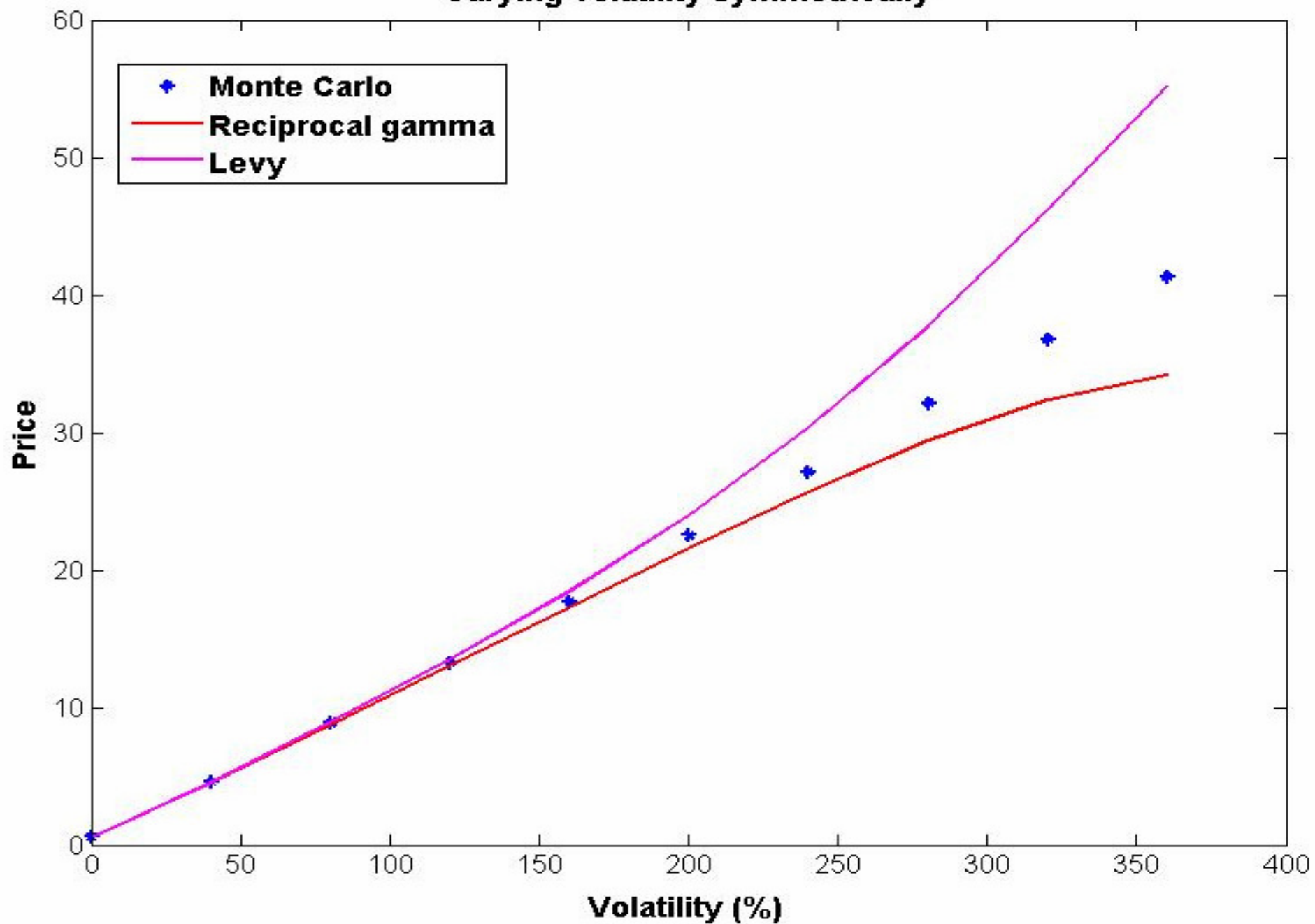
PDFs of AQB distribution and approximating log-normal distribution



Objectives

- ❑ To present what methods have been suggested in literature to price Asian-style options
- ❑ To implement two to three suggested methods and compare their performance

Varying volatility symmetrically



Schedule

- Matlab implementation in September
- The thesis to be written in September and October
- Final results to be presented on November 21, 2011

References

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- ❑ Ju, 2002. Pricing Asian and Basket Options Via Taylor Expansion. *Journal of Computational Finance*, 2002, Vol. 5, No. 3.
- ❑ Kwok, Wong, 1999. Currency-translated Foreign Equity Options with Path Dependent Features and Their Multi-Asset Extensions. *International Journal of Theoretical and Applied Finance*, 2000, Vol. 3, No. 2, pp. 257-278.
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