

Averages and Beyond in Accounting, Actuarial and Day-to-day Life.

Professor Rajendra Shah

MD

DS Actuarial Education Services

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Session today

- What is Average
- Averages in Day-to-day Life
- The Flaw of Averages
- Rethink on Conventional Batting Average
- Averages in Technical Analysis
- Averages used in Accounting
- Averages in Actuarial Applications
- Beyond Average in Actuarial Applications
- Average is Over

What is Average?

Is average

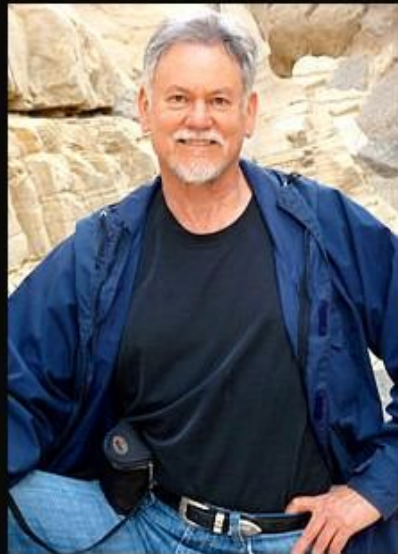
- A representative of a group?
- A central item for a group?
- A most frequently occurring item for a group?

Average is a tricky term!



I Averages in Day-to-day Life

- Average Speed
- Average Value of an Investment in the centre of a period
- Average family size and Size of an average family



A person working 45 hours per week averages 44% more income than someone working 40 hours per week. That's 44% more income for 13% more time.

(Warren Farrell)

izquotes.com

Average Speed during a to and fro Journey

- Average Speed during Journey from Mumbai to Pune : 60 kmph
- Average Speed during return journey via the same route : 90 kmph

Determine the Average Speed during the to and fro journey.

Choose the likely answer:-

- A. 64 kmph
- B. 72 kmph
- C. 75 kmph
- D. 76 kmph



Average Value of an Investment in the centre of a period

If an investment of \$1,000 grows to become \$16,000 over 16 years, what could be its value in the centre of the period, i.e. after 8 years?

Choose the likely answer:-

- A. \$8,000
- B. \$8,500
- C. \$5,500
- D. \$4,000



Average family size and Size of an average family

Consider the data regarding number of members in each family for a sample of 6 families residing in a society:

5 3 2 4 2 3

What may be regarded as Average Family size?

Choose the likely answer

- A. 2
- B. 3
- C. 3.17
- D. 2.5

What may be regarded as Size of an Average Family?



"How do you divide your love among four children?"

"I don't divide it. I multiply it."

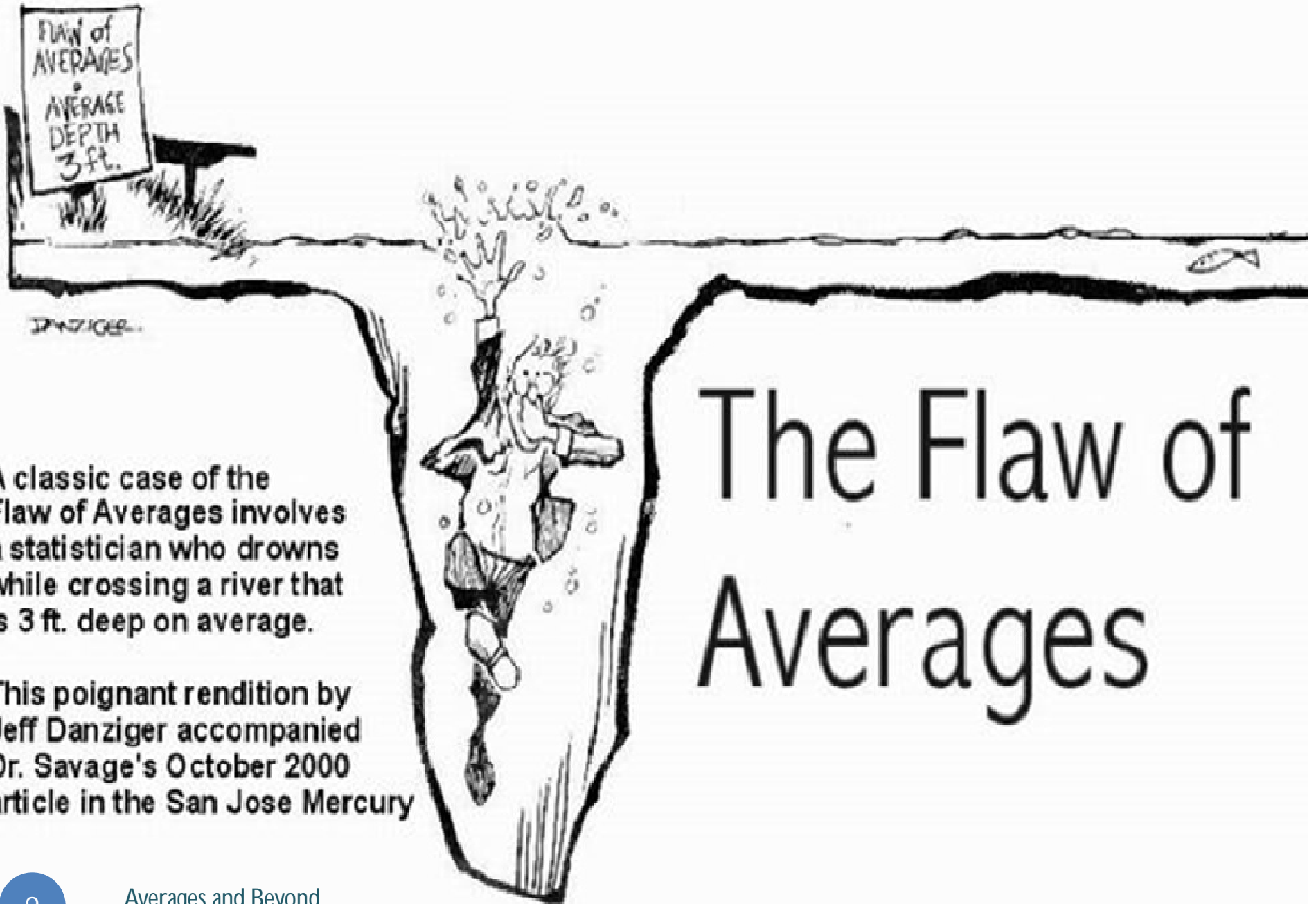
What average would you calculate?

