Behavioral Economics and the Demand for Insurance

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ABSTRACT
While neoclassical economic models have provided significant insight into policy and economic behavior, these models fail to take into account actual human behavior outside of what is defined as rational. These anomalies in human behavior from what neoclassical models predict creates problems when looking to implement effective policies in practice. Through examining one such application of this problem in the demand for insurance, this paper examines the work of several behavioral economists in an attempt to understand where current consumer behavior strays from what neoclassical economists predict. This paper pinpoints the resulting difference in consumer behavior and seeks to understand its specific causes. Following a discussion of the literature, this paper argues that there remains a need to investigate the root causes of this anomalous behavior in order to effectively influence insurance policy to ensure consumers are purchasing both the right type and amount of insurance to best fit their needs.

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INTRODUCTION
Economic models have been imperative in understanding consumer and governmental behavior, informing policy, and predicting economic activity for over a century. Neoclassical economic theory that has been taught in classrooms, found in textbooks, and referenced all over the world relies on a few basic assumptions, one of which being that people are rational and make rational choices. However, more recent work in economics challenges this notion and argues that an individual's behavior is not entirely rational, and a number of influences exist that drive their choices outside of what is expected by neoclassical economic theory. As a result, the field of behavioral economics, combining neoclassical economic theory with human psychology, attempts to understand where human behavior is inconsistent with these historical models and what biases and underlying causes create such anomalous behavior. It is important to note that behavioral economics does not attempt to prove neoclassical theory incorrect, but simply looks to understand where original models may need improvements to account for an individual's deviation from what economists deem rational thinking and behavior.

Behavioral economics has received considerable recognition as a growing subfield of economics as several recent Nobel Prize winners in economics have focused their work in this area. Though behavioral economics provides insight into a variety of sectors, this paper specifically examines its analysis of the insurance sector. In addition to securing a foundation of essential concepts from behavioral economics, this paper also analyzes literature and published studies in an attempt to understand the anomalous behavior that rises within the demand for insurance. Finally, future areas for research are discussed in order to understand the causes of this unexpected behavior in hopes of improving policy going forward.
In order to apply behavioral economics to a vast number of sectors, it is important to acknowledge the work of economists and psychologists that prompted the growth of the field.

The work of Daniel Kahneman and Amos Tversky studies the deviation from historically rational behavior by individuals and sought to understand its cause through several psychological concepts (Kahneman and Tversky, 1974, 1991, 1992). In addition to challenging components of neoclassical economic models, Kahneman and Tversky developed a new method of measuring human behavior under risk in contrast to expected utility theory. As behavioral economics found applications in several areas, Howard Kunreuther has been essential to its implementation in the insurance industry. By studying both the supply and demand for insurance, Kunreuther has noted several inconsistencies with the predictions of neoclassical economic models and has advocated for the continued use of behavioral economics to study and understand these anomalies (Kunreuther, 2011).

In addition to analyzing the work of several economists and psychologists in both behavioral economics and the insurance sector, this paper also emphasizes an important need for research moving forward. As insurance policies are an important facet of society, it is important that research aims to inform the government and insurance commissioners of how policies can be improved to ensure that consumers are purchasing coverage that is appropriate for their needs and less susceptible to bias. In order to effectively do this, further research must seek to understand the direct causes of this anomalous behavior. While some literature attempts to understand these root causes, significant work remains to be completed.

The organization of this paper allows readers to first gain a basic understanding of key facets of behavioral economics before applying them in an insurance setting and examining areas for future work. First, an introduction to behavioral economics summarizes the groundbreaking work of Kahneman and Tversky and seeks to establish an understanding of the basics of the field. The following section continues to examine the contributions of behavioral economics in understanding behavior under risk and uncertainty before the next section looks at the work of Kunreuther and others as behavioral economics is applied to the demand for insurance. The final section offers areas and methods for future research with the goal of improving policy before the paper concludes.

INTRODUCTION TO BEHAVIORAL ECONOMICS

One of the cornerstone assumptions for neoclassical economic theory is that all people are rational and behave as such. While this assumption provides the necessary framework to formulate economic models, recent research combining psychology and economics challenges the notion that people act rationally. The combination of psychology and economics to study human behavior is a more recent phenomenon, pioneered by psychologists Daniel Kahneman and Amos Tversky in the latter half of the twentieth century (Kahneman and Tversky, 1974, 1991, 1992). Kahneman and Tversky challenged the assumptions and models of neoclassical economics and opened the doors to endless applications of the newly coined field of behavioral economics.

