

The Effect of Anchoring on Economic Decision-Making

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Abstract. The anchoring effect is a cognitive heuristic that influences human decision-making processes. People consistently perceive the initially available information as an anchor and use this reference point to form decisions. However, decision-makers' over-reliance on anchors causes them to falsely believe the information they perceive without further thought. This paper explains the definition, underlying mechanism, and applications of anchoring. For methodology, the paper uses qualitative research to illustrate examples of anchoring in different scenarios. To conclude, even though the automatic generation of heuristics is difficult to detect, it is important to understand the way anchoring affects economic decisions in advance. The research results of this paper have practical contributions and far-reaching implications. Different from the mathematical analysis method, the case analysis method more accurately reflects the importance of anchoring in real life environment. In addition, some people have prejudices about the anchoring effect. This paper can bring enlightenment to people and help them better understand the way in which anchoring facilitates the generation of economic gains and losses.

Keywords: Anchoring Effect; Economic Decision-Making; Heuristics-Driven Bias; Reference Point; Behavioral Finance.

1. Introduction

Behavioral finance argues that humans are susceptible to cognitive heuristics. Heuristics allow people to take mental shortcuts in their thinking, thereby increasing efficiency and saving energy. However, easy computation over-relies on anchors to make judgments, which means that people have a strong tendency to make wrong decisions based on available reference points. The consequences of the anchoring effect can be significant, while people barely notice their biases.

Anchoring has many applications in the field of finance and economics, where the way people perceive information is directly related to gains and losses. As a result, people do not exhibit rationality in their behavior due to the intervention of bias, which inevitably results in the financial loss of decision-makers. Investors sell winning stocks and hold losing stocks; analysts predict companies' future prices based on their past performances; consumers find discounted products attractive. Without prior knowledge of heuristics, people habitually make irrational choices instead of maximizing their utility or value.

Anchoring is a heuristic that guides humans to accept irrelevant information in their decision-making processes. The concept of heuristics was introduced by Simon in 1955, who argued that humans were not perfectly rational (Furnham & Boo, 2010). In 1974, Tversky and Kahneman became the first to identify and theorize the anchoring heuristic. As a number of recent studies have examined anchoring effects from different angles, more and more people become aware of this cognitive bias.

This paper aims to explain the relationship between anchoring and human decision-making. In the first section, the paper explains the concepts of behavioral finance and heuristics. In the second section, the paper elaborates on the definition and discusses the importance of the anchoring effect. In the third section, the paper lists three examples to introduce the application of anchoring heuristics in different scenarios. In the fourth section, the paper summarizes the views of different studies and draws a conclusion. The applications of anchoring mostly extend to the contexts of negotiation, marketing, and stock trading. Therefore, the three examples correspond to the three contexts and aim to provide a clear insight into how anchoring works.

The paper has two main contributions. To begin with, this paper uses qualitative research instead of quantitative research to analyze the effect of anchoring. In contrast to the mathematical analysis of numerical data, qualitative research involves the investigation of non-numerical data. By referring to interview-based studies, the paper focuses on the collection of non-numeric data and applies case

analysis methods to obtain useful information about the anchoring effect. Moreover, people are usually biased against the anchoring effect, believing that anchoring is not influential enough to cause large economic consequences. This paper emphasizes the importance of anchoring through application examples and brings new enlightenment to people. Hence, people are more aware of the consequences of anchoring bias and increasingly seek ways to avoid it.

2. Literature Review

2.1 Definition

Tversky and Kahneman define anchoring as when people make estimates, they start with an initial value (anchor) and then adjust to arrive at a final answer (Tversky & Kahneman, 1982). Compared with the actual value, people's final answers are often biased towards the anchor, signaling insufficient adjustments that typically result from incomplete computation or special framing of options.

As Kahneman explained, humans have two modes of thinking: System 1 and System 2 (Kahneman, 2011). System 1 operates automatically and effortlessly to complete simple tasks, while System 2 requires attention to perform complex computations. Although System 1 is prone to mistakes in complex calculations, System 2 adopts the recommendations of System 1 with little disagreement. As a result, the incomplete computation of humans' System 1 thinking leads to insufficient adjustments and intuitive errors.

