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## **We All Want to Change the World: How Behavioral Insights Can Help Reduce Carbon Emissions**

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We All Want to Change the World: How Behavioral Insights Can Help Reduce Carbon  
Emissions

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A Thesis

Presented to

the Faculty of the College of Arts, Humanities and Social Sciences

University of Denver

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In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

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by

Thomas C. Gifford

June 2021

Advisor: Dr. Henning Schwardt

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## **Abstract**

The world is in the midst of an unprecedented environmental crisis driven primarily by human behavior. As the world has globalized, countries have developed, and standards of living have improved, global pollution has skyrocketed and has resulted in a wide range of environmentally destructive outcomes. All paths to environmentally sustainable development involve a dramatic cut in carbon emissions from current day levels. In this thesis, I explore how the omission of behavioral factors from mainstream neoclassical models has contributed to, and can aid in reducing unsustainably high levels of carbon emissions. Throughout the history of economic thought, classical economists such as Smith, Knight, and Fisher explicitly state that humans are prone to acting in a way that is inconsistent with utility and profit optimization models. Despite these warnings, the widespread acceptance of theories reliant on revealed preference with homogenous rational agents led to the normalization of overconsumption and environmentally destructive behavior. In the 1980's, economists began systematically exposing universal shortcomings in human rationality, many of which directly contribute to unsustainable levels of emissions. Incorporating these biases into mainstream economics presents policy makers with a number of novel, cost-effective tools to curb carbon emissions, and compels a reevaluation of what it means to act rationally.

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## **Chapter 1: Introduction**

Right now, in Econ 101 classes all around the world, students are being taught the concepts of marginal cost and revenue, utility curves, product possibility frontiers, cost-benefit analysis, and efficiently run widget factories. The human beings behind the graphs and functions are mentioned in class discussion but are ultimately irrelevant to the grade. At a glance, one may easily mistake a microeconomics final for an advanced algebra test. The answers to utility optimization and profit maximization problems are taught as how consumers and producers should behave to achieve societally efficient outcomes; economic agents are assumed to be rational, utility-maximizing creatures. Behavioral factors and psychological inconsistencies are assumed away in the aggregate and are largely considered unimportant. However, a closer look at the history of economic thought reveals that economics has not always been as mathematized as it is today. In fact, many founding members of the field were acutely aware of the logical and ethical dangers of thinking too normatively about human behavior. Many of these ignored warnings have direct implications on how we understand and approach environmental sustainability and climate change. This paper addresses the question: ‘how can behavioral insights help reduce carbon emissions?’ In order to fully address this question, we must also explore the consequences of omitting behavioral factors from our understanding of economic decision making and the efficacy of attempted course

corrections based in mainstream thought. This paper reviews the history and evolution of economic thought regarding behavioral factors, explores the ethical consequences of embracing neoclassical optimization theories, and reviews the most pertinent contemporary literature surrounding the efficacy of behavioral interventions in achieving socially efficient outcomes.

Chapter 2 is an exploration of behavioral insights throughout the history of economic thought. Adam Smith and J.S. Mill were amongst the early critics of a purely normative mode of discussing human action; Veblen and Knight later spotted dubious moral implications of accepting the outcomes of human discussion to be the product of a rational process. They recognized that the self-fulfilling idea that consumption reveals optimized preferences reduces human action to an epicurean calculus and normalizes hedonistic behavior. Even Irving Fisher, who helped mathematize the field, wrote extensively about the failures of human rationality. Despite their warnings, mainstream economics became increasingly normative throughout the 20<sup>th</sup> century thanks to the work of Friedman and others in the Chicago school. In accepting the ideas of mainstream theory as fact, we opened the door to conspicuous over-consumption and rapidly accelerated the climate crisis. In the 1970s, researchers began to catalogue widespread discrepancies between the predicted outcomes of mainstream theory and the real world. Researchers in this branch of study, which became behavioral economics, asserted that economic models of human behavior *must* include behavioral insights and acknowledge failures of human rationality to be considered realistic.

