Behavioral Decision Theory

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Over-confidence and the Hazards of Making Predictions

The Dow Jones Industrial Average closed last night at 10257. 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.

Over Confidence

- When people were asked to describe themselves as being better than average, average or poor drivers compared to those they encounter on the road, 80% described themselves as above average. By definition only 50% can be above average!

- Similarly most people have too great a confidence in their own abilities to pick stocks that will outperform the markets,

Crystal Ball Gazing is Harder than you Think

- **In August 1941, Captain William T.Pulleston, the former chief of U.S. Naval Intelligence, stated, "The Hawaiian Islands are over-protected; the entire Japanese Fleet and Air Force could not seriously threaten Oahu."**

- **Three days later the officer in charge of radar at Pearl Harbor was told by a subordinate that a radar signal indicated at least 50 planes, possibly far more, were approaching Oahu at almost 180 miles an hour. His reply, "Well don't worry about it … it's nothing."**

- **A potential initial investor in the Ford Motor Company was told by his banker, "The horse is here to stay, but the automobile is only a novelty – a fad." The investor bought $5,000 worth of Ford stock anyway and sold his shares several years later for $12.5 million.**

The Hazards of Prediction in Literature and Arts

- **"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, informing Rudyard Kipling that he should not send in further articles.**

- **In rejecting the thriller The Day of the Jackal in April 1970, a publisher wrote author 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.**

Spotting Talent is Tough

- **Marilyn Monroe was told early in her career, "You'd better learn secretarial work, or else get married."**

- **A Universal Studio executive dismissed two actors at the same meeting, telling the first, "You have no talent," and the second, "You have a chip on your tooth, your Adam's apple sticks out too far, and you talk too slow." The first actor was Burt Reynolds and the second was Clint Eastwood, the movies' two biggest box-office draws in the 1970s.**

- **Edouard Manet, one of the earliest Impressionists, said to Claude Monet of Pierre-Auguste Renoir, "He has no talent at all, that boy … Tell him to please give u painting." Renoir is one of the acknowledged masters of Impressionism, whose masterpieces have sold above $60 million.**

Musical Musings

- **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.**

- **Thomas J.Watson, the founder of IBM, said in 1943, "I think there is a world market for about five computers."**

Technology Titans and Predictions

- **Thomas J. Watson, the founder of IBM, said in 1943, "I think there is a world market for about five computers."**
- **The editor of the London Daily Express, when told in 1922 that the inventor of television wanted to see him, said, "For God's sake go down to reception and get rid of the lunatic who's down there. He says he's got a machine for seeing by wireless! Watch him – he may have a razor on him."**
- **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."**

Anchoring

- **Anchoring is the name of the tendency to cling to irrelevant facts in the use of decision-making. Confirmation Bias is the tendency to ignore facts, which do not support your theses and heavily be influenced by those facts or arguments that support your existing pre-conceived notions.**

Anchoring Illustration 1: **Restaurant selection**

- **A group of people was asked to say which one out of two hypothetical French restaurants based on their descriptions would they rate higher. They were also allowed to give an "equal" rating. The descriptions were designed so that on paper the restaurants looked very similar and most people would not be able to make a judgment. Not surprisingly, most people said they were unable to rate either restaurant higher than the other.**

- **Now a second group was asked to do the rating, but instead of giving them descriptions all at once, they were given comparable attributes of each restaurant one at a time and asked to state their tentative preference after each attribute is presented. Example, first attribute pair might be**

- **Restaurant A is known for its excellent ratatouille and Restaurant B is famous for its Marsala au gratin.**
- **The participant is asked which restaurant would he tentatively rate higher on the basis of this attribute and then the next attribute is presented. At the end, the participant is asked for his ratings. Now, most participants had no trouble rating either on or the other as superior. What is more there was a very high correlation between the final rating and the tentative rating they gave after seeing the first attributes. Clearly anchoring is at play.**

Anchoring Illustration 2: **Genghis Khan**

- **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 or a siren song. It is just there to put a date in your mind. Perhaps, it did not even seem right – too early. But when answering the second question, it tends to weigh down your answer.**

Answers to Anchoring Illustration 2

- **The first question is nothing more than an anchor or a siren song. It is just there to put a date in your mind. Perhaps, it did not even seem right – too early. But when answering the second question, it tends to weigh down your answer.**
- **Genghis Khan actually died in 1227 A.D.**