It is difficult to deny the influence of neoclassical economics on policy and decision-making, but it is important to recognize where it falls short. Through its prioritization of assumptions that make it possible to create models, neoclassical economics establishes a set of predictable behaviors, standardizing a “normal” way for people to behave (Levy, 2019). The heavy reliance on the assumption that people are rational, while aiding in the simplicity of constructing models, creates a problem when human behavior does not align with pure rationality. The study of behavioral economics attempts to improve over neoclassical models by accounting for deviations in human behavior from what is deemed “normal” and by replacing past assumptions with psychologically accurate alternatives (Levy, 2019). Behavioral economics does not seek to

replace neoclassical economics, but simply addresses a need to improve upon the already established theories due to the disconnect between how people are expected to behave and their actual behavior.

At the center of Kahneman and Tversky's analysis of human behavior lies the distinction of two sets of processes that occur when thinking or making decisions, coined System 1 and System 2. System 1 is responsible for immediate and quick decisions that require little to no effort while System 2 it utilized for decisions, calculations, and analysis that require more mental effort. Even though these two systems serve different functions, they work together and play an important role in processing decisions, analyzing risk, and allowing for potential bias. System 2 is enacted only when a task is too complicated for System 1, and therefore most thinking begins with System 1 but has the chance to end with System 2. However, bias enters the equation as the brain typically seeks to avoid exerting significant effort, thus delaying the shift to System 2 if possible (Kahneman, 2011). The difference between the functions of these two systems is continuously explored by Kahneman and has implications in several aspects of behavioral economics that influence human behavior and allow it to deviate it from complete rationality.

In addition to the two systems, Kahneman elaborates on two different "selves," the remembering self and experiencing self. Like System 1 and System 2, these selves have different implications on the decision-making process and subsequently allow the presence of bias. The two selves are most prevalent in the analysis of utility. Neoclassical economic theory measures expected utility, which is entirely governed by rationality and describes the utility people should receive from items and experiences. The two selves, however, account for actual utility experienced. Kahneman explains that the experiencing self focuses on immediate thoughts and feelings while the remembering self-examines the event as a whole. To illustrate this concept, Kahneman et al. (1993) designed an experiment in which participants would place their hands in bowls of cold water for different amounts of time. The "short experiment" consisted of 60 seconds in water at 14° Celsius while the "long experiment" lasted 90 seconds, where the first 60 seconds were identical to the short experiment, but the temperature increased by 1° over the final 30 seconds. The experiencing self would deem the long experiment as worse due to its duration, but the remembering self would prefer the long experiment because the increased temperature at the end led them to remember the experience more positively. The separation between these two selves generate different measurable levels of utility, which contradict neoclassical economic theory that there is only one rational amount of utility achievable. The two selves demonstrate the influence of psychological perception and its ability to vary between people in their overall calculation of utility, a fundamental economic concept.

Similar to how the experiencing self and remembering self-lead individuals to calculate different levels of utility, biases and heuristics cause people to deviate from entirely rational thought, even subconsciously. When facing a difficult problem, the quick intuition of System 1 often tries to substitute a simplified, related question, known as a heuristic, instead (Levy, 2019). Biases and heuristics are one of the larger developments of behavioral economics and their consequences can be studied in a wide variety of applications. Among several distinct heuristics, some of the most prevalent include the availability heuristic, the representativeness heuristic, and the anchoring and adjustment heuristic.

The availability heuristic leads people to overestimate the probability of an event occurring because it is easier for them to imagine its occurrence. Kahneman and Tversky (1974) illustrate this bias when they ask participants whether there are more English words that begin with the letter r or have r as their third letter. Most people answer that there are more English words that

begin with the letter r because it is easier for them to think of words that begin with r than have r as the third letter (Kahneman and Tversky, 1974). However, this is where the availability heuristic allows for bias, as there are actually more letters in the English alphabet that have r as their third letter. Because people find it easier to think of words that begin with r, they automatically, and incorrectly, associate a higher probability with the occurrence of these words than words with r as their third letter.

The representativeness heuristic once again affects probabilities, but in this case, individuals have the tendency to use similarity as a substitute for probability. One important aspect of this heuristic is the gambler's fallacy, in which people believe certain events are "due" to occur after they have not occurred recently. This concept is illustrated well in casinos, specifically within the context of roulette wheels. Cronson and Sundali (2005) found that after the same color had appeared on the roulette wheel five times in a row, gamblers believed the other color was "due" and placed bets that the streak would end. This reveals the roulette wheel's influence to incorrectly calculate probabilities as the probability of landing on a red or black space remains unchanged, but gamblers use the similarity of past occurrences to evaluate probabilities differently.

