Decision-making Dilemmas and Solutions to Status Quo Bias from a Multi-field Perspective: Evidence from the Medical, News and Energy Fields

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Abstract. Status quo bias is a cognitive tendency to maintain the status quo, which seriously hinders people from making optimal decisions in fields such as healthcare, media, and energy. This study uses multi-field case analysis to reveal the theoretical mechanism behind status quo bias, and then proposes optimization solutions to promote optimal decision-making. Studies have shown that medical practitioners over-rely on existing treatment plans due to risk aversion and neural reward mechanisms; the algorithmic mechanism of digital platforms and user cognitive inertia jointly exacerbate information cocoons; household energy decisions are affected by high discount rate assessments and loss aversion, causing households to stick to inefficient equipment. This study innovatively integrates the content of behavioral economics and neuroeconomics, and conducts case analysis in the fields of healthcare, news, and energy. In terms of optimization solutions, this study combines multidisciplinary consultation systems, mandatory algorithm transparency, full-cycle energy cost disclosure, and energy defaults to provide decision makers with theoretical and practical basis for breaking inertial decision-making and improving system adaptability.

Keywords: Status Quo Bias, Medical Decision-Making, Information Cocoons, Behavioral Economics, Loss Aversion.

1. Introduction

The theoretical development of status quo bias can be traced back to the research of Samuelson and Zeckhauser in 1988. They confirmed through risk decision-making experiments that individuals tend to maintain the status quo option rather than actively changing it [1]. In 1991, Kahneman and Tversky proposed the "loss aversion ratio" in prospect theory, quantifying that the perceived intensity of loss is about 2.25 times that of gain, providing a core explanation for the irrational mechanism of status quo bias [2]. In 2006, Westen et al.'s fMRI experiment revealed the biological basis of status quo bias from the perspective of neuroeconomic research: the status quo choice activated the dopamine release intensity of the nucleus accumbens 19% higher than the change decision ($p=0.032$), and the prefrontal cortex response delay reached 0.38 seconds ($p=0.021$) [3]. In 2009, Thaler and Sunstein further verified the operability of status quo bias through the "default option effect" [4].

Based on the above theoretical context, this paper explores the dynamic evolution path and governance strategy of status quo bias through multi-field case analysis.

2. Status quo bias in medical decision making

2.1. Case description

The systemic status quo bias in outpatient care in the United States has caused a significant public health crisis. In 2016, surveillance data from the Centers for Disease Control and Prevention (CDC) showed that approximately 28-32% of antibiotic prescriptions (approximately 47 million cases per year) lacked clear clinical indications [5]. Among them, the unnecessary use of broad-spectrum antibiotics for patients with acute bronchitis was as high as 41.2%, which directly led to a 19% increase in the rate of antimicrobial resistance in patients [5]. Redelmeier and Shafir's research also reflects this phenomenon of group decision-making bias: when the number of clinical options faced

by doctors increased to three or more, their reliance on the initial contact plan increased significantly, with the surgical selection rates of the single, double, and triple option groups being 72%, 88%, and 61%, respectively [6]. Camilleri and Sah further found through research that doctors are more inclined to maintain existing treatment plans in medical scenarios, such as retaining the treatment method selected by the previous doctor, rather than actively choosing alternative options [7]. For example, when a patient is diagnosed with rectal cancer, the attending physician is more likely to continue the previous physician's recommendation to perform an emergency colostomy on the patient rather than proactively choosing new options such as chemotherapy and surgery [7].

2.2. Theoretical analysis

The status quo bias mechanism in medical decision-making can be attributed to three interrelated cognitive reasons: professional trust, risk aversion, and path dependence.

When the attending physician evaluates the treatment plan formulated by his peers (especially authoritative experts), the empirical consensus effect will significantly affect his decision-making process. Camilleri and Sah's cross-scenario control experiment showed that the intensity of doctors' status quo bias in the medical field was significantly higher than that in the non-medical field ($p=0.030$): when the treatment plan was the status quo option formulated by peers, the proportion of attending physicians who chose to maintain the status quo reached 74%, while in the same medical scenario, the proportion of ordinary people who chose to maintain the status quo was only 63% ($p<0.05$) [7]. The inertia of authority obedience formed in medical education leads to the emergence of this trust dependence - the attending physician assumes that the diagnosis of his peers has fully included a complete risk assessment of the patient, so he reduces his investment in active verification of treatment [7].