Anchoring Illustration 3: **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 aa ten-page information packet about the 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 Illustration 4: **African Nations in the UN**

- **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 wheel , the median guess was 25;***
  - ***For the group that received 65 on the wheel the median guess was 45.***

Frame Dependence – Mental Accounting and Prospect Theory

- **When Nobel Laureate Merton Miller was asked to describe in twenty five words or less, his contributions to finance, he said - "If you transfer a dollar from your left pocket to the right".If you transfer a dollar from your left pocket to the right, you are no wealthier. I and Franco (Modigliani) proved that rigorously."**

- **The manner in which a problem is stated or represented is called its frame. Frame independence means that the manner in which a decision theoretic problem is framed is irrelevant; traditional finance assumes framing is transparent. Or, practitioners can see through all different ways cash flows might be described. In reality some frames may be opaque.**

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?"

- ***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?***

Frame Dependence Illustration 4 : **Selection Vs. Cancellation**

- Two groups of participants were given the choice of getting a holiday at one of the two destinations described below.

Spot A:
Average Weather
Average Beaches
Medium Quality Hotel
Medium Temperature Water
Average Quality Nightlife

Spot B:
Excellent Weather
Gorgeous Beaches and Coral Reefs
Ultra chic hotel
Very cold water on the beach
No nightlife
Very Strong Winds

- *About two thirds chose Spot B. Now, a second group of participants were given the same option in a different frame. They were told they had both reservations but had to cancel one of them. A majority of them opted to cancel the reservations for spot B.*

- *The answer to the puzzle probably lies in the fact the first frame was a selection problem, the second one was framed in terms of rejection. People tend to focus on the positives when selecting something; they tend to focus on the negatives when rejecting something. Spot B has more positives than spot A but also has more negatives, explaining part of the puzzle.*

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.

Here is an example from the computer industry:

- Apple CEO John Sculley was thoroughly committed to the Newton. He coined the term PDA or Personal Digital Assistant and made it the centre of his personal vision for the computer industry.
- Development of the Newton began in 1987.
- The product was launched in in 1993. At $1000 it was much too expensive to have succeeded.
- By January 1994 it was obvious that sales were disappointing and that Newton would remain a money losing project
- But Apple persevered with the Newton project.
- In 1995, new features were released.
- In 1996, a backlit screen was also added.
- In 1997, Apple spun out the whole Newton division but that didn't work so six months later Apple absorbed the division back into the fold.
- CEO's come and go but losing projects go on forever. Sculley was replaced by Gil Amelio, who was replaced in a dramatic turn of events by Steve Jobs. And of course, every one knows that Steve Jobs had himself been replaced no leass dramatically by John Sculley.

- *So events came a full circle and Newton was still there.*

Some illustrations of Prospect Theory

- Problem 1. You have to choose between accepting a guaranteed sum of $1500, or play a lottery. If you play the lottery, you have a 50% chance of winning and $1050 and a 50% chance of winning $1950. Would you play the lottery? Yes or No?

- Problem 2. You have to choose between accepting a guaranteed loss of $750 or participating in a lottery. If you play the lottery, you have a 50% chance of losing $525 and a 50% chance of losing to $975. Would you play the lottery? Yes or No?

- Problem 3. Imagine you have just won $1500. Now you have the choice to participate in a lottery. In this lottery you have a 50% chance of winning $450 and a 50% chance of losing $450. Would you play the lottery? Yes or No?

- Problem 4. Imagine that you have just lost $750 in a lottery. Now you have the choice to participate in a lottery, which gives you a 50% chance of losing $225 and a 50% chance of winning $225. Would you choose to participate? Yes or No?

Solutions to Prospect Theory Problems

- Compare your responses to Problems 1 and 3. From a dollar perspective they are equal, but they are framed differently.

- According to standard decision theory, people should respond with the same response to both the questions. However when a survey was conducted it was found that 25% of the people are more willing to play the gamble in Problem 3 as opposed to Problem 1. The Behavioral Decision theory explanation is that people tend to combine losses and gains differently. In problem 3, people combine the loss of $450 with the gain of $1500 to have a net loss of $1050. But in problem they tend to look at winning in isolation.

- Similarly, let us move to Problems 2 and 4. Again the problems are dollar equivalent. But they are framed differently. In Problem 2, 75% chose to gamble rather than accept a sure loss. But in Problem 4, 50% of the people switched to the guaranteed option