Finally, the anchoring and adjustment heuristic creates bias as people tend to reach their final answer or decision off of a predetermined "anchor" if one is present. For example, Kahneman and Tversky (1974) designed an experiment in which participants spun a wheel marked from 0 to 100 and wrote down the number they landed on before answering if the percentage of African nations in the United Nations was larger or smaller than the number they wrote. This question was then followed by their estimate of the percentage of African nations among the UN. Even though the number on the wheel had no relation to the number of African nations in the UN, people used the number they landed on as an anchor and adjusted their final answer based off their original number. Under the anchoring and adjustment heuristic, System 1 attempts to construct a situation under which the circumstances of the anchor are true, even though the anchor may not be related to the end result. This bias has been explored in its ability to frame questions to receive a specific answer or prime participants to alter their final decisions.

The observation of heuristics and biases and their abilities to alter rationality have had significant policy implications. Because biases are highly prevalent, calculated and consistent formulas are often more accurate than humans at predicting results, even compared to those with significant experience in their fields (Meehl, 1986). Human judgment allows the possibility for bias, whether from heuristics, overconfidence, or overemphasis on certain variables. Thus, formulas prevent unnecessary bias from entering the equation and produce more accurate results. For example, when predicting grades for college freshman at the end of the year, formulas including only high school grades and one aptitude test were more accurate than counselors who interviewed students for 45 minutes and had access to their high school grades, multiple aptitude tests, and a four-page personal statement (Meehl, 1986). The counselor's judgment to include additional information in their analysis was less accurate than the purely numerical and formulaic calculation, revealing the ability of bias to enter the prediction by way of human interpretation.

In addition to the prevalence of biases and heuristics in decision making, Thaler and Sunstein (2009) used insights from behavioral economics to develop nudge theory, in which governments or other institutions can influence and incentivize people to make decisions that are ultimately better for them. After the immediate success of their work, former president Barack Obama hired Thaler to implement nudge theory and his findings into government policy. More recently,

behavioral economists Benartzi et al. (2017) analyzed the effectiveness of nudge theory, measured by comparing the cost of implementation to the outcome of the nudge, on several policies within the United States. They concluded that nudge theory provided a greater benefit than traditional approaches after adjusting for cost across a plethora of policies including retirement savings, college enrollment, energy conservation, and influenza vaccinations. Behavioral economics has provided several insights to increase the effectiveness of public policy, and the growing popularity of the field will continue to highlight new research and methods to improve upon neoclassical economic models traditionally used.

RISK AND BEHAVIORAL ECONOMICS

Another major area of study within behavioral economics is the study of risk and behavior under uncertainty. Neoclassical economics explains people's preferences under risk through numerous models and assumptions, namely expected utility theory. Through expected utility theory, people are expected to receive a predetermined amount of utility in any given situation. However, as suspected, people's actual behaviors deviate from these calculated predictions. Prospect theory is an alternative to expected utility theory that attempts to break down why people experience different levels of utility and how this then impacts their decisions under risk and uncertainty. There are three main components of prospect theory: reference points, diminishing sensitivity, and loss aversion.

Kahneman (2011) explains the impact and importance of reference points with a simple illustration:

> "Today Jack and Jill each have a wealth of 5 million.
> Yesterday, Jack had 1 million and Jill had 9 million.
> Are they equally happy? (Do they have the same utility?)" (p. 275).

Even though they have the same wealth today, which neoclassical economic theory would associate with equal utility, Jack is likely happy about his new wealth and Jill is likely upset. Even though their current wealth is the same, their happiness or utility in this situation stems from the wealth they had before today, or their reference point. To generalize this situation, events that leave people better off than their reference point can be counted as gains and outcomes that leave them worse off than their reference point are considered losses. Therefore, whether a specific event is considered a gain or loss is entirely dependent on the individual's reference point. This contradicts the idea that all people experience the same utility from the same event and prompts people to behave irrationally in the eyes of neoclassical economists.

The next component, diminishing sensitivity, can be demonstrated by Weber's Law in psychology. Weber's Law concludes that the just noticeable difference needed to detect a change in intensity increases linearly as the beginning intensity increases (Luce and Edwards, 1958). For example, it takes a larger increase in volume to detect a change in volume when a television is already at a high volume than if the television was at a very low volume. This concept of diminishing sensitivity applies to wealth as well, as the difference between $100 and $200 feels much larger than the difference between $900 and $1,000, even though they both differ by $100. This idea becomes important when people examine potential losses and gains, because the same amount may impact one person more than another, which leads to additional discrepancies in decision making.

