Beamer Final Assignment DTFF

S. Kim, M. Kiefer, V. Khmarskyi, B. Clays

University of Zürich,

December 1, 2021

Table of Contents

Short lists

2 summations

Here is an itemized list of some courses:

- Digital Tools for Finance
- Financial Engineering
- Stress Testing of Banks

Here is an enumeration of some stuff:

1. First thing
2. Second thing
3. Third thing
4. Test my thing

This frame contains Pythagoras' theorem

A very useful theorem

Theorem

In a right-angled triangle, the square of the hypotenuse side is equal to the sum of squares of the other two sides.

Some statistics equations

2 widely applicable equations

Unbiased Sample Variance

$$\sigma_X^2 = \frac{1}{n-1} * \sum_{i=0}^{n} (X_i - \overline{X})^2 \tag{1}$$

Correlation

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}} \tag{2}$$

A little new mathematical stuff

$$\oint_C \vec{F} \cdot d\vec{s} \tag{3}$$

The Black Scholes Partial Differential Equation

Necessary to apply a dynamic replication strategy

"In mathematical finance, the Black–Scholes equation is a partial differential equation (PDE) governing the price evolution of a European call or European put under the Black–Scholes model. Broadly speaking, the term may refer to a similar PDE that can be derived for a variety of options, or more generally, derivatives. For a European call or put on an underlying stock paying no dividends, the equation is:" [1]

$$\frac{\partial V}{\partial t} + \frac{1}{2}\sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} = rV - rS\frac{\partial V}{\partial S} \tag{4}$$

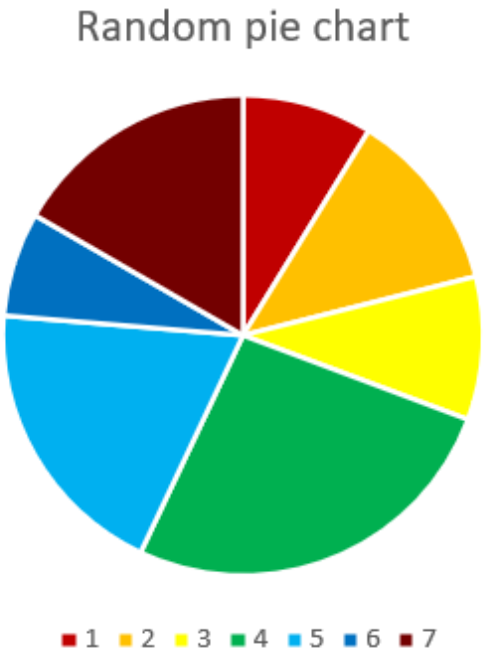
For further reading, Black and Scholes (1973) is helpful.

[1] https://en.wikipedia.org/wiki/Black-Scholes_equation

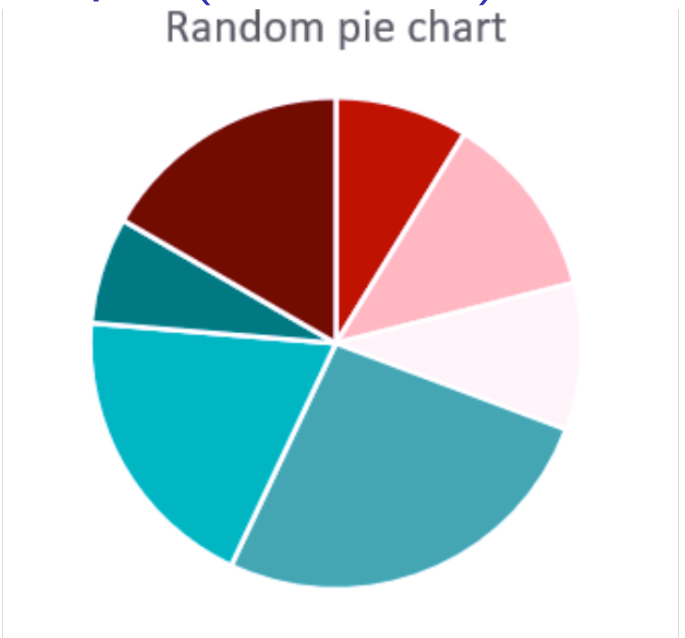
Not-so-colour-blind-friendly graphs

Pie charts are always a suboptimal visualization choice. But in case of colour-blindness, pie charts are even worse because, unlike when using bar plots, colour is the only distinguishing factor.