Ms. Mani Maker, a secretary at a large enterprise has joined a course to learn computer programming and is eager to make use of her knowledge. She decides to write a computer program for a computerised service to a marriage bureau to be run by her and run it on the computer when it is not being used by others and the boss is not watching. She is soon able to run a part time business. She collects fee from her customers on the basis of the satisfaction experienced by them. A sample of Ms. Mani Maker's earnings is given below:

Day	Income (in Rs.)	Day	Income (in Rs.)	Day	Income (in Rs.)
1	560	11	0	21	0
2	0	12	0	22	900
3	1250	13	750	23	0
4	1850	14	1050	24	1000
5	0	15	1300	25	0
6	0	16	0	26	0
7	500	17	5800	27	1200
8	3200	18	0	28	0
9	0	19	250	29	950
10	1200	20	0	30	850

What average income would be appropriate in the following situations:-

- a) An officer of the Income Tax Department has criticised the utilisation of the business for the purpose of tax avoidance. Ms. Mani Maker wants to defend herself for not paying the advance tax on additional income.



A classic case of the Flaw of Averages involves a statistician who drowns while crossing a river that is 3 ft. deep on average.

This poignant rendition by Jeff Danziger accompanied Dr. Savage's October 2000 article in the San Jose Mercury

The Flaw of Averages

Rethink on This Average

Average no. of runs scored per inning
= $\frac{\text{Total no. of runs scored in the career}}{\text{No. of times got out in the career}}$

What is the average no. of runs scored by a batsman in a series, given inning wise scores:-

Inning	Runs	No. of Balls played
1	124	189
2	13*	24
3	57	114
4	38*	56
5	1	4
Total	233	387

Conventional Average = $233/3 = 77.67$

Strike rate adjusted average = Conventional Avg. x Total no. of balls played in innings where he got out / Total no. of Balls in All Innings played in the career