The third concept, loss aversion, explores the concept that "losses loom larger than gains" and examines how the fear of losses prompts people to make decisions to avoid them, perhaps

even at an additional cost (Kahneman and Tversky, 1991). Baumeister et al. (2001) provided psychological insight into the difference in perception of good and bad events in a variety of situations, such as emotions and feedback. Kahneman then studied this pattern from an economic perspective. Mathematically, a loss of $50 should have the same effect as a gain of $50, but Kahneman found that people perceive the loss as much worse than the respective gain is good (Kahneman and Tversky, 1991). This large emphasis on the impact of losses leads people to make decisions that may be considered irrational in order to avoid dealing with a loss.

In addition to prospect theory, the endowment effect plays an important role in understanding how people reach decisions under risk and uncertainty. Developed by Richard Thaler (1980), the endowment effect draws on the main three principles of prospect theory to explain the value people place on their current status and how this affects their perceptions of gains and losses. In the early stages of developing this concept, Thaler noticed a fellow professor refused to sell a bottle of wine he owned for anything less than $100, while admitting that he would never pay more than $35 for the same caliber wine himself (Kahneman and Thaler, 1991). This demonstrates the endowment effect as the professor values the wine, he owns more than an identical bottle of wine not in his possession. This professor likely associates selling the wine with a loss, so he needs to receive more in financial compensation to overcome the loss of the wine, revealing the concept of loss aversion at work. Additionally, the professor's preference to buy or sell the bottle, each at a different price, is dependent on his reference point of whether he currently owns the wine or not. Because people attach different values to their current statuses or belongings, otherwise referred to as their endowments, the endowment effect does not affect everyone in the same capacity.

Even though the impact of the endowment effect varies from person to person, the influence of loss aversion in undesirable situations impacts people's perceptions in a uniform manner. As individuals attempt to avoid losses and view them as negative, they tend to overestimate the true negative impact such events would have or assign too much weight to negative events that have a low probability of occurring. This is the definition of the possibility effect, which can lead people to pay more than traditional economic theory would dictate to eliminate these negative risks. As a result of the possibility effect, people are led to assign lower probabilities to events that are more certain to occur. This is known as the certainty effect, which comes into play when people use these misjudged probabilities to make decisions, which is then referred to as the expectation principle. To illustrate this concept, Kahneman and Tversky (1992) conducted a study to measure the weight people assigned to their decisions relative to the actual probabilities of these events. To ensure some moderate level of risk was present, they conducted their research in the frame of a gamble with money at stake. Participants were given the choice between gambles with different potential gains and risks associated with them. Their decision weights, or perceived probabilities in comparison to actual probabilities, for each gamble were measured based on their selections of different gambles. The estimates of the weights people placed on their decisions compared with their actual probabilities in the context of gains can be found in Table 1.

Probability (%)	0	1	2	5	10	20	50	80	90	95	98	99	100
Decision Weight	0	5.5	8.1	13.2	18.6	26.1	42.1	60.1	71.2	79.3	87.1	91.2	100

Table 1: Estimation of decision weights for gains (Kahneman and Tversky, 1992)

It is clear to see that small probabilities are overestimated, and large probabilities are significantly underestimated.

In light of the above, Kahneman and Tversky (1992) adopted a fourfold pattern of risk attitudes to illustrate behavior as an effect of each of the principles previously listed. Boiled down to its core components, this pattern is illustrated in Table 2.

	Gains	Losses
High Probability Certainty Effect	Risk Averse	Risk Seeking
Low Probability Possibility Effect	Risk Seeking	Risk Averse

Table 2: Fourfold pattern of risk attitudes (Kahneman and Tversky, 1992)

This discovery is considered one of the most significant contributions of prospect theory (Kahneman, 2011). While neoclassical economic theory can explain both cases of risk aversion and risk seeking in situations with a low probability of gains, risk seeking behavior under circumstances of high probability of losses contradicts what is expected. This signifies that people experiencing a high probability of losing will seek risk, rather than avoid it, which does not follow traditional theory and introduces a new insight from the field of psychology.

The behaviors under prospect theory, the endowment effect, and the fourfold pattern of preferences can be summed up into a general statement: people value their utility based on their reference points and view equivalent losses as worse than gains. The tendency of people to avoid losses as a result has opened the door to studying behavior under risk and uncertainty in many disciplines, one of which being insurance.