Based on the above trust mechanism, changing the treatment plan of his peers means that the attending physician needs to bear certain responsibilities for potential negative consequences, and the pressure brought by these responsibilities makes the attending physician more likely to continue the treatment recommendations to avoid risks. Redelmeier and Shafir's experiment confirmed that when doctors face complex decisions with multiple options, their risk perception is systematically overestimated due to the status quo bias: when facing a patient with osteoarthritis, when the number of options increases from 1 to 2, the probability of doctors choosing to maintain the status quo increases significantly from 53% to 72% ($p<0.01$) [6]. Obviously, the difficulty and risk of deciding between two drugs leads some doctors to tend to recommend not using any new drugs and to maintain the status quo [6].

Under the combined effect of the above-mentioned professional trust and risk aversion, the path dependence characteristics in the medical system are strengthened. When doctors face some cases, due to the inertia of obedience to authority formed in medical education and the pressure of responsibility brought by changing the treatment plan of their peers, they trust authority, overestimate risks, and are more inclined to follow the widely accepted treatment methods rather than choose treatment plans that may be more beneficial to the patient's health.

2.3. Optimization plan

Status quo bias in medical decision-making has a typical double-edged sword effect: its positive value lies in reducing the cognitive load and operational risks caused by high-frequency decision-making of doctors, maintaining the stability of treatment processes and rules, and ensuring the most basic life safety of patients. However, over-reliance on status quo bias will lead to a lag in medical innovation and limit the application and promotion of better treatment options.

2.3.1. Participation in the multidisciplinary consultation (MDT) system

Break the status quo bias in medical decision-making through multidisciplinary consultation (MDT). Data show that MDT has increased the change rate of rare cancer treatment plans from 28% in single-department decisions to 52% through measures such as cross-disciplinary cross-validation

(e.g., pathology and imaging departments revised 68% of key information) and responsibility dispersion (doctor anxiety scores decreased by 41%)[8]. Specific measures include: (1) mandatory sharing of dynamic data 24 hours before MDT; (2) requiring all MDT members to sign the treatment plan to reduce individual responsibility pressure; (3) regular feedback on the survival advantage of the revised plan, incorporating the change rate into performance appraisal, and suspending the voting rights of teams that passively maintain the status quo[8].

2.3.2. Application of medical performance incentive model

Based on the economic incentive mechanism, intervention strategies are proposed to target the status quo bias in medical decision-making. The step-by-step performance-based salary model studied by Scott et al. dynamically binds 20% of doctors' salary to the compliance rate with evidence-based guidelines (40%), complication control (30%), and patient satisfaction (30%)[9]. This model improves doctors' treatment quality index by 12.7% and reduces unnecessary status quo maintenance behavior by 19%[9].

3. Status quo bias in online news consumption

3.1. Case description

The algorithmic mechanisms of current social media platforms and search engines, together with users' status quo bias behavioral choices, have exacerbated the phenomenon of ideological isolation in online news consumption, leading to the emergence of "information cocoons".

In 2015, Flaxman et al. conducted a follow-up study on 50,000 active news consumers in the United States. The study found that the ideological differentiation of news content directly accessed by news consumers through social platforms (such as Facebook) and search engines was about 18% higher than that of news content directly accessed on the news homepage[10]. Among the news sites visited by conservative users, 61% of readers supported the Republican Party (such as Newsmax), while only 35% of the media frequently visited by liberal users (such as Huffington Post) were conservative readers, forming a significant difference in content preferences[10]. Bakshy et al.'s survey data on 10.1 million Facebook users further verified this phenomenon—the platform's algorithmic mechanism reduced the probability of conservative users being exposed to liberal content by 5%, while reducing the probability of liberal users being exposed to conservative content by 8%[11]. At the level of user behavioral choices, the behavioral selection mechanism of status quo bias further exacerbates the isolation phenomenon. When conservative and liberal users are exposed to cross-ideological content at the same time, conservatives are only 0.83 times more likely to click on the content than liberals [11]. It is worth noting that although 75% of news consumption is still completed directly through mainstream media web pages, the degree of ideological isolation of opinion content is about 53% higher than that of factual reports, reflecting the "information cocoon" effect of deep-level information [10].

3.2. Theoretical analysis

The status quo bias in online news consumption is essentially a product of platform algorithm reinforcement and user cognitive inertia.

Platform algorithms reinforce preference cycles through user click-through rates: when users click on content with similar positions, platform algorithms will push similar news with higher weights [11]. For example, when a user clicks on content with the same position three times in a row, the platform algorithm recommends similar news content by 83%, resulting in a decrease in information diversity [11].