Framing, as an important means of generating an anchoring effect, determines how options are presented to the decision-maker. Tversky and Kahneman first identified the concept of framing effect: the phrasing of information in terms of its positive and negative aspects changes people's decisions. People avoid risk when information is phrased positively and seek risk when information is phrased negatively. The framing effect typically occurs in medical scenarios, where life-or-death decisions can be impacted by the way medical information is presented (Almashat et al., 2008). Classical economics assume that people are selfish and make perfectly rational choices that benefit only themselves. However, even when patients are prescribed the recommended treatment, it is difficult for people to make the right health choices under the influence of anchoring effects (Reed et al., 2021). A primary function of framing is to change people's mode of thinking. By triggering people's System 1 thinking, intentional use of framing leads people to make mistakes and reduces their use of System 2 to adjust.

In many situations, people are biased in their evaluation of conjunctive and disjunctive events. Bar-Hillel designed two experiments to test this hypothesis (Bar-Hillel, 1973). In the first experiment, where participants in a compound gamble needed to win every high-probability bet, subjects were asked to state the maximum number of times they would participate in compound gambles rather than accepting a simple gamble. In the second experiment, where participants of compound gambles only needed to win one low-probability bet, subjects were asked to state the minimum number of times they would participate in compound gambles rather than accepting a simple gamble. The results indicate that people overestimate the probability that conjunctive events will happen and underestimate the probability that disjunctive events will happen.

The fixed probability of the compound gamble serves as a starting point for judging both conjunctive and disjunctive events. Take conjunctive events, for example. In the experiment, a conjunctive event was composed of multiple high-probability gambles. People took the high probability of a single gamble as the starting point but failed to adjust sufficiently. Consequently, they believed that their chances of winning conjunctive events were higher than they really were.

Furthermore, the strength of the anchoring effect is determined by several factors that vary in different situations. The combination of the two external information sources has more influence on customers' judgment of objective facts than on their subjective preferences (Andersson et al., 2021). As Strack and Mussweiler explained in their study, a primary factor that influences the strength of the anchoring effect is the applicability of activated memory (Strack & Mussweiler, 1997). In the

study, all participants were first asked to guess whether the Brandenburg Gate is taller or shorter than 150 meters. Later, one group of participants was asked to state how tall the Brandenburg Gate is, while the other group was asked to state how wide the Brandenburg Gate is. The results show that the anchoring effect is stronger when both questions ask the same dimension of the object. After comparing 150 meters with the height of Brandenburg Gate, participants automatically perceive the anchor (150 meters) as a height, not width. Given that the first question activates height-related information stored in participants' memory, the anchoring effect is stronger when participants are asked questions about the information they have activated.

Another factor that affects the strength of the anchoring effect is mood. According to Englich and Soder, negative emotions influence the extent to which anchoring bias affects non-experts (Englich & Soder, 2009). In Englich and Soder's study, participants were asked to describe either a happy or a sad incident before finalizing their sentencing decisions for a shoplifting case. The results suggest that the anchoring effect is stronger when the non-experts are in a sad mood.

Englich and Soder's study also indicates that experts make judgments based on their expertise, whether in a happy or sad mood. Despite being unaffected by emotional factors, experts are still susceptible to the anchoring effect in their decision-making processes. In Northcraft and Neale's study, two groups of real estate agents were asked to appraise a house (Northcraft & Neale, 1987). Both groups were given the same information except for the house's list price (\$65,900 versus \$83,900), creating a 10% difference between the two groups' appraisal averages. Real estate agents, unquestioned experts in the housing industry, are still affected by the anchor (list price) they see.

2.2 The Importance of Anchoring

Anchoring plays an important role in people's daily life. For instance, the pricing pages of a news website or fitness app usually display three purchasing options: basic, plus, and premium. In most cases, basic is cheaper than plus, and premium is the most expensive option. The plus option is placed in the center of the page; it has detailed descriptions below; it is bigger. In this scenario, the basic and premium options serve as the low-price and high-price anchors. To increase sales of the plus option, the company deliberately minimizes the attractiveness of basic and premium options. The basic option is cheaper, but it has fewer functions. The premium option has good functions, but it is too expensive for the general public. As a result, when customers are anchored by the above-mentioned two bad options, they tend to favor the plus option because compared with the basic and premium options, it is both affordable and functional.