BEHAVIORAL ECONOMICS AND THE DEMAND FOR INSURANCE

The study of risk aversion is not a new phenomenon, and such a principle explains the creation of the insurance industry. Referring back to Table 2, the bottom right quadrant representing risk aversion creates insurance markets through the tendency to avoid risk for low probability losses. Expected utility theory reveals that people that are risk averse are willing to pay to avoid risk, so purchasing protection to avoid facing the entire financial burden from a large loss creates a demand for insurance. While this demand has been carefully analyzed through neoclassical economic theory, like many situations described earlier, human behavior creates anomalies to expected demand for insurance that behavioral economics seeks to understand. While anomalies also exist on the supply side of the insurance industry with the insurers themselves, this research will focus on abnormalities in consumer, or demand side, behavior.

In order to understand where human behavior deviates from perfect rationality, it is important to define what is expected. Kunreuther et al. (2013) develop what they refer to as the benchmark model for insurance demand by using expected utility theory principles. First of all, the benchmark model assumes that consumers have access to all relevant data, including risk probabilities, and that they can effectively calculate everything necessary to ensure they are choosing a policy that is in line with their level of risk aversion. Following this assumption, the model assumes consumers can calculate the highest deductible at which they no longer gain from the corresponding lower premiums enough to offset the risk of a potential loss. Through these assumptions, the benchmark model predicts that consumers will choose the right amount of insurance to fit their unique levels of risk aversion as well as an optimal deductible that minimizes premium payments while offsetting the risk of a large loss.

Before analyzing where this benchmark model is inconsistent with consumer behavior, it is worthy to note that there are specific insurance markets in which this model holds true. The first of these markets is auto collision insurance, where the model predicts that consumers voluntarily demand less collision insurance as their car ages and its value depreciates, and this pattern is observed (Kunreuther et al., 2013). Another example is renters' insurance, another voluntary type of insurance, where the expected losses are relatively low, and premiums can exceed these losses significantly. Thus, the model predicts that the demand for renters' insurance will be low and this is consistent with low levels of renters' insurance consumption (Kunreuther et al., 2013). On the life insurance side, the demand for term life insurance is consistent with the benchmark model. As expected, nearly 75 percent of households with the head between 35 and 44 years of age have term insurance, as after this stage couples likely have less dependents to provide for and both spouses are likely to be contributing to the household income (Retzloff, 2005a). Additionally, the demand for term insurance increases as household wealth increases (Retzloff, 2005b). While the benchmark model for insurance demand can predict the optimal behavior for consumers, anomalies in the demand for insurance deviate from these expected behaviors, piquing the interests of behavioral economists.

Perhaps one of the most prevalent challenges to the benchmark model is the lack of information given to consumers about insurance policies as well as the consumers' inability to correctly calculate, if at all, which policy is most appropriate for them. While the severity of a large loss is certainly important in buying an insurance plan, it is also important that consumers factor in the probability that the event will actually occur. This presents a challenge to the benchmark model as probabilities are not always made available to consumers and if they are, consumers may not know how to properly put them into context and use them in calculations. The overweight of

the severity of potential events in the decision-making process lends itself to allow several heuristics to create bias in the minds of the consumer.

The availability heuristic enters the insurance purchasing decision as consumers have an easier time remembering events that have occurred recently and thus overestimate the probability a similar event will happen in the future. Several studies examining trends in earthquake and flood insurance find that the demand for these policies increases after an earthquake or flood occurs (Kunreuther et al., 1978; Palm, 1995). Even though the probability of such a natural disaster remains similar before and after its occurrence, a significant amount of people purchase the corresponding insurance only after the natural disaster occurs, highlighting the bias of the recent event on their insurance purchasing decisions.

A study analyzing the valuation of insurance policies according to their deductibles revealed another heuristic present in insurance demand: the anchoring and adjustment heuristic. Through three separate experiments, Shapira and Venezia (2008) found that the general public, or people without an in depth understanding of the insurance industry, tend to undervalue insurance policies in increasing amounts as the deductible of the policy increases. Using the deductible as an anchor, participants generally calculated the value of the policy by subtracting the deductible, thus believing that policies with higher deductibles had lower values than policies with lower deductibles. This then led them to choose insurance policies with small deductibles as they believed they had more value, even though their calculations were incorrect. By anchoring their analysis to the deductible present, consumers were unable to correctly estimate the value of various insurance policies, leading them to select plans that are likely inconsistent with their needs as defined by expected utility theory.