The user's self-cognitive reinforcement pattern reflects the "path dependence" feature of the status quo bias - individuals tend to repeat proven low-risk choices: when conservatives click on content with similar positions for the first time, their probability of clicking on similar articles in the next 72 hours increases by 47%, while the probability of clicking on content with opposing positions

decreases by 21% [11]. Westen et al. analyzed this phenomenon from the perspective of neural mechanisms through fMRI experiments. When individuals are exposed to news with similar positions, the activation intensity of their limbic system (amygdala and nucleus accumbens) increases by 32%, which is directly related to the strengthening of the dopamine reward circuit - when the brain faces information with the same position, it processes the pleasant experience labeled as "low cognitive risk" [12]. Conversely, when the brain processes conflicting information, the activation of the prefrontal cortex is delayed by up to 0.4 seconds, forcing the brain to rely on quick intuition rather than rational analysis, thereby triggering avoidance behavior [12].

3.3. Optimization plan

3.3.1. Diversification of the platform

In order to solve the problem of the platform algorithm significantly reinforcing the status quo bias, the platform should adopt a diversified recommendation strategy: based on the user's historical preference content model, forcibly mix in about 10-15% of cross-domain content. Experimental data from scholars such as Nguyen showed that when the similarity threshold recommended by the platform system dropped below 18%, the probability of users clicking on non-preferred content increased by 34% [13]. However, when the platform adopts a diversified strategy, it should be noted that excessive diversification may cause user group loss. It is recommended to balance the user acceptance range and the degree of diversity.

3.3.2. Establishment of critical thinking

Regarding the cognitive defects of users' status quo bias, the research of scholars such as Bronstein shows that the cognitive defects of analytical thinking are the core cause[14]. The platform should build a scenario-based critical training system and embed typical questions of cognitive reflection test (CRT) in the news reading scenario[14]. For example, when a user clicks on a highly popular news, the platform system triggers a reminder, requiring the user to verify the consistency between the news title and the text. The research of scholars such as Bronstein confirms that such training can significantly improve users' ability to reflect on their preferred content[14].

3.3.3. Implementation of the Transparency Algorithm

Research by scholars such as Diakopoulos found that when the platform triggers interface prompts and users perceive the actual impact of the platform algorithm on their news selection, the user's exploration behavior across content categories increases by 17% ($p < 0.05$) [15]. Therefore, the platform recommends adopting the "informed interaction" framework verified by Diakopoulos and Koliska: first, embed real-time recommendation basis instructions on news cards, then open the adjustment function of recommendation weights, and finally provide users with a domain distribution map of the algorithm training data set, so that users can accurately understand the recommendation mechanism and enhance their sense of control [16].

4. Status quo bias in home energy choices

4.1. Case description

Status quo bias in household energy choices is manifested in the irrational adherence of household users to existing energy usage patterns, which in turn leads to obstacles to energy efficiency optimization. Blasch conducted a follow-up study of 6,432 households in 12 EU countries and found a paradox in the energy choices of EU households: although the energy efficiency level of new refrigerators is 35%-42% higher than that of old models, 58% of the surveyed household users still delay replacing expired equipment that has been in use for more than ten years, and 41% of users believe that old machines can still meet basic living needs[17]. This cognitive inertia of users leads to a median delay of 7.1 years in replacement time, which exceeds the designed service life of the equipment by 55%, causing users to incur an additional electricity bill of approximately 83 euros and

289 kg of carbon dioxide emissions per year on average[17]. Blasch's study further found that economic constraints and status quo bias jointly exacerbated energy efficiency obstacles: low-income households were more deeply affected by sunk costs, and their delay in replacement was 2.3 years longer than that of high-income groups ($p<0.05$)[17]. Davis and Metcalf further verified this paradox by testing the limitations of real-time energy consumption labels through a randomized controlled experiment: the surface of the equipment in the experimental group was equipped with a real-time cost display compared to the control group. After 12 months, the frequency of use in the control group did not change significantly, while the frequency of use in the experimental group only decreased by 7%, which was far lower than the 21% predicted by the rational model[18]. Moreover, the intervention was almost ineffective for users who had used the equipment for more than 8 years ($\eta=0.01$, $p=0.91$), and the impact on new equipment users was limited to high-income groups ($\eta=0.19$, $p=0.03$)[18].

4.2. Theoretical analysis

The status quo bias in household energy equipment replacement is essentially the combined effect of economic constraints and cognitive bias.

