

Expected utility good  
for explaining how  
choices made  
philosophy essay



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Expected Utility is an invaluable concept in economics, it is a way of defining preferences for and therefore decision making power over uncertain outcomes, it has dominated the analysis of decision making under risk for economists since it was developed by Von Neumann and Morgenstern (1944). It has been used to construct basics such as demand and supply curves which are used for example to calculate the costs created by a tax increase. However since its development questions have been asked about its value as a descriptive model. It is said that it includes an inadequate recognition of various psychological principles of judgement and choice and that "...as it is commonly interpreted and applied, it is not an adequate descriptive model"(Kahnemann & Tversky 1979). This study will look at the classical theory and the violations and anomalies of this theory as well as the experimental evidence to support this. I will then look at the alternative theory's that explain choice under risk.

Expected Utility dates back to Bernoulli(1738) who sought to explain the St Petersburg paradox, they wanted to find out why people would pay only a small amount for a game of infinite mathematical expectation. Bernoulli proposed a descriptive model that people maximised expected utility rather than expected monetary value and that the paradox could be resolved if decision makers displayed risk aversion, the experiment used a logarithmic utility index defined over wealth to give a finite price for a fair gamble with an unbounded expected value. As Bernoulli's theory was mostly descriptive it wasn't until Von Neumann and Morgenstern(1944) that expected utility maximisation was formally proved to be a rational decision criterion. They highlighted through a number of experiments the various ways that people

preserve and misperceive risks. Expected Utility theory is a normative theory of decision making under uncertainty derived from several axioms, (an axioms truth is taken for granted, and serves as a starting point for deducing and inferring other truths). The Expected Utility theory is based on four required assumptions (axioms) about the property's of the agents preference relation. The axioms are completeness, transitivity, convexity/continuity and independence. The ordering and continuity axioms imply that preferences over prospects can be represented by a real valued index function and the independence axiom imply that preferences can be represented by a monotonic function. If an agent's utility function satisfies the Von Neumann and Morgenstern axioms, then the agent maximises the expected utility of wealth when making choice under uncertainty. The independence axiom is the most restrictive and there are systematic violations of the independence axiom, most alternatives of Expected Utility theory relax the independence axiom. These axioms form the idea that people are rational and that their tastes and therefore choices are consistent. The main strength of neoclassical economics and therefore Expected Utility theory's ability for explaining how people make choices is its lack of detail about how people actually behave in the real world , it gives the economic theory great flexibility when mathematical techniques are used. However there have been numerous studies and developments explaining violations of the classical rationality.

There are many violations and anomalies that dismiss Expected Utility theory as a good theory for explaining how people make choices. Expected Utility theory is used to explain how people make choices however it often fails to

hold up in many real life situations, there have been experiments to find out if these deviations from Expected Utility theory are random or if there is a constant logic behind the deviations. There have been alternative theory's developed to help explain how people make choices and their main motivation is that "...actual decision makers do not behave rationally in the face of uncertainty, or at any rate do not consistently follow the Expected Utility rule."(Hirshleifer 1992 p33)

One of the main problems with the expected utility theory is the axiom independence variable. It is controversial and is frequently violated in experimental situations. The independence rule dictates that a rational agent will hold one preference given another preference, the problem is that the rule is only followed when preferences are formed in a specific way. The expected utility interpretation of this is that preferences should be formed in this way but the alternative thinking is that the independence rule is not a valid general rule of consistency but rather a rule that must be followed. The systematic violations of the independence axiom are the common consequence effects and the common ratio effect.