Another reason why the plus option is more popular is that people avoid extremes and dislike risks. Consumers are more likely to buy mid-priced products because it combines the advantages of good quality and low price. In reality, however, mid-priced products are often misjudged by customers and have no absolute advantage over other products. Commonly, people use anchoring as a tool to gain benefits, while others suffer from not knowing that anchoring bias exists. The financial loss regarding website subscriptions may be small, but the cost of being affected by anchoring can potentially be huge, as reflected in the next situation: an art auction.

Beggs and Graddy explained the effect of anchoring on the art auction: in a hot market, where the overall presale estimates are higher, final prices are typically higher than in normal markets (Beggs & Graddy, 2009). Anchoring bias leads to huge losses for some buyers in art auctions. Therefore, the importance of the anchoring effect is reflected in various situations, where changes in reference points affect economic decision-making and ultimately create economic losses.

3. Application

3.1 Application 1: Price Negotiation

A major application of anchoring occurs in price negotiations. The buyer wants to buy the product at the minimum cost, while the seller wants to sell the product at the highest price to maximize profits. If no party quits the transaction during the price negotiation process, a final price will be determined

after the negotiation. Although some deals are canceled because of disagreements in prices, transactions occur as long as the price is within a specific range that both parties accept. The upper bound of this range is the highest price the buyer is willing to accept, and the lower bound is the lowest price the seller is willing to accept. The objective of both parties is to maximize the financial utility derived from the transaction. Therefore, buyers want to keep the final price as close to the lower bound as possible, sellers want to keep the final price as close to the upper bound as possible, and the anchoring effect can help people achieve these goals in price negotiations.

In the buyer-seller simulated experiment that Kristensen and Gärling conducted, participants' counteroffers are directly related to proposed selling prices (anchor point) and reservation prices (reference point) (Kristensen & Gärling, 2000). In the experiment, business students acted as condominium buyers. Before students presented a hypothetical seller with a counteroffer, a random anchor point was selected, and students were asked to state whether the anchor point was higher or lower than their counteroffers. Students were also informed about their reservation prices as reference points, which is the maximum price they were willing to accept. The results show that high counteroffers occur when the anchor point is high or when the reference point is high. By initially providing a lower selling price, sellers anchor buyers to select a lower counteroffer. This strategy is commonly used by sellers in price negotiations and is closely related to the concept of anchoring.

An experiment conducted by Whyte and Sebenius indicates that during a negotiation, anchoring largely affects subjects' initial offers, aspiration levels, and bottom lines (Whyte & Sebenius, 1997). In the experiment, participants belonged to an auto parts manufacturer and were told to negotiate the price of the auto parts with a Japanese firm. Before the negotiation, participants received a low anchor and a high anchor: the Japanese company wanted to purchase the parts for \$12 and \$32, while their control group did not receive specified prices. The results indicate that, during the next day's negotiation, the seller's opening price, the minimum price that satisfies the seller, and the minimum price that is acceptable change significantly for both low and high anchors. It is clear that anchoring affects multiple factors during the negotiation process, which greatly influences the final price decided.

According to Ritov, the anchoring effect is associated with the profit schedule format (Ritov, 1996). In Ritov's competitive market simulation, two versions of the market (buyer increasing seller decreasing and buyer decreasing seller increasing) were randomly assigned to participants. In the BISD (buyer increasing seller decreasing) version, the buyer's profit was listed in the schedule using increasing order, whereas the seller's schedule was listed using decreasing order. The BDSI (buyer decreasing seller increasing) version was the opposite of the BISD version, in which the profit schedule's format was exchanged between the buyer and seller. The results show that the profit of sellers is higher than buyers for the BISD version, and the order is reversed for the BDSI version. Both the buyer and the seller are anchored on the first number that appears in the profit schedule, demonstrating that the framing of the profit schedule can act as an anchor and impact people's decision-making processes.

3.2 Application 2: Marketing Strategy

Anchoring is often used to structure marketing strategies. It is a commonly used technique in the advertising industry that people use to influence a customer's perception of products. For instance, after seeing a high-price anchor, consumers tend to favor the next product that has a low price. The pricing of a product also affects how much buyers like the product and the way buyers infer the product's quality. Compared with ordinary products, products with an anchor bring different emotional feelings to customers. By providing specific anchoring information, sellers influence consumers' judgment and thus increase product sales.