Real colours



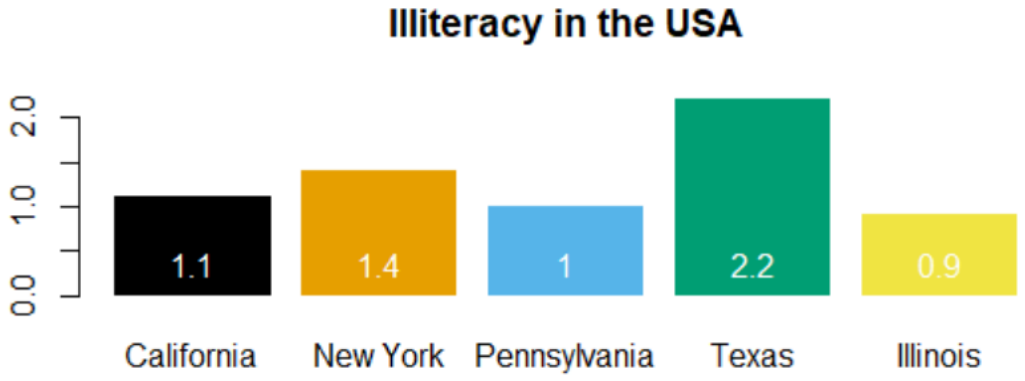
Same piechart simulated for tritanopia (blue-blind)



Colour-blind-friendly graphs

This is an example of better visuals: a barplot using colour-blind-friendly colours for easy distinction (Data comes from freely available R dataset about states in the USA).

Real colours



Same data simulated for tritanopia (blue-blind)

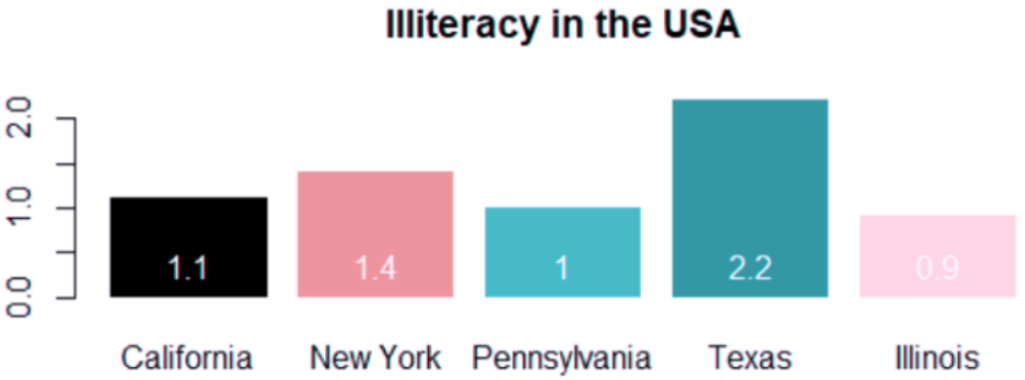


Table made with dcolumn

Aligning the decimal separator

This table was created with *dcolumn*		
−111.00	55.40	6.50
5555.10	−0.00001	0.011
1.73	8.88	4.20
−1.50	−666.00	−0.0005

Table: This meaningless table has all decimal points nicely aligned for easy reading.