Chapter 3 is an overview of a selection of the most important findings of behavioral economists over the last 40 years and their direct impacts on climate change.

Many of the biases and heuristics that researchers have repeatedly exposed show that people do not act in a manner that is consistent with mainstream economic theory. We form beliefs on the most readily available information instead of the most accurate information, frequently make errors when projecting future utility, and have a stubborn attachment to the status quo (even when it's not in our best interest). These deviations from mainstream consumption models have wide-ranging consequences, including how we value ecological processes, and helps explain why we fail to act on climate issues.

Chapter 4 is a comparison of neoclassical solutions to climate change against those which incorporate behavioral insights. First, there are various methodological issues associated with valuing the costs and benefits of environmentally destructive development, and incorporating these insights may provide a more accurate idea of the true value of ecological processes. Additionally, in various contexts, money has proven to be amongst the most expensive methods to change behavior, whereas low-cost behavioral interventions are significantly more cost-effective. Because humans do not evaluate the world the way neoclassical theory assumes we do, there are several underutilized, cost-effective measures, which incorporate psychological insights and emotional queues, that policymakers have at their disposal to help achieve carbon-cutting goals.

Chapter 5 investigates the paths forward for policymakers when confronting the environmental crisis, as well as potential pitfalls. Taking account of people's trust in defaults, anticipating the effects of framing information, utilizing cool-off periods, and simplifying complex choices have all been shown to increase the likelihood a person acts in accordance with neoclassical economic theory. In many circumstances, using these sorts of interventions does result in more environmentally friendly behavior (Camerer

2003; Thaler 2008). However, there is a danger in adopting the behaviorist mindset as they fall into the same trap as mainstream economists: they assume that utility maximization is how one *ought to* act. This oversight directly contradicts and ignores the warnings of classical economists, even the advice of Adam Smith.

Chapter 6 concludes with a brief overview of the previous chapters, as well as some concluding remarks. The urgency of addressing climate change increases every day, and dogmatic attachment to normative economic theories sews the seeds of its own destruction. While the omission of behavioral insights from mainstream theory is undoubtedly problematic and has contributed to the climate crisis, we should not simply "correct" people's behavior with rational ends in mind. We must overcome the hedonistic calculus and redefine utility while prioritizing sustainable outcomes.

## **1.1 Introduction to Climate Change**

Of all the human-created problems that dominate the daily headlines, there are few as urgent or universal as global climate change. The evidence of climate change, primarily driven by increased CO<sub>2</sub> and other greenhouse gas emissions, is undeniable, and it affects, to varying degrees, every human being on the face of the planet.

According to a 2018 climate report, human activity has already caused temperatures to rise approximately 1.0°C above preindustrial levels, and we will likely reach 1.5°C between 2030 and 2052 without drastic changes in carbon-emitting behavior (IPCC 2018). According to the US Global Change Research Program, "Evidence for climate change abounds, from the top of the atmosphere to the depth of the oceans... this warming has driven primarily by human activity" (Harris & Roach 2018, 307). Carbon

emissions have increased dramatically since the mid 20<sup>th</sup> century, with developed countries emitting the most carbon per capita; for example, citizens of the United States emit 17 metric tons of CO<sub>2</sub> per year, citizens in most other developed countries emit in the range of 4 to 10 metric tons per year, while people in developing countries emit less than 4 metric tons per year (Harris & Roach 2018, 313). Researchers have estimated that if the everyone consumed at the same per person level as Americans, the world could only support 1.4 billion people (Magdoff and Foster 2011). While everyone does bear the cost of a changing climate, not every area is affected equally, for instance, the arctic and Antarctic regions have been warming at a rate double the global average. As carbon emissions continue to rise, more and more carbon and heat is absorbed by the oceans which causes ocean acidification, the destruction of marine habitats, and rising ocean levels. Over the last century and a half, oceans have been consistently rising by about 2mm per year which has resulted in a cumulative rise of 9 inches since 1880; if the West Antarctic ice sheet disintegrates, sea levels could rise by more than 12 feet. The ocean is acidifying at its fastest rate in 300 million years which is causing massive disruption to marine ecosystems (Harris & Roach 2018, 315). Without emission reductions, coral reefs are expected to decline by 70-90%; coastal resources, fisheries, and aquaculture (especially in areas near the equator) are facing irreversible damage. Warming temperatures will result in smaller crop yields and increased water stress, especially in Sub-Saharan, Southeast Asia, and Central and South America. There is also the danger that higher temperatures will lead to increases in diseases such as malaria and dengue fever (IPCC 2018, 9). These projections are of course just that: projections. But there is ample evidence of damage already done and numerous troubling trends of environmental