$$= 77.67 \times 307 / 387$$

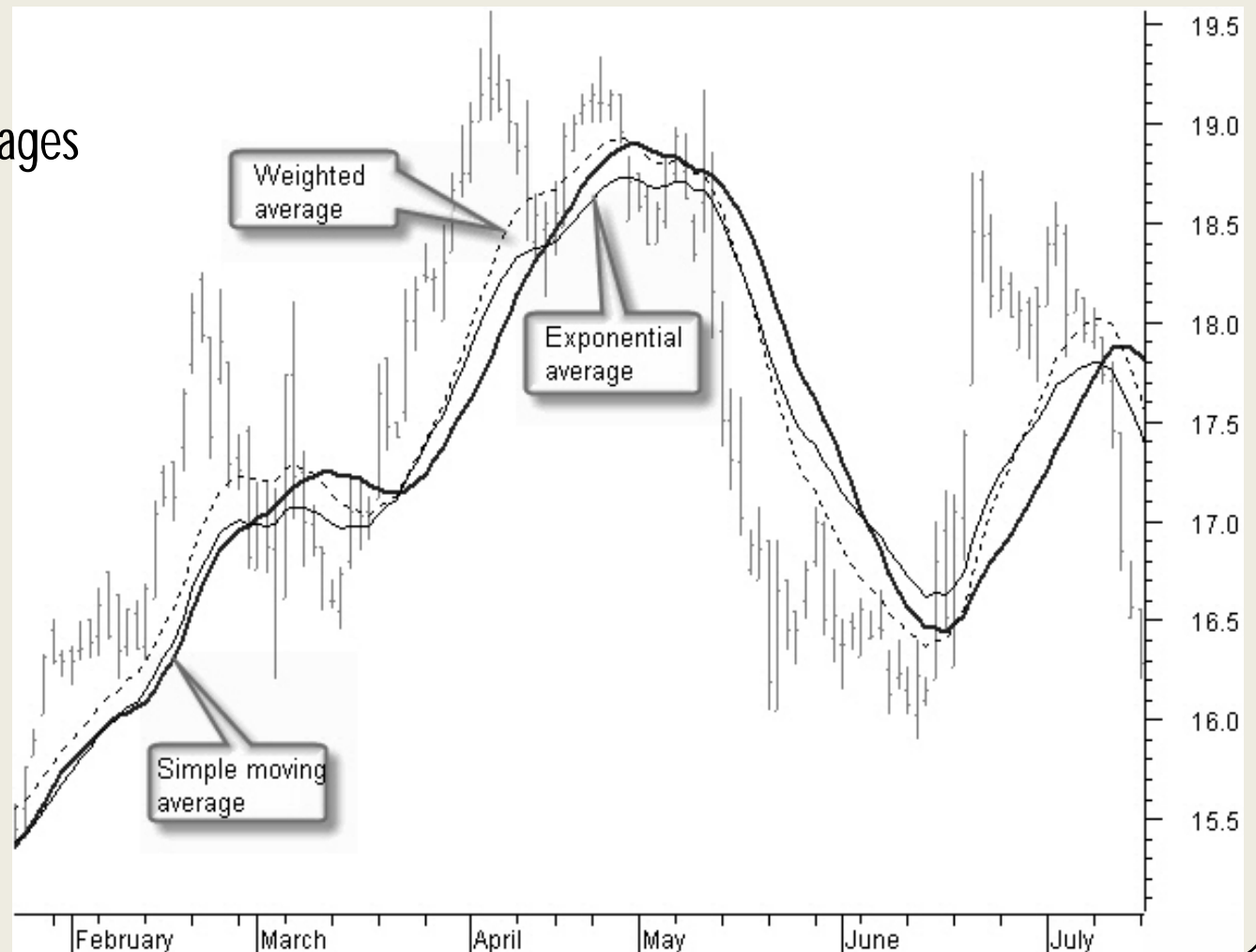
$$= 61.61$$

This average is also equal to Average Strike Rate X Average no. of balls played when got out.



Averages used in Technical Analysis

- Moving Averages
- Exponential Averages



Tools based on these averages

- MACD
- Exponential Averages in conjunction with ROC



Averages used in Accounting

- Average Cost per unit for Units held in Stock
- Average Accounting Return
- Accounting Ratios



Averages in Actuarial Applications

- Average Loss per event
- Average number of claims
- Use of Average in Provision for Liability



"He's 104. He always comes back on his birthday -
I worked out he'd be gone at 69."

Use of Average in Liability Provision

ASC 450, *Contingencies*, outlines the accounting and disclosure requirements for loss and gain contingencies. It states that "An estimated loss from a loss contingency is recognized only if the available information indicates that (1) it is probable that a liability has been incurred at the reporting date and (2) the amount of the loss can be reasonably estimated," without providing a definition of either probable or reasonably. Even if FASB defined probable, the idea of a threshold is ill advised. Suppose we define 51 percent to be probable.

Then (1) Firm A, which had a pending legal action with a 50 percent chance of a \$100,000 judgment, would have no charge

(2) Firm B, with a 51 percent chance, would have a \$100,000 charge.

(3) Firm C, with 1,000 independent cases of \$100, each with a 50 percent chance of judgment, would have no charge.

In reality, firm C is expected to incur loss of around \$50,000 far more certainly than the other two firms!

Suggested further reading: "The Flaw of Averages in Accounting and Law" by Sam L. Savage and Marc Van Allen.