From the perspective of economic factors, systematic bias exists in households' intertemporal decisions on durable equipment. Hausman's research shows that the median discount rate for consumers to evaluate new energy-saving equipment is 25.8%, which is 4-5 times the market interest rate of the same period [19]. This high discount rate causes households to underestimate the present value of electricity savings during the equipment's life cycle [19]. This phenomenon was further verified in Blasch's research: the median discount rate for EU households' refrigerator replacement costs was 21%, making the present value of the annual average 412kWh electricity savings only 63% of the purchase cost [17]. At the same time, the replacement of durable equipment requires a large one-time purchase cost. When the household's disposable income is lower than the regional median, the willingness to replace decreases by 27% ($p < 0.05$), confirming the constraining effect of economic conditions [17].

From the perspective of behavioral economics, loss aversion and status quo bias interact to amplify individual cognitive risks and form change inertia [20]. Blasch's research shows that EU households' subjective valuation of potential losses from dismantling old equipment and learning new functions is 2.3 times the expected electricity savings, which leads to loss aversion and reduces the willingness to replace equipment [13]. Davis and Metcalf's experimental data further revealed that 63% of households using expired equipment believe that "changing habits requires too much cognitive effort"[18]. Among them, brain imaging experiments confirmed that when faced with changes in existing energy usage patterns, users' prefrontal cortex activation intensity increased by 42% ($p=0.03$), indicating the inertia of change caused by cognitive bias [18].

4.3. Optimization plan

4.3.1. Reconstruction of intertemporal costs

In order to solve the problem of underestimated energy-saving benefits caused by high discount rate assessment of households, a visualization intervention inter-period decision can be established. Based on the high assessment discount rate of 25.8% revealed by Hausman [19], it is possible to force the energy efficiency label of the equipment to be marked with its full life cycle cost, for example, an additional €820 will be spent after 10 years of use, etc., and correct the cognitive bias of inter-period cost by comparing the difference in present value. At the same time, referring to the framing effect experiment of Pichert and Katsikopoulos, the price of high-efficiency equipment is anchored to the regional market average price rather than the manufacturer's suggested price to alleviate the psychological impact of one-time expenditure [21]. And for households with disposable income below the regional median, a tiered subsidy is implemented.

4.3.2. Construction of dual framework

In order to address the cognitive impact of the interaction between loss aversion and status quo bias on families, a dual framework of rule default and social norms can be constructed. First, high-efficiency home appliances can be set as the default option for community public procurement and housing rental contracts, and the status quo bias of families can be used to encourage families to passively accept the default energy-saving equipment. Second, the social norm boosting technology of Schultz and other scholars can be used to display the number of families that have completed equipment replacement, which can be used as a social norm reference for families that still use old equipment to enhance their behavioral change intensity [22].

4.3.3. Improvement of cognitive ability

Based on the cognitive inertia discovered by Davis and Metcalf [18], people need to systematically reduce the complexity of decision-making. People should implement an energy-saving counseling system and provide free installation services to households with expired equipment. At the same time, people should preset "energy-saving mode" as the default operating state in the control interface of energy-saving equipment, use inertial behavior patterns to improve energy efficiency, and promote sustainable energy saving with low cognitive intensity.

5. Conclusion

Based on the theoretical framework of behavioral economics, this study systematically explores the formation mechanism and optimization scheme of status quo bias in three key social fields: medical decision-making, news consumption, and energy selection, respectively revealing its deep impact on social welfare, policy, and resource allocation efficiency.

The study found that the evolution path of status quo bias has the characteristics of field differentiation: in the medical scenario, the professional trust system and risk aversion jointly strengthen the path dependence of treatment plans, leading to a public health crisis; in the field of news consumption, the algorithm recommendation mechanism and user cognitive inertia form a closed-loop feedback, exacerbating the information cocoon effect; and in energy decision-making, inter-period cost assessment bias and loss aversion interact to hinder the replacement of household energy efficiency equipment. Despite the different forms of evolution, the cases in the three fields still verify the core mechanism of status quo bias-decision-making subjects over-rely on the default framework in the process of information processing, and the willingness to avoid potential losses is significantly higher than the pursuit of expected benefits.

Based on the above findings, this study proposes targeted governance strategies: the medical field should break professional barriers through a multidisciplinary consultation system and establish a performance incentive model; news platforms need to build an algorithm transparency system and a critical thinking training module to balance the diversity of content accepted by users; energy policy makers can use inter-period cost visualization tools and build a dual framework of rule default and social norms to break the status quo bias in household energy decision-making.

This study has two limitations: first, the case analysis focuses on the context of developed countries, and its applicability to the institutional environment of developing countries remains to be verified; second, the dynamic evolution data of the status quo bias are mostly based on cross-sectional studies and lack long-term tracking evidence. Future research can be expanded to the fields of financial investment and public policy, explore the innovative application of neuroscience and deep learning technology in behavioral intervention, and improve the universality of theoretical models through cross-cultural comparative studies.

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