The preference for small deductibles is an anomaly in the demand for insurance that extends far beyond this experiment and captures the importance of prospect theory in the insurance industry. Loss aversion and the idea that people experience losses more intensely than equivalent gains can lead consumers to pay additional money for policies that include rebates from which claims are deducted instead of a deductible. Even though these policies may be more expensive than policies with traditional deductibles, they can appear more attractive because consumers are not faced with the magnified loss of paying up to the deductible but instead have the opportunity to gain money back at the end of their policy period if they do not use up the rebate in claims. The consumer's strong desire to avoid losses can lead them to choose a policy that falls in line with the predictions of prospect theory and challenges the notion that insurance demand is derived from expected utility theory.

In reality, there are several reasons people demand insurance besides an attempt to satisfy their aversion to risk. Since the benchmark model only highlights risk aversion as the motivation behind purchasing insurance, other incentives thus deviate from neoclassical economic theory. For example, someone might need to purchase an auto insurance policy or flood protection in order to satisfy requirements for purchasing a car or qualifying for a mortgage (Kunreuther et al., 2013). Additionally, strong feelings of anxiety or regret may cause someone to purchase insurance. Schade et al. (2012) found that people were willing to pay more for insurance policies for small probability events when the probability was ambiguous versus when it was exact. However, feelings of worry were found to play a larger role in determining a participant's willingness to pay for an insurance policy than subjective probabilities. Several other studies have also noted the influence of worry and anxiety on the demand for insurance, as well as the importance of regret perhaps after needing insurance that was not purchased prior. These emotional incentives behind insurance demand do not fall in line with the benchmark model and

have subsequently created another application for behavioral economics in the insurance industry.

One final explanation for anomalies in insurance demand to note is the impact of framing and priming. The presentation of insurance policies can also have an effect on which policies consumers select, and this effect was explored further through a study conducted through the presentation of health insurance online. In this experiment, health insurance plans were labeled as either gold, silver, or bronze according to their premium levels and out of pocket costs. Halfway through the experiment, the descriptions of the gold and bronze plans were switched but participants of average mathematical ability preferred the gold plan, regardless of its description and components (Ubel et al., 2015). This study confirmed the influence of the framing effect on insurance demand as the way policies are presented can have an influence on their demand more than the components of the policies themselves.

Because there are several deviations from what expected utility theory predicts, insurance companies, regulators, and economists are looking into potential changes in the insurance industry that take these anomalies into account. One of the most widely discussed solutions is potential government intervention, but this idea comes with debate as to how much is appropriate and by what method. In 2010, after enrollment numbers in the Children's Health Insurance Program (CHIP) were much lower than the eligible population, the US Department of Health and Human Services created a pool of $200 million that was to be awarded to individual states that were successful in redesigning the enrollment process for CHIP. As a result, enrollment increased by approximately 1.2 million people between 2009 and 2011 (Rice, 2013). However, it is important to note that the main deterrent to purchasing this insurance was lack of knowledge of eligibility, which falls under the first type of anomaly discussed where consumers are not properly informed of their insurance options. This type of government intervention is in line with what Kunreuther et al. (2013) refer to as "public provision of accurate information" (p. 204) wherein the government can attempt to improve insurance demand anomalies that result from a lack of knowledge, information, and education about proper risks. In this case, the government is not changing any insurance policies but is working to ensure that consumers are informed and any deviations from expected utility theory are not on the base of misunderstanding or lack of information.

Kunreuther et al. (2013) also highlight two other types of government intervention, strong paternalism, where the government may intervene with private insurers or oversee government-run insurance policies, and soft paternalism, in which the government attempts to change rules and regulations in ways that would not impact well-informed consumers but would alleviate anomalies in groups of consumers that may not be as informed. The difference in these intervention styles highlights the importance of understanding their effectiveness under different circumstances. Many proposals for change in the health insurance system generally follow a strong paternalism model as there is greater demand for direct policy intervention. On the other hand, Thaler's nudge theory follows a soft paternalism approach and may be better fit for influencing the behavior of some consumers in areas such as immunizations and diet choices.

The majority of possible solutions to demand side anomalies fall at the feet of the government and range from limited to extensive involvement whether through regulation or actual policies themselves. However, it is important that regulators and government officials understand why these anomalies exist and the factors that cause consumers to deviate from expected utility theory. While literature exists on the demand for insurance from a behavioral economics perspective, there remains a lot to understand. Economists continue to debate the role of

incorrect probability judgment in the demand for insurance plans, a pivotal finding that could shed light into how consumers perceive probabilities when faced with a large potential monetary loss (Kunreuther et al., 2013; Kahneman 2011). Additionally, though there has been research into the availability heuristic after the occurrence of a natural disaster, there is less known about whether people's preferences are altered after explicitly informing them about potential risks and probabilities, pairing the availability heuristic with framing and priming. This could provide insight into how increasing knowledge about insurance policies and corresponding risks affects consumer behavior.