An early challenge to the independence axiom is the "Allias Paradox" Maurice Allias(1953). The Allias Paradox is a choice problem designed to show an inconsistency of actual observed choices with the predictions of expected utility theory. The main point the paradox is trying to make is that the independence axiom may not be valid for expected utility. The independence axiom implies two identical outcomes within a gamble should be treated as irrelevant to the gamble as a whole but this overlooks complementary outcomes. The allais paradox states that agents don't  
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evaluate parts of choices independently of the other choices going against what the independence axiom requires and therefore argues that it isn't an adequate judge of choice. It has been said that these contradicting choices imply a fanning out of indifference curves. Allias Paradox has led to what Kahneman and Tversky (1979) called the common consequence effect that argues that say getting £50 as a consolation prize in a multi-million pound lottery one has lost is probably less exhilarating than finding £50 on the street. The Allias Paradox shows the powerful effect of just how choices are framed and that changes in wording can affect the reference point used to evaluate outcomes, this presents a problem when evaluating whether expected utility theory is a good theory for explaining how people make choices.

If the Allias Paradox highlights a violation of the expected utility axioms then that decreases the degree that we can describe expected utility theory as a good theory for explaining how people make choices, An experiment by Daniel Ellsberg(1961) the Ellsberg Paradox may show an even worse violation of the expected utility axioms. The paradox violates both the completeness and the monotonicity axioms. The conclusion that can be drawn from the Ellsberg Paradox is that people always prefer definite information to indefinite, people tend to “ prefer the devil they know” (Hirshleifer 1992).

Another experimental that shows a violation of the transitivity axiom is called the Preference Reversal, which explains the failure of procedure invariance, especially the overpricing of low-probability, high payoff bets.

Regret theory was proposed as a rational for preference reversal, it gives a rational basis for the irrational result of preference results.

The Allias and Ellsberg Paradox's highlight violations in the axioms that are used to create the expected utility theory but there has been studies that reject these findings. The experiments are "evidence that merely illustrates certain limitations of the human mind as a computer" (Hirshleifer 1992) meaning that a change in the way a question is posed can fool the brain. The paradox's may be nothing more than mental illusions that are of little significance for economists.

In order to answer if expected utility theory is a good theory for explaining how people make choices I will look at some anomalies investigated in the Journal of Economic Perspectives which reviews empirical challenges to utility maximisation. These anomalies show that agents don't always make accurate or unbiased forecasts of potential choices which goes against the axioms of expected utility theory. The areas in which errors of forecasting and choice I am looking at are, the effects of the current emotional state, the effects of the context of choice, learning from the past and mispredicting adaptation (Journal of economic perspectives vol. 20 p. 221-234). The effects of current emotional effect explains where the emotional state of the agent affects the choice made. The effects of the context of choice looks at the evaluation of a single choice or a comparison of the values of two competing choices, and it concludes that "...simultaneous decisions cause the attribute of variety to be much more salient in simultaneous choice than it will be at the time of actual consumption"(Kahnenman and Thaler 2006). Learning from the past is when agents choices involve past experiences and this may <https://assignbuster.com/expected-utility-good-for-explaining-how-choices-made-philosophy-essay/>

cause biased evaluations. Mispredicting adaptation is when people who are making life choices in the pursuit of happiness are likely to make the wrong choice as they are systemically wrong in their expectations about what life circumstances would increase happiness. Expected Utility is a good theory for explaining how people make choices if the axioms apply and if the agent maximises utility, however the examples show there is biased forecasts of future utility, and this affects how effective expected utility theory is at explaining peoples choices as it doesn't take into account these factors but merely expects people to behave rationally with consistent choices.

Another reason why expected utility theory may not be a good theory for explaining how people make choices is that it doesn't take into account the endowment effect. The endowment effect states that people demand more to give up an object that they would need to acquire the same object. There is also the status quo bias where there is a preference for the current state that biases decision making. These anomalies are explained by Loss Aversion (Kahnemann and Tversky 1984). Loss aversion is "...the disutility of giving up an object is greater than the utility associated with acquiring it"(Journal of economic perspectives vol. 5 p. 194). Loss aversion explains that " the main effect of endowment is not to enhance the appeal of the good one owns, only the pain of giving it up" and that " individuals have a strong tendency to remain at the status quo, because the disadvantages of leaving it loom larger"(Kahnemann and Thaler 1991). The problem with expected utility not taking into account these economic anomalies that violate standard theory is that because such behavioural effects aren't included the model predicts "...more symmetry and reversibility than are

observed in the world, ignoring potentially large differences in the magnitude of responses to gains and losses”(Journal of economic perspectives vol. 5 p. 205). Including distinctions such as loss aversion could improve the precision of utility theory’s and help explain how people make choices.

As we have seen Expected Utility theory has been shown to have many violations of axioms but another failure of Expected utility is an inadequate recognition of psychological principles of judgement and choice. Loss aversion and the various anomalies are some examples of psychological principles not included in expected utility theory, I will now quickly look a few more such psychological aspects. Expected utility theory uses heuristics which are used to speed up the the process of finding a good solution. Three heuristics used in making judgements under uncertainty are repetitiveness, availability of scenarios and adjustment from an anchor. These heuristics are usually effective however they lead to systematic errors, expected utility may be let down by not incorporating an understanding of these heuristics and the biases that produce them.

I have shown a number of violations of the expected utility that may mean it is not a good theory for explaining how people make choices, there have been a number of alternative models of risk preferences developed that have replaced the expected utility formula with alternative formulas that people are assumed to follow. Kahneman and Tversky (1979) proved in a number of experiments that the reality of decision makers varies from the axiom assumptions held by expected utility theory. They proposed an alternative to the classic expected utility theory called prospect theory which brings psychology into the economics to help explain how people make

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choices. The theory states that "...we have an irrational tendency to be less willing to gamble with profits than with losses"(Tvede 1999, p. 94). They showed that by weakening the independence axiom and retaining the axioms of order and continuity the expected utility theory then has a better explanatory power for how people make choices. Two of the main problems that prospect theory attempted to explain are the certainty effect where people underwent outcomes that are probable rather than with certain. This generates risk aversion in choices with sure gains and risk seeking in choices involving sure losses. The Isolation effect shows that people usually discard components that are shared by all choices under consideration, this leads to "inconsistent preferences when the same choice is presented in different forms". The two main inconsistencies between prospect theory (that calculates value) and expected utility theory is that while utility is linear in probabilities, value is not. And secondly where "utility is dependent on final wealth, value is defined in terms of gains and losses"(prospect-theory. behaviouralfinance. net). "Prospect theory represents a great improvement over classical expected utility theory. Indeed many violations of expected utility theory are explicitly predicted by prospect theory" (Plous1993, p. 105). Prospect theory implied violations of stochastic dominance that was solved by Kahneman and Tversky (1992) in Cumulative prospect theory. This theory "uses loss aversion and diminishing sensitivity to explain the curvature of the value function and the weighting of functions"(Choices, values, and frames Daniel Kahneman, Amos Tversky 2000).

In answering the question "is expected utility a good theory for explaining how people make choices?" I have to conclude that although I have looked

at ways in which expected utility theory has failed at successfully explaining how people make choices it is still a useful tool as it helps show people thinking about economic decision making under conditions of uncertainty, no theory about human behaviour can make accurate and correct predictions all the time but expected utility theory can still be used as an analytical tool (Hirshleifer H. Riley J. 1992). The introduction of prospect theory represents improvement over classical theory, it combines the prospect aspects with a solid mathematical basis making it easier to apply. The main problem with using expected utility theory as a model to explain how people make choices as people do not always behave rationally, people may avoid slight risks but take wild gambles. For example people may fail to save for the future even though they have the means to do so and a good chance of a long life, they may not have any idea about how to attain happiness or they may not be selfish and give money away or make a decision that helps others but doesn't maximise their own utility.

Overall I would have to conclude that expected utility theory isn't a very reliable or conclusive theory for explaining how people make choices. It fails on three main counts, firstly people do not structure problems as comprehensively and holistically as expected utility theory shows. People appear to not process information or probabilities according to the expected utility rule and that expected utility theory as an "as if model, poorly predicts choice behaviour in laboratory situations" (Paul J. H. Schoemaker 1982). Therefore it is doubtful that expected utility theory can be described as a good theory for explaining how people make choices especially given

the developments in prospect theory and further developments such as cumulative prospect theory.