degradation. Between 1970 and 2016, populations of mammals, birds, amphibians, reptiles, and fish decreased by more than 68%. More than 75% of the world's land has been altered by human development, and 85% of wetlands have been lost; this has contributed to over 1 million species being threatened to the point of extinction. Researchers approximate that humanity is currently overusing the Earth's biocapacity by 56% (WWF 2020). Current models project that we are currently consuming at a rate that exceeds planetary boundaries on several dimensions including the rate at which nitrogen is removed from the atmosphere for human use as well as loss in biodiversity (Steffen et al. 2015). In addition to these excesses, humanity is rapidly approaching the ecological thresholds for freshwater use, ocean acidification, and change in land use (Rockstrom et al. 2009). We have passed the point where the status quo is viable; inaction is no longer a workable option.

The dangers of climate change are undeniable and, taken as a whole, overwhelming. Yet climate scientists have identified many measurable, albeit lofty, goals to minimize the effects of climate change. In order to slow and eventually reverse climate change trends, global carbon emissions must decline by 45% from 2010 levels by 2030, reaching net zero emissions by 2050 (IPCC 2018, 12). Other estimates state that a 70% reduction in global emissions would reduce humanity's ecological footprint from 1.64 earths to 0.96 earths (Harris & Roach 2018, 219). The modern, globalized, capitalist world operates on the neoclassical assumptions that markets achieve efficient outcomes and that negative externalities can be accounted for and corrected through the price mechanism. Yet, as the evidence shows, the market has failed, and we are rapidly approaching an unprecedented climate disaster.

The goals set by climate scientists are ambitious, but the problem is pressing, and the culprit is obvious: ubiquitous overconsumption in developed countries. The top 8% of carbon emitters contribute *half* of total greenhouse gas emissions; the average carbon footprint of the top 1% of income earners is significantly larger than that of the bottom half of the income distribution (Magdoff & Foster 2011). Growth correlates with pollution, so as the world has industrialized and standards of living have improved, pollution has skyrocketed. The last century has seen an explosion in water use, sulfur emissions, energy use, CO<sub>2</sub> emissions, meat/fish consumption, and car usage. Neoclassical theory operates under the assumptions that more consumption is better than less, and that people's consumption choices reveal an accurate window into their utility-maximizing preferences. This overly simplistic view of human decision-making helps explain some of the underlying causes of climate change. Acceptance of utility maximization theory encourages people to consume with no regard to non-salient or long-term outcomes, and thus, normalizes unsustainable levels of consumption. "Basically, the economic system does not work when it comes to protecting environmental resources, and the political system does not work when it comes to correcting the economic system" (Speth 2008, 52). The neoclassical tools, using taxes and incentives to promote societally efficient market outcomes, have categorically failed at achieving sustainable forms of growth.

Achieving these climate goals will require both supply-side (switching from a fossil fuel reliant energy grid to one based on renewable energy sources) and demand-side solutions (changing people's carbon-emitting behavior). The literature exploring supply-side solutions is extensive (IPCC 2019; WWF 2020; Harris & Roach 2018). and

will not be discussed in depth in this paper. Demand-side solutions, on the other hand, are generally believed to be the most cost-effective and environmentally friendly approach to achieving carbon emission goals and will be the primary focus of the proceeding chapters. Despite the overwhelming evidence for the necessity of drastic action, no country is currently on a carbon trajectory that is truly sustainable (Wendling et al. 2020). The proposals explored in this paper, by themselves, will not reverse climate trends, however, can be part of a bigger solution. The reasons for inaction are innumerable and, to a certain extent, irrelevant; the modern globalized market economy is failing, and we are faced with one of the largest existential threats in human history. And for us to know the path forward, we must understand how we got here.