Heatmap

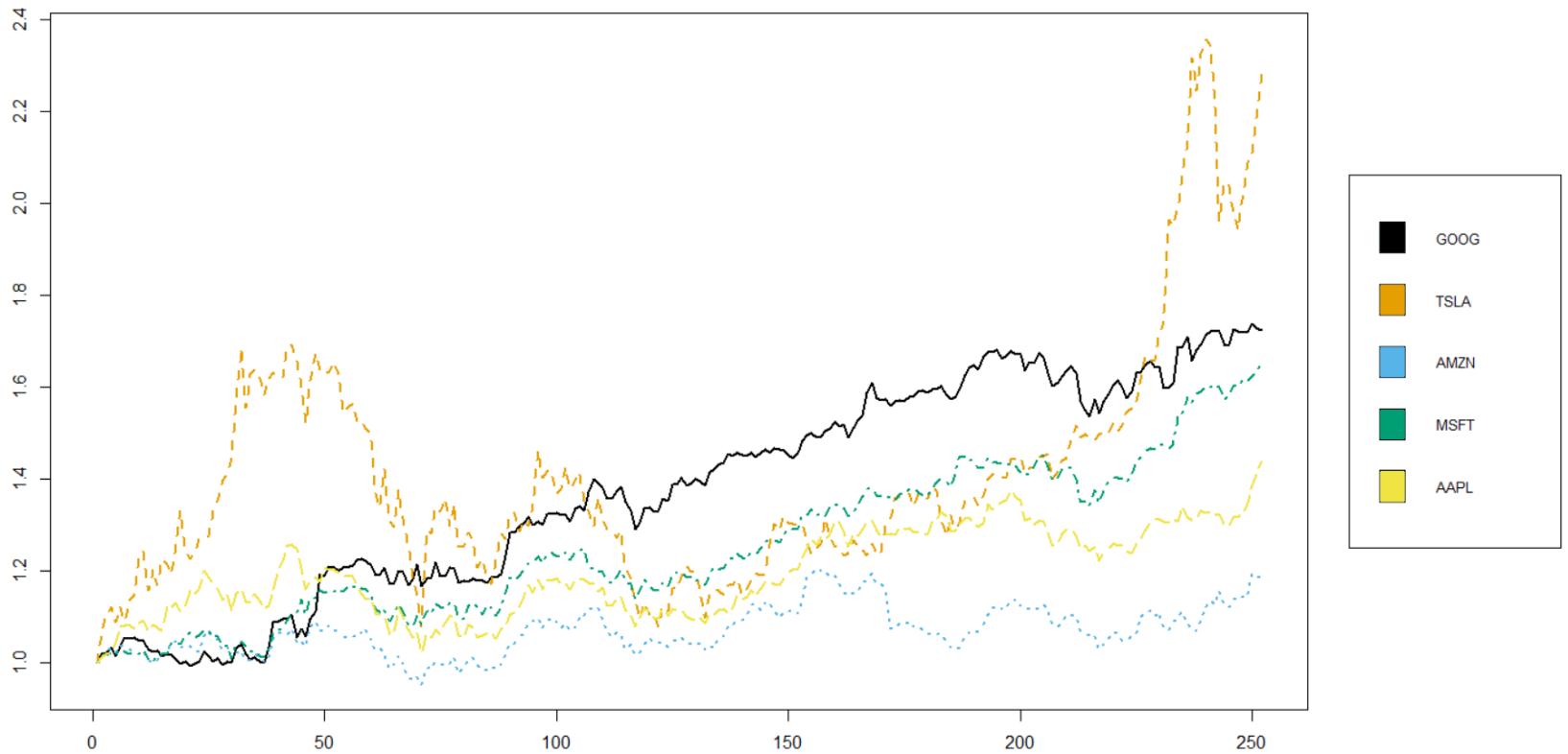
The net profits of the 5 biggest publicly traded companies in the United States. This visualization quickly makes very clear that Tesla has not been nearly as profitable as other very big companies.

	AAPL	AMZN	MSFT	GOOG	TSLA
2020	$ 57,411 M	$ 21,331 M	$ 44,281 M	$ 40,269 M	$ 721 M
2019	$ 55,256 M	$ 11,588 M	$ 39,240 M	$ 34,343 M	-$ 862 M
2018	$ 59,531 M	$ 10,073 M	$ 16,571 M	$ 30,736 M	-$ 976 M

Table: Net Profits for Apple, Amazon, Microsoft, Alphabet and Tesla

Colour-blind-friendly graph

Figure: Cumulative stock returns of the 5 biggest US companies, since Nov 23rd 2020.



 Black, Fischer and Myron Scholes (May 1973). "The Pricing of Options and Corporate Liabilities". In: *Journal of Political Economy* 81(3), pp. 637–654.