Beyond Averages in Actuarial Applications

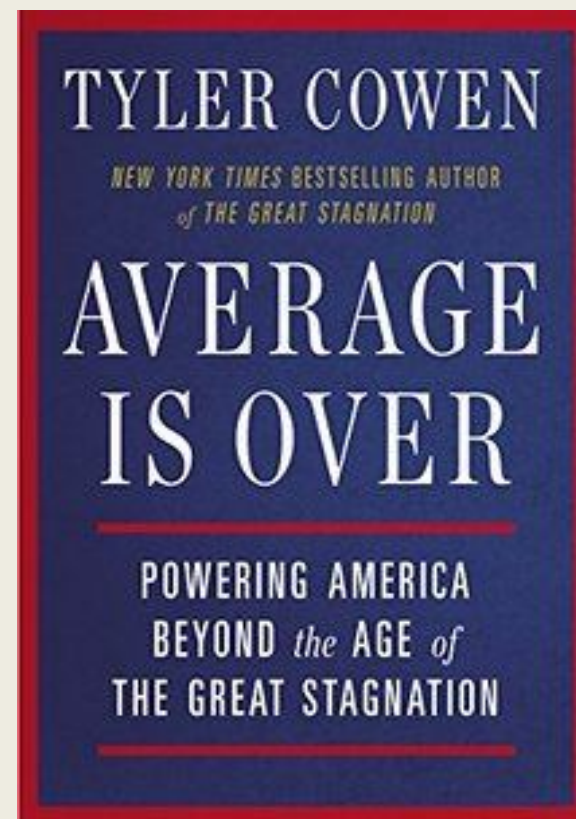
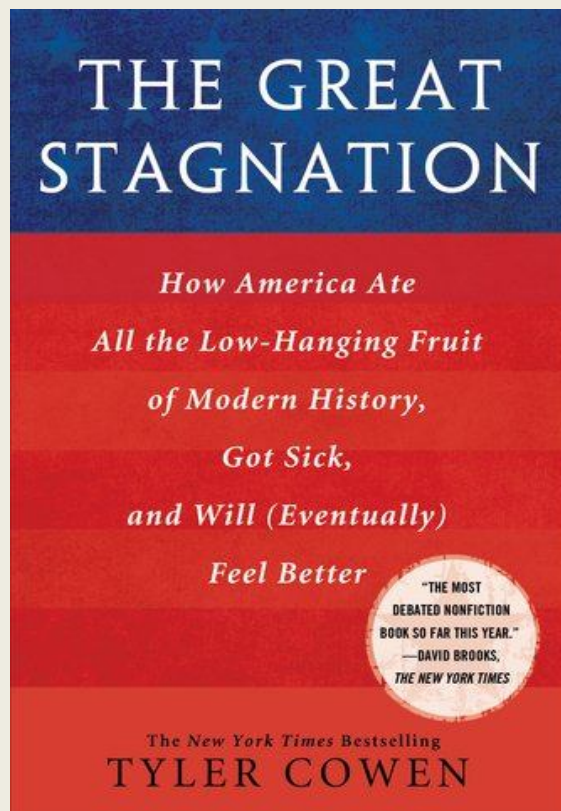
- Significance of Variance in Premium decision.
- Should an actuary begin stating an interval of values for the liability and recommend a safety margin? An interval such as $(\mu, \mu + \sigma)$ to advocate safer value like $\mu + \sigma$?



"There must be some mistake. According to our actuary tables I'm going to live to 83. Let me live! I'm an average man!"

Average is Over

- The Great Stagnation
- The Average is Over



Tyler Cowen's Observations and Views

"The widening gap between rich and poor means dealing with one big, uncomfortable truth: If you're not at the top, you're at the bottom."

"High earners are taking ever more advantage of machine intelligence in data analysis and achieving ever-better results. Meanwhile, low earners who haven't committed to learning, to making the most of new technologies, have poor prospects. Nearly every business sector relies less and less on manual labour, and this fact is forever changing the world of work and wages.

A steady, secure life somewhere in the middle —average — is over."

End of Average

Todd Rose, not an average Harvard Professor:

- "Average is a statistical myth."
- "They have strengths and weaknesses. They all do, even geniuses do."
- "The mythical yardstick – the average human – is hurting everyone."
- Individual is more important than generally laid down principles for masses.



Human beings don't line up perfectly. There is no average learner. They have strengths and weaknesses. They all do. Even geniuses do."

— LECTURER TODD ROSE, ED.M.'01, ED.D.'07



Any Questions?

Thank You.

Prof. Rajendra Shah
Managing Director
DS Actuarial Education Services (DS ActEd)