## Chapter 2: Classical Behavioral Economists

A selective reading of classical economists has led to the omission of behavioral insights from neoclassical economic models. Political economists and ancient philosophers were fully aware of the importance of emotional states and other psychological factors in the human decision-making process, and this persisted through the age of Adam Smith. Several classical economists, including Smith, J.S. Mill, Thorstein Veblen, Frank Knight, and Irving Fisher acknowledged the importance of psychological limitations in economic decision making. These insights were largely ignored by mainstream economics, and throughout the mid 20<sup>th</sup> century, the field became increasingly mathematized and reliant on rationality assumptions. Theories of rational markets and revealed preference won the day, and a “hedonistic calculus” became mainstream. In omitting behavioral insights from neoclassical theory, economics has actively contributed to widescale market and nonmarket failures, including the ongoing climate crisis.

### 2.1 Adam Smith

Adam Smith, often dubbed the “Father of Economics”, is most well-known for *The Wealth of Nations* (1776). This is well deserved, as there are few books whose influence is as far-reaching; however, the fame of *Wealth of Nations* detracts from his

other, earlier book, *The Theory of Moral Sentiments* (1759). To admonish the first with endless praise and ignore the latter is to have an incomplete picture of Smith's ideas and philosophy.

In *The Theory of Moral Sentiments*, Smith portrays humans as deeply flawed, irrational, ridiculous beings who frequently act in direct conflict with self-interests, and who are frequently guided by short-term "passions" rather than by rationality. These passions are inevitable, not something we can combat, but something we all must confront and internalize in our own way. "[H]is own passions are apt to mislead him—sometimes to drive him and sometimes to seduce him to violate all the rules which he himself, in all his sober and cool hours, approves of" (Smith 1759, 164). Furthermore, Smith highlights throughout the book that to act virtuously frequently requires the conscious rejection of the impulses that accompany our passions, "[T]hat to feel much for others and little for ourselves... constitutes the perfection of human nature..." and that virtuous actions "require the greatest exertions of self-command" (Smith 1759, 20-21). This paints a much different picture of economic agents than is portrayed in mainstream theory. Whereas mainstream theory is founded on the premise that people choose by optimizing, Smith argues that people's choices depend on which way the wind is blowing. Moreover, he argues that the *correct* way of living frequently involves resisting our compulsive desires. Already, we can see a notable difference between the agents in models Smith is famous for inspiring, and people who act in the real world.

One of Smith's most important insights in *The Theory of Moral Sentiments* is distinguishing the "indulgent and partial spectator" from the rational, "impartial spectator." Smith writes: "The propriety of our moral sentiments is never so apt to be

corrupted as when the indulgent and partial spectator is at hand, while the indifferent and impartial one is at a great distance” (Smith 1759, 106). In creating these dueling characters, Smith argues that human behavior contains paradoxes and that the actions of a person cannot be understood by viewing them as a singular agent. While the impartial spectator has the power to look back and judge past decisions, it is the partial spectator, guided by whims and passions, who is more frequently making the final decision on what one will and will not do.

Smith continues to make the point that even if we are aware of our impartial spectators, letting them take control of our decision-making is a hard thing to accomplish. It is hard for us, as humans, to put aside our own beliefs and biases and judge our own behavior. He writes that we fail “to view it in the light which any indifferent spectator would consider it” and even goes as far to say that “[t]his self-deceit, this fatal weakness of mankind, is the source of half the disorders of human life” (Smith 1759, 109). Mainstream economics posits that errors cancel out on the aggregate; Smith argues the opposite. There is no invisible hand magically guiding people into making the utility-maximizing decision. There is nothing inherently efficient or economical in the way humans act. Rather, "half of the disorders of human life" can be directly attributed to these errors and biases!

