

Four Mistakes in Quantitative Finance Chapter 24

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1. Mistaking tails for volatility

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- *Kurtosis \neq Variance*

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- *Variance*

- $\frac{\sum (x - \mu)^2}{n}$

- “Average squared deviation”

1. Mistaking tails for volatility

- *Kurtosis*

- $\frac{\sum(x-\mu)^4}{n} \div \left(\frac{\sum(x-\mu)^2}{n}\right)^2$
- Average of “squared deviation squared”
- \div
- Square of “average squared deviation”

1. Mistaking tails for volatility

- *Kurtosis*

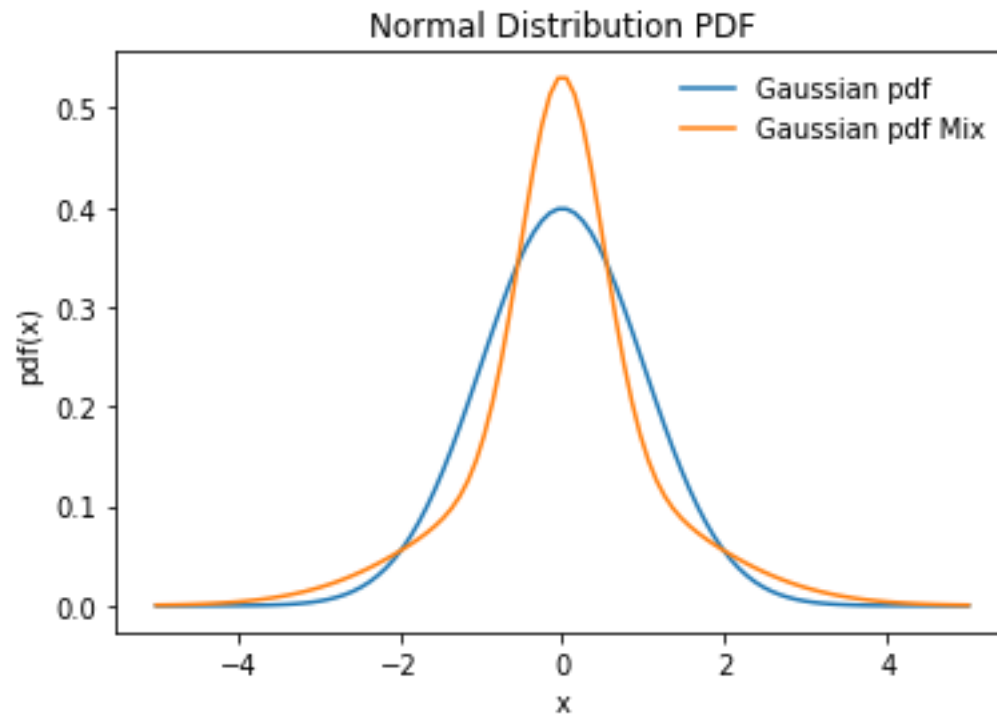
- $\frac{\sum (x-\mu)^4}{n} \div \left(\frac{\sum (x-\mu)^2}{n} \right)^2$

- A Jensen's inequality ratio

Recall Chapter 4

- Fatten the tails
 - Mix high and low variance
 - Overall variance unchanged

Recall Chapter 4



Recall Chapter 4

- SCFT ~p64 Fig 4.1

Option Greeks/Moments

- Greeks \leftrightarrow Payoff function \leftrightarrow polynomials \leftrightarrow moments

(See excel model for polynomial intuition)

Option Greek Moments

Dynamic Hedging

- P 202 – moments explained
- P 264 – 4th moment trade example

2. Missing Jensen's Inequality

3. Inseparability of Insurance and Insured

- “House insurance has negative returns”

- Insurance & Insured interact for compounding

4. Necessity of a Numeraire

3. Necessity of a Numeraire

- Basic unit by which value is computed

Recap

1. Tails \neq Variance
2. Jensen's Inequality
3. Insurance + Insured
4. Numeraire

EXTRA SLIDES

3. Necessity of a Numeraire

- Stability relative to the basket of goods you care about

Recall Chapter 4

- Fatter Tails =>
 - More quiet times

LINK TO CODE

- <https://github.com/FergM/fattails/blob/main/notebooks/>