FURTHER RESEARCH FOR POLICY IMPLEMENTATION

Though a considerable amount of research exists indicating the presence of insurance demand anomalies, there is a need to further understand the causes of these anomalies. By understanding the root causes of this unexpected behavior, policies can be influenced to ensure consumers are purchasing the correct type and amount of insurance. Many of the proposals offered above and in other literature recommend providing consumers with updated probabilities and statistics important to their insurance decisions. However, additional research indicates that people are often unsuccessful at correctly interpreting these probabilities into the terms of their insurance policies. This example thus highlights the importance of investigating the root causes of demand anomalies further because initial solutions proposed may not effectively aid consumers in their insurance decisions.

As briefly discussed earlier, anomalies in insurance demand may rise from a lack of information available to consumers as they seek to find the optimal insurance policies. However, research conducted by Kunreuther et al. (2001) reveals that additional statistics provided to consumers actually allow more heuristics, biases, and miscalculations to enter insurance-purchasing decisions for several reasons. First of all, through giving participants probabilities pertaining to the likelihood of death by a car accident as a means of comparison, Kunreuther and his colleagues noticed that respondents were unable to properly assess the probability of an accident at a chemical facility. They had hoped that by providing their participants with a baseline probability that they could understand and visualize, participants' probability judgment for the more obscure chemical facility accident would be more accurate, but this was incorrect. Participants did not view a chemical facility accident with probabilities ranging from 1 in 100,000 to 1 in 1,000,000 as any less dangerous than a 1 in 6,000 chance of death due to a car accident and as a result do not distinguish between similar small premiums. This is likely due to the difficulty in interpreting what these probabilities mean in context and reveals that simply providing consumers with likelihoods of issuing a claim does not prevent them from pursuing anomalous behavior.

In addition to giving participants probabilities to aid their decisions, Kunreuther et al. (2001) gave a portion of respondent's premiums instead, inferring that insurance consumers understand premiums well and can differentiate between the context of high and low premiums. Instead, they found that participants could not properly differentiate between high and low premiums and assign accidents with higher probabilities of occurring to high premiums and low probability accidents to low premiums. This was an unanticipated finding, but important in understanding what policy changes moving forward will be effective at decreasing behavior outside of neoclassical models of insurance demand. Insurance premiums are readily available to consumers, however this study highlights that these amounts may not actually aid people in assessing the risks associated with potential insurance plans and ultimately may not help them choose the best amount of insurance to fits their needs. While premiums are certainly an

important aspect of insurance plans, these finding highlights that providing consumers with solely premiums will likely not improve their decisions.

Another important insight gained from this study was the presence of the anchoring and adjustment heuristic to given probabilities. After providing participants with probabilities of death due to car accidents and seafood poisoning, Kunreuther et al. (2001) found that participants were likely to anchor their calculation of the risk of a chemical plant accident on the other probabilities mentioned even though they were not directly affiliated. Even in an attempt to help consumers put risks into context by providing probabilities they could likely visualize with ease; bias remains present in their assessment of risk. Not only did Kunreuther and others find that consumers have a difficulty interpreting the contexts of probabilities, but within this process heuristics and biases become prevalent.

In addition to difficulties in gauging probabilities and premiums, multiple studies have also attempted to understand the impact of framing, priming, and emotions on insurance decisions by explicitly attempting to elicit certain emotions and responses from participants. For example, Botzen et al. (2013) found that creating an emotional and realistic frame around the presentation of flood risk in the Netherlands increased the demand for flood insurance and protection. Additionally, through simulating insurance losses and invoking positive and negative emotions, Jaspersen and Aseervatham (2017) found the presence of the gambler's effect. For example, the study found that participants that experienced a loss but were primed with positive emotions were more likely to believe that they would not incur a loss again, believing that a period without a loss was "due." These two studies attempt to understand the causes behind the biases and anomalies present in insurance decisions by manufacturing these influences themselves in a controlled environment. In turn, these researchers now have a better understanding of how the presentation and design of insurance plans affects consumers and are a step closer to recommending policy changes to decrease these influences.

While several economists and psychologists have begun to study the root causes of anomalous behavior regarding insurance demand, there are additional areas of research that may be beneficial moving forward. For example, the use of eye-tracking technology throughout many psychological disciplines has increased as it provides new insight into eye movements and cognitive processing. Because past research reveals eye movements result from the interchange between cognitive and perceptual processes (Richardson and Johnson, 2008), eye-tracking technology may be useful in measuring the amount of effort exerted by participants when choosing insurance plans online. As an increasing number of insurance plans are offered online, the presentation of policies may play a role in consumers' thought processes that impact their overall decisions.