Dogerlioglu-Demir and Koçaş used an experiment to illustrate the effect of environmental anchors on consumers' internal reference prices (Dogerlioglu-Demir & Koçaş, 2014). In the experiment, a restaurant's picture was shown to the participants. A group of participants were asked to estimate the price they would pay for a meal at this restaurant. The other group was asked to estimate the price

they would pay for a hamburger meal at this restaurant. The results show that people are willing to pay more for a meal at the restaurant when the name of the restaurant is Studio 97 than Studio 17. The effect of incidental environmental anchoring disappears when hamburger is mentioned because customers have a stronger internal reference point for the average price of a hamburger meal. Many companies make the numbers appear in different regions of the restaurant to influence customers' price judgments. Clearly, the incidental environmental anchors' effect is stronger when people have weak internal reference points for the item they buy.

Paek, Yoon, and Hove tested the impact of anchoring on advertisement by measuring customers' attitudes toward the advertisement (Aad), attitude toward the brand (Abr), and purchase intention (PI) (Paek et al., 2011). Advertisements using nutrition claims with an anchor have two advantages. First, participants believe that the product is low-calorie and healthy. Second, customers prefer information with anchors to other information without anchors. As a result, anchoring provides businesses with unique advantages, which promote better marketing outcomes.

3.3 Application 3: Stock Trading and Investment Decision

Anchoring plays a significant role in affecting stock market transactions and investment decisions. Many stock analysts predict the performance of companies in the stock market based on their past performance. Even if a company shows a trend of rapid growth, analysts ignore this information and focus on the past price of the company's stock to predict its future prices. Similarly, investors analyze the gains and losses of investing in a particular industry based on its past growth. For example, while it is not a wise choice to invest in the stressed real estate industry at a particular time, some investors are always optimistic about investing in the real estate industry because this industry's history suggests high overall returns. In the stock market, even though insiders have access to private information, they are still susceptible to the anchoring effect (Lee & Piqueira, 2019).

Anchoring also causes traders to delay selling stocks. People sell winning stocks and hold losing stocks because they are risk-averse under a gain and risk-seeking under a loss. The expectation is that losing stocks will return to their original levels because the emotional damage derived from losing stock is too great to be accepted. When the growth trend of stocks indicates that the probability of returning to the initial level is low, people choose to hold stocks, leading to the eventual loss of wealth. Even if the stock returns to its original price after a while, people still have made the wrong decision, because the money earned from selling the stock can be used to generate steady financial growth through interest.

According to Lowies, Hall, and Cloete, anchoring bias occurred in South Africa's property investment decision-making, and fund managers failed to adjust along with the new information revealed (Lowies et al., 2016). In the study, participants were asked to choose from three properties. Initially, most people chose Property C, no one chose Property B, and a small portion of people chose Property A. Then, participants received new information about the three properties, which indicated that Property A was the best property. Nevertheless, 84.6% of participants that initially chose Property C did not change their decision, showing that people are probably insensitive to new information and rely heavily on the initially available anchor.

4. Conclusion

The anchoring effect appears frequently in daily life. This paper introduces the concept of anchoring, explains the significance of the anchoring effect, and discusses three essential applications of anchoring in different contexts: price negotiation, marketing, and stock trading. While it can be difficult to notice the bias that anchoring causes people to have, it is important to recognize this bias and understand the mechanisms behind it. As a cognitive heuristic, the anchoring system is difficult to understand, but by exploring common applications of anchoring, one can raise awareness of the concept and be aware of its use in a variety of situations.

The paper also provides new insights into possible implications. To start with, the anchoring effect discussed in this paper is not only related to the economic gains and losses of companies, but also to the choices of individuals in their lives. Anchoring plays a key role in influencing savings decisions. With so many people facing a retirement savings crisis because of overspending, anchoring is a useful tool to improve people's saving plans. Therefore, the topic of implementing anchoring to improve individual welfare is clearly worth discussing. Additionally, quantitative research has its own advantages. Mathematical analysis of data generates more accurate results and quantifies the influence brought by the anchoring effect. Future research may combine quantitative and qualitative research method to obtain more authentic and credible information about the anchoring effect.