In addition to introducing a two-agent model for individual decision-making, Smith directly attacks the idea that revealed preferences reflect optimized utility. First, he recognizes that a significant part of utility maximization comes from the *imagination*. "The imaginations of mankind... and such passions... are always, in some measure, ridiculous" (Smith 1759, 25). Each person is at the whim of her own passions, which are

products of her own imagination, and since others' imaginations are inaccessible to her, everyone's passions are absurd. In other words, there is inherent subjectivity in human motivations and decisions.

Secondly, Smith understands that the promise of increased utility can often be a stronger motivator than actual gained utility. “How many people ruin themselves by laying out money on trinkets of frivolous utility?” (Smith 1759, 125). Smith writes that our partial spectator will always value present utility over future utility, and that can lead to suboptimal outcomes. “The pleasure which we are to enjoy ten years hence interests us so little in comparison with that which we may enjoy today...” (Smith 1759, 131). To illustrate his point, Smith uses the universally understood proverb, “the eye is larger than the belly” (Smith 1759, 127), and cites how the capacity of our stomachs bears no weight on the extent of our desire to eat. While Smith’s example is somewhat benign, it is easy to see the inefficiencies and potential problems that accompany our collective tendency to consume today at the expense of tomorrow. Sometimes, its consequences are limited to a night of uncomfortable digestion; but on a global scale, this hedonistic philosophy can lead to truly disastrous consequences. Or, as Smith puts it, “The great source of both the misery and disorders of human life, seems to arise from over-rating the differences between one permanent situation and another” (Smith 1759, 103).

Throughout *The Theory of Moral Sentiments*, Smith identifies many fundamental differences between people in the real world and those in economic models. This includes the observation that pain is a more “pungent sensation than pleasure” (Smith 1759, 34), which hints at an idea that would later become to be known as “loss aversion.” He writes of people becoming irrationally fond of essentially worthless objects, “If he breaks or

loses them, he is vexed out of all proportion to the value of the damage” (Smith 1759, 69). This is similar to the idea in Behavioral Economics of the “endowment effect”, or that people disproportionately overvalue things they have in hand. Both of these inefficiencies of human rationality, in addition to the ones previously mentioned, fly directly in the face of the utility-maximizing agent presented in neoclassical economic models and are presented by the "Father of Economics" himself! They have largely been explained away as 'marginal' or as errors that cancel out in the aggregate, but this line of thinking leaves open the possibility of systematic and measurable failures in rationality. While early economists could justify creating an oversimplified economic agent for the sake of theory, it is a grave mistake to pretend these seemingly irrelevant factors have not perpetuated the current climate crisis.

Smith was far from the first writer to recognize flaws in human rationality, although he may have been the first economist. He concludes *The Theory of Moral Sentiments* with several citations from Cicero, Epicurus, Aristotle, and other philosophers. Aristotle writes in the *Nicomachean Ethics* that virtue is the habit of moderation, which leads to the conclusion that utility maximation is antithetical to living virtuously. There is nothing novel in Smith’s observations; to a certain extent, Smith is simply reframing ancient ideas for a modern, capitalist audience. With this context, the work of behavioral economists in the 1970s and 1980s was not a revolution, but a rebirth of old ideas that were set aside because they were messy and complicated. After all, what is an economist supposed to do with a person whose actions are determined by “imaginary” passions which sometimes, but not always, influence the person to act against their long-term self-interest? How does a researcher fit that into a mathematical

model? These questions are completely valid, and to argue that the only useful model is one that perfectly captures every passing whim would be disingenuous and counterproductive. However, relaxing some of the rigid, quixotic assumptions that underlie mainstream economic models provides the opportunity to combat issues like climate change with a new set of tools based on actual human behavior.