The study conducted by Ubel et al. (2015) referenced earlier highlights the impact of framing and overall presentation on insurance choices, and eye-tracking technology may be able to additionally detect for the presence of bias in these decisions. As discussed above, System 1 and System 2 involve different amounts of cognitive effort, and the low effort exerted by System 1 may give rise to the presence of heuristics and biases. By identifying the levels of effort exertion when choosing insurance plans, it may be possible to determine which system is at work and if biases may an underlying component to these decisions. Innocenti et al. (2010) test one component of distinguishing between System 1 and System 2 through measuring participants' gaze processing when asked to choose which envelope, of two, had been placed in a larger envelope based on two sets of data provided to inform their decisions. They found that participants that were overconfident in their decisions tended to direct their gaze immediately

towards the set of data they believed would be more beneficial in a subconscious, System 1-like manner. The authors believe that this behavior occurs as generally overconfident individuals collect information differently and allocate their attention based on past experiences, preventing the use of significant energy and thus System 2.

While this experiment is not directly related to the insurance industry, it reveals the ability to gauge cognitive effort and distinguish between the presence of System 1 and System 2, a tool that would provide further insight into the causes for bias in choosing insurance plans. As eye-tracking technology gains popularity and recognition, it may assist in the expansion of analysis and understanding of root causes of heuristics, biases, and anomalies present in insurance demand and provide insight into policy adaptations that will decrease the impact of these deviations from neoclassical economic theory and benchmark models.

CONCLUSION

Even though neoclassical economic models have been imperative in informing policy and predicting economic behavior, recent research reveals that these models may not be entirely accurate when accounting for actual human behavior. While perfect rationality may lead to behavior that falls in line with what neoclassical models predict, it is clear that a significant amount of people do not make perfectly rational decisions, putting into question the validity of these models in practice. While the study of the psychology behind an individual's decisions does not attempt to replace neoclassical theory, it has highlighted a need to improve upon it to appropriately reflect circumstances in which human behavior is not entirely rational. As the extension of behavioral economics into the insurance industry has highlighted a deviation from expected utility theory and the presence of biases and heuristics, economists and psychologists seek to understand the insurance markets in which these anomalies are present as well as the causes of this behavior.

With the expansion of behavioral economics in the insurance industry, it is important to acknowledge potential limitations of this work. Because new research aims to elicit certain choices and responses in insurance demand, it is possible that different approaches in these experiments will lead to different results as the methodology is likely to contribute to the emotions and thought processes of participants. In addition, it is important to note that experiments conducted in a lab or educational setting may not reflect real world insurance choices as participants' selection of insurance policies is hypothetical and may not equate to their choices in a real-world setting. Even with these limitations, however, future research can still provide valuable insight into anomalies present in insurance demand and inform future policy as long as researchers understand these potential restrictions.

Recent and future research alike have the potential to influence future insurance policy and regulation significantly. As prior literature has noted difficulties in purchasing the correct type and amount of insurance, there is a need to improve the current industry to ensure that consumers demand insurance that is in line with their circumstances. As more insurance policies are offered online, research could inform insurance suppliers of how the visual design and presentation of their policies influences consumer choices as well as suggest certain design elements to reduce the amount of bias that may enter into an individual's decision. Additionally, the research done by Kunreuther et al. (2001) can inform regulators about the impact of probabilities, statistics, and premiums on insurance demand to ensure that attempts to provide consumers with more information to make informed decisions does not cause them to further stray from what may be considered best for them according to their specific needs.

While research into consumer behavior in the insurance industry has become more popular, further exploration is still necessary. Now that the presence of anomalies in insurance demand has been demonstrated, a next important step is understanding what causes these deviations from neoclassical economics theory to occur and utilizing that information to appropriately inform government bodies and insurance regulators. As briefly mentioned earlier, there has been a divide regarding the impact of small probabilities on insurance decisions, an important focal point of insurance policies since the industry operates due to risk aversion as individuals seek to avoid risk of large payouts, even in circumstances with low probabilities. Further research into the impact of the possibility and certainty effects could provide insight into larger biases that may be present in insurance demand across the industry. Additionally, new eye-tracking technology could allow economists and psychologists to study the relationship between cognitive effort and insurance purchasing decisions to further understand some of the psychological root causes of anomalous behavior within the demand for insurance.

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