The Biology and Chemistry of Trading…

Saurabh Singal

Dec 11, 2006

Predicting is simple…

- **The Dow Jones Industrial Average closed last night at 12,307. As a price index the Dow does not include re-invested dividends. If the Dow were redefined to reflect the re-investment of all dividends since May 1896, when it commenced at a value of 40, what would be its value now?**
  - **In addition to your guess, please also make a low guess and a high guess, so that you are about 90% sure that the true answer is between the ranges.**

But prone to error!

- **"I'm sorry Mr.Kipling, but you just don't know how to use the English language," wrote the editor of the San Francisco Examiner in 1889.**
- **In rejecting the thriller *The Day of the Jackal* in April 1970, a publisher wrote to Frederick Forsyth, " (Your) book has no reader interest."**
- **A well-known American art critic said of Picasso in 1934: "(Picasso's) prestige is rapidly waning and the custodians of his fame and his pictures are fighting a losing battle to elevate him to a position among the immortals." Picasso painted many of his important works in the next forty years.**

In Movies and Music

- Marilyn Monroe was told early in her career, "You'd better learn secretarial work, or else get married."
- The manager of the Grand Ole Opera told one young singer, "You ain't going nowhere … son. You ought to go back to drivin' a truck." The singer was Elvis Presley.
- "We don't like their sound. Groups of guitars are on their way out," said a Decca Recording Company executive in 1962 in turning down the Beatles.

In Technology.

- Thomas J.Watson, the founder of IBM, said in 1943, "I think there is a world market for about 5 computers."
- Ken Olson, the founder of Digital Equipment, stated in 1977 just before the PC revolution began, "There is no reason for any individual to have a computer in their home."
- Bill Gates - 64 KB of RAM should be enough for everybody!

Daniel Kahneman

Nobel Prize in 2002

"On many occasions I have praised flight cadets for clean execution of some aerobatic maneuver, and in general when they try it again, they do worse. On the other hand, I have often screamed at cadets for bad execution, and in general they do better the next time. So please don't tell us that reinforcement works and punishment does not, because the opposite is the case." – Israel Air force Instructor

This was a joyous moment, in which I understood an important truth about the world: because we tend to reward others when they do well and punish them when they do badly, and because there is regression to the mean, it is part of the human condition that we are statistically punished for rewarding others and rewarded for punishing them. –**Daniel Kahneman**

How evolutionary wiring makes tading inherently tricky?

- How we handle panic or trauma
- How we handle euphoria / depression
- Pattern Recognition – good for facial recognition bad for trading
- Cognitive Biases

Cognitive Biases

- Overconfidence Bias
- Representativeness Bias
- Anchoring
- Cognitive Dissonance
- Availability Bias
- Self Attribution Bias
- Mental Accounting
- Confirmation Bias
- Hindsight Bias
- Framing
- Recency Bias

Emotional Bias

- Endowment Effect
- Loss Aversion
- Regret Aversion
- Lottery Effect
- Status Quo

Anchoring

- **Anchoring is the name of the tendency to cling to irrelevant facts in the use of decision-making.**
- **With Genghis Khan in charge the Mongols ruled much of Central Asia before their leader led them on in an ill-fated campaign against Hungary, where he died.**
- ***Question 1. Did these events happen before or after A.D. 151?***
- ***Question 2. In what year did Genghis Khan die?***
- **The first question is nothing more than an anchor.**
- **It is just there to put a date in your mind.**
- **Perhaps, it did not even seem right – too early. But it tends to weigh down your answer.**
- **Genghis Khan actually died in 1227 A.D.**

Anchoring: Housing Appraisal

- **A group of randomly selected house brokers were taken to a house and asked to appraise its value. In addition the brokers received a ten-page information packet about the house, including a list price of $65,000.**
- ***The average appraisal value that the group of brokers came up with: $67,800.***
- **Then a second group of brokers were taken to the same house and given the same tour and the information package, but with one difference. The list price mentioned was $84,000.**
- ***This time the average appraisal price returned by the brokers had moved to $75,190.***
- **This was more than $7,000 higher**

Anchoring: Wheel of Fortune

- Even when we know that we are susceptible to Anchoring, we are still not free from the effect.
- In another experiment a wheel of fortune containing numbers from 1 to 100 was spun and different groups of participants were asked if the percentage of African Nations was higher or lower than the number on the wheel. They were then asked to give their guess as to this percentage.
- *The number on the wheel influenced the guesses*
  - *For the group that got 10 as the number on the wheel , the median guess was 25;*
  - *For the group that received 65 on the wheel, the median guess was 45.*

Confirmation Bias

- **Confirmation Bias is the tendency to ignore facts, which do not support your thesis and heavily be influenced by those facts or arguments that support your existing pre-conceived notions.**

Prospect Theory: Assymetry of Loss and Gain

- People feel a stronger impulse to avoid losses than to acquire gains.
- Sunk Cost Fallacy.