References

- [1] Almashat, S., Ayotte, B., Edelstein, B., & Margrett, J. (2008). Framing effect debiasing in medical decision making. *Patient Education and Counseling*, 71(1), 102–107. <https://doi.org/10.1016/j.pec.2007.11.004>.
- [2] Andersson, H., Bökman, F., Wallhagen, M., Holmgren, M., Sörqvist, P., & Ahonen-Jonnarth, U. (2021). Anchoring effect in judgments of objective fact and subjective preference. *Food Quality and Preference*, 88, 104102. <https://doi.org/10.1016/j.foodqual.2020.104102>.
- [3] Bar-Hillel, M. (1973). On the subjective probability of compound events. *Organizational Behavior and Human Performance*, 9(3), 396–406. [https://doi.org/10.1016/0030-5073\(73\)90061-5](https://doi.org/10.1016/0030-5073(73)90061-5).
- [4] Beggs, A., & Graddy, K. (2009). Anchoring effects: Evidence from art auctions. *American Economic Review*, 99(3), 1027–1039. <https://doi.org/10.1257/aer.99.3.1027>.
- [5] Dogerlioglu-Demir, K., & Koçaş, C. (2014). Seemingly incidental anchoring: The effect of incidental environmental anchors on consumers' willingness to pay. *Marketing Letters*, 26(4), 607–618. <https://doi.org/10.1007/s11002-014-9295-0>.
- [6] Englich, B., & Soder, K. (2009). Moody experts-- How mood and expertise influence judgmental anchoring. *Judgment and Decision Making*, 4, 41–50. <https://doi.org/10.4324/9780203141939-11>.
- [7] Furnham, A., & Boo, H. C. (2011). A literature review of the anchoring effect. *The Journal of Socio-Economics*, 40(1), 35–42. <https://doi.org/10.1016/j.socec.2010.10.008>.
- [8] Kahneman, D. (2011). Thinking, fast and slow. Farrar, Straus and Giroux.
- [9] Kristensen, H., & Gärling, T. (2000). Anchor Points, Reference Points, and Counteroffers in Negotiations. *Group Decision and Negotiation*, 9(6), 493–505. <https://doi.org/10.1023/a:1008722223618>.
- [10] Lee, E., & Piqueira, N. (2019). Behavioral biases of informed traders: Evidence from insider trading on the 52-week high. *Journal of Empirical Finance*, 52, 56–75. <https://doi.org/10.1016/j.jempfin.2019.02.007>.
- [11] Lowies, G. A., Hall, J. H., & Cloete, C. E. (2016). Heuristic-driven bias in property investment decision-making in South Africa. *Journal of Property Investment & Finance*, 34(1), 51–67. <https://doi.org/10.1108/jpif-08-2014-0055>.
- [12] Northcraft, G. B., & Neale, M. A. (1987). Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. *Organizational Behavior and Human Decision Processes*, 39(1), 84–97. [https://doi.org/10.1016/0749-5978\(87\)90046-x](https://doi.org/10.1016/0749-5978(87)90046-x).
- [13] Paek, H.-J., Yoon, H. J., & Hove, T. (2011). Not all nutrition claims are perceived equal: Anchoring effects and moderating mechanisms in food advertising. *Health Communication*, 26(2), 159–170. <https://doi.org/10.1080/10410236.2010.544281>.
- [14] Reed, K. L., Harvey, E. M., & Everly, C. J. (2021). The intersection of Behavioral Economics and the General Medicine Literature. *The American Journal of Medicine*, 134(11). <https://doi.org/10.1016/j.amjmed.2021.06.041>.
- [15] Ritov, I. (1996). Anchoring in simulated competitive market negotiation. *Organizational Behavior and Human Decision Processes*, 67(1), 16–25. <https://doi.org/10.1006/obhd.1996.0062>.
- [16] Strack, F., & Mussweiler, T. (1997). Explaining the enigmatic anchoring effect: Mechanisms of selective accessibility. *Journal of Personality and Social Psychology*, 73(3), 437–446. <https://doi.org/10.1037/0022-3514.73.3.437>.

- [17] Tversky, A., & Kahneman, D. (1982). Judgment under uncertainty: Heuristics and Biases. *Judgment under Uncertainty*, 3–20. <https://doi.org/10.1017/cbo9780511809477.002>.
- [18] Whyte, G., & Sebenius, J. (1997). The effect of multiple anchors on anchoring in individual and group judgment. *Organizational Behavior and Human Decision Processes*, 69(1), 75–85. <https://doi.org/10.1006/obhd.1996.2674>.