Similar to how *The Wealth of Nations* laid the foundation for mainstream economics, *The Theory of Moral Sentiments* paved the way for behavioral economics. Smith deviates significantly from the utility-maximizing, rational human presented in mainstream models and, instead, argues that humans are hopelessly inept at forecasting and maximizing their future utility, but also that utility maximization is not the goal of a virtuous life. At one point, Smith brings up the example of Isaac Newton, whose book on natural science and mathematics sat unsold in bookstores for years before people recognized its value. I cannot help but think it is ironic that this anecdote is located in Smith's less studied and analyzed book, and that, perhaps, economics, whether out of arrogance or apathy, fell into the exact trap Smith warns of in the book. Economists failed to recognize the value of the insights sitting on the shelf next to their foundational text.

## **2.2 John Stuart Mill**

Adam Smith was not alone in recognizing the importance of behavioral factors in human decision-making. A number of economists throughout the 19<sup>th</sup> and early 20<sup>th</sup> centuries made similar nods to behavioral inefficiencies that mathematical models were incapable of capturing. While economics was still finding its footing in the scientific

community, J.S. Mill wrote an essay called “On the Definition and Method of Political Economy” in which he makes many of the same observations as Smith and identifies shortcomings in the methods and assumptions of political economy.

The first thing that Mill notes in his essay is the incredibly limited context in which the study of “political economy”, or economics, is truly reflective of human behavior. Economics only concerns itself with the human desire for and pursuit of wealth and “makes entire abstraction of every other human passion or motive” (Mill 1877, 41). Mill continues by writing that “Political Economy considers mankind as occupied solely in acquiring and consuming wealth” and assumes that everyone is a “ruler of all their actions” (Mill 1877, 42). Mill highlights these assumptions to bring attention to the fact that they directly contradict experience and that any conclusions based on these assumptions should be considered to be something other than the truth. Political economy, according to Mill, “presupposed an arbitrary definition of man” (Mill 1877, 45) and is therefore only applicable to a specific context in which pursuit of wealth is the only motivating force in a person’s life.

Smith frames *Theory of Moral Sentiments* by pointing out the shortcomings in human rationality and how that relates to moral action, while Mill frames his essay around the obvious absurdity of the assumptions that make up economics and limits the scope of his conclusions to economics. Mill does not see these discrepancies between classical assumptions and real human behavior as a death knell to the entire science and, instead, views them as essential footnotes to any conclusion that comes from the field. “The conclusions of Political Economy, consequently, like those of geometry, are only true... *in the abstract*; that is, they are only true under certain suppositions” (Mill 1877,

48). Mill subsequently outlines why generalizing assumptions in the field of economics are inevitable and justifiable; the field, generally speaking, attempts to use the scientific method in the same way that chemists and biologists utilize it but runs into pragmatic problems early in the research process. Economists cannot answer the question ‘what is the effect of protectionist trade policy?’ in the same way chemists can answer ‘what is the effect of combining element X with solution Y?’ Chemists can isolate compounds, have strictly controlled variables in all of their experiments, and can chart various outcomes across varying conditions to isolate the effects of element X on solution Y. Economists do not enjoy that same luxury. It is not possible to find two countries (identical in population, natural resources, geography, etc.) to tell one country to adopt a free trade policy and the other to adopt a more protectionist approach. Even if this were possible, there are endogenous cultural and political factors that are impossible to account for when comparing a 'control' country against their protectionist neighbor. Economics cannot isolate variables the same ways chemists can in laboratories, and therefore is faced with a paradox: it needs to be descriptive of the real world to be worthwhile, yet it lacks the capacity to do so. Mill finds a middle ground:

Since therefore it is vain to hope that truth can be arrived at, either in Political Economy or in any other department of the social science, while we look at the facts in the concrete, clothed in all the complexity with which nature has surrounded them, and endeavor to elicit a general law by a process of induction from a comparison of details; there remains no other method than the *à priori* one, or that of “abstract speculation.” (Mill 1877, 48)

Limiting the scope of economics to the realms which solely concern themselves with the abstract production and accumulation of wealth provides a good starting point for delineating what economics can and cannot solve. The idea that traditional economic

tools can be applied to solve problems that are not directly related to the production and accumulation of wealth directly contradicts classical economists. So, when faced with a problem like global climate change, it is important to take notes of the limitations in what claims to be 'objective' analysis. Saving the environment is a categorically different problem than optimizing utility or maximizing output with given inputs, so acknowledging the limitations that exist within mainstream economic tools is a step in the right direction.