Frame Dependence Illustration 1: The General's Dilemma

- Imagine you are the commander in the army threatened by a superior force. Your staff says your soldiers will be caught in an ambush in which six hundred of them will die unless you lead them to safety by one of two available routes. If you take route A, two hundred soldiers will be saved. If you take route B, there is a one third chance that six hundred soldiers will be saved and a two thirds chance that none will be saved. Which route should you take?

- Imagine that you are once again a commander in the army, threatened by a superior force. Once again, your staff tells you that if you take route A, four hundred soldiers will die. If you take route B, there is a one third chance that no soldiers will die and a two thirds chance that six hundred soldiers will perish. Which route do you choose?"

Frame Dependence Illustration 1: The General's Dilemma (contd..)

- Research by Kahneman and Tversky showed that most people would choose route A in the first scenario because you would save two hundred lives, but the same people end up choosing route B in scenario B because there is a one third chance no lives are lost. The scenarios have the same end result in each option - but the two scenarios are framed differently. In one, the emphasis on how many lives are saved and the respondents want to be cautious and save as many lives as possible. In the second case, the emphasis is on how many lives are lost and most people try to gamble or be adventurous to avoid the certain death of four hundred.

Frame Dependence Illustration 2:Gambling with Earned Money vs. Won Money

- People have a tendency to treat different cash flows differently depending on the source of the cash flow. A lot of people would not gamble with "hard earned money", but if they bet bet 5 dollars and win 10,000 thousand dollars with it, they might be less averse to gambling with all 10,000 dollars.

- Money is money, but many people would not mind betting or losing money that was won this way. While traditional finance suggests people should not distinguish between dollars in different pockets, in reality people do make the distinction.

Frame Dependence Illustration 3: Theatre Ticket Illustration

- Scenario A. Imagine you have purchased a ticket to a theatre. On reaching the theatre you find that the ticket is lost and that it costs a hundred dollars to buy another ticket. Would you buy another ticket or go home?

- Scenario B. You arrive at the theatre and queue up to buy the ticket when you realize you have lost 100 dollars somewhere. Would you still buy the ticket or go home? (Assuming of course that your wealth is much more than 100 dollars and that you have cash or credit cards readily available)

  It turns out that several people would go home in scenario A but the same people would pull out another 100 dollars in scenario B. In reality the outcomes are identical - you have lost 100 dollars and if you want to see the theatre you need to pay another 100 dollars. But people often have "mental accounts" - in this case a mental account for entertainment, for which they may be willing to spend 100 but not 200 dollars.

- ***Similarly, one could add a third scenario to the two above- you own a hundred shares of Microsoft which is down 100 dollars today, and will your answer change now?***

Prospect Theory : Different Treatment of Gains & Losses

- Most people hate to lose. However, this aversion to loss often ends up influencing our decision making more than is realized. People are risk averse in terms of gains but risk-seeking in terms of losses. For example, if given the chance to lock in a smaller gain vs. a risky gamble with either no gain or an even higher gain, (such that the expected value is the same in each case) the majority of the people choose the sure gain. But when the problem is of locking in a sure loss versus a gamble where they could either avoid the loss totally or land up with a bigger loss, people would like to take the gamble.

- People often persist with keeping losing stocks in their portfolios and sell their winners far too early to lock in a gain.

- This also leads to the Sunk Cost Fallacy. People also end up throwing good money after bad.

Relation to GMC…

How do we hire?

Cognitive Dissonance?

Neuro-transmitters.

- Dopamin – Euphoria
- Serotonin – anxiety; undertrading/overtrading (Loss aversion)
- Amygdala – Fight or Flight; response to Trauma. Selling Positions in a Panic.

Dopamine

- Hormone like substance produced by the hypothalamus in the brain.Mainly associated with *pleasure system*.Released in response to, or in anticipation of, pleasurable stimuli.
- Unexpected GOOD results -> ***more*** Dopamine released-> **Euphoria**. And vice versa.
- This explains Lottery Effect – pay much more than fair price for games with very large returns vs games with moderate returns.
- Over reaction (de Bondt)
- Under reaction (PEAD; price momentum)

Deception in Nature and Markets…

- Predators and Preys
- Fed announcements
- Charts