After defining the realm in which economics provides useful insights, the next step is to identify the areas of life which economics neglects. According to Mill, these oversights are far from irrelevant. Mill describes the "discrepancy between anticipations and the actual fact" as one of the "disturbing" phenomena which economics frequently overlooks (Mill 1877, 51). This is because everyone in a marketplace is operating on different sets of information. "A person may be warranted in feeling confident, that whatever he has carefully contemplated with his mind's eye he has seen correctly; but no one can be sure that there is not something in existence which he has not seen at all" (Mill 1877, 55). Similar to Smith's argument that the promise of gained utility is a more powerful motivator than attained utility, Mill acknowledges the unavoidable subjectivity in decision making and the discrepancy between our expectations and tangible results. This undermines the idea that there are any discoverable "laws" of human behavior and necessitates a more nuanced approach to social science than is necessary in the natural sciences. There can be no 'law of revealed preference' because there are so many concrete exceptions to the law, and, as Mill put it, "there are not a *law* and an *exception* to that law... There are two laws" (Mill 1877, 57). Therefore, economists need to be

careful in the *kinds* of assertions they make. Rather than presenting theories and data analysis as absolute facts, economics needs to acknowledge its epistemological limits; this requires a holistic reexamination of mainstream economic theory and a critical look at how these oversights may be contributing to global climate change.

### **2.3 Into The 20<sup>th</sup> Century**

Economics continued to evolve and establish itself amongst the social sciences into the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, and with that development came a major push to mathematize the field and an increased emphasis on the power of normative models. Great economists like Jevons, Walras, and Menger, known for starting the marginalist revolution, pushed the field forward by normalizing the rationality hypothesis in the hope that economics “might gradually be erected into an exact science...” (Jevons 1871, 21). They modeled that an economic agent will necessarily maximize their utility under a given budget constraint and subsequently introduced the concept of a demand curve and market equilibrium (Arrow 1986). In shifting the focus of economics away from the relatively narrow “acquisition and consumption of wealth” and towards the abstract idea of utility maximization, the marginalists expanded the scope of what economics was capable of achieving, the questions it was capable of answering, and lost track of the line between abstraction and reality.

The marginalists separated themselves from classical economists through their mathematical rigor and through introducing the idea that people make decisions based on *marginal* utility. Rather than more always being better, a person’s economic decisions are based on what she already has. Despite this refinement, the marginalists also founded

most of their theories on the same simplifying assumptions as the classical economists. Smith and Mill's concerns about the limitations of normative economic theories were set to the side because, frankly, no one knew what to do with them. This does not mean that economists who were active during the marginalist revolution were unaware of the shortcomings, but it does mean that behavioral inefficiencies were not center stage. Numerous economists from that period, both within and outside of the marginalist perspective, were completely conscious of these systematic biases, yet their insights were set aside for nearly six decades.

An early, unsurprising critic of mainstream economic theory was Thorstein Veblen. He, like Mill and Smith before him, did not consider the lack of behavioral insights in economic models to be a menial complication to economic theory, but, instead, a critical oversight in the development of economic theory. Veblen, in his essay "The Limitations of Marginal Utility" (1909), recognizes that the marginalist 'revolution' was not a revolution at all and that marginalist theories and models were based on the same simplifying assumptions as their classical predecessors. The only discernable difference that Veblen identifies is that classical economics is confined within "narrower limits and sticks more consistently to its teleological premises" (Veblen 1909, 130). Since the marginalists were not directly addressing the inadequacies of the core assumptions of classical theory, their refinements to economic theory were not improvements, but a step in the wrong direction. Veblen begins his critique by simply stating the underlying assumptions of marginalist and classical theories. "Mankind is (conceived to be) clearsighted and farsighted in its appreciation of the future sensuous gains and losses" (Veblen 1909, 132). This echoes back to Smith's "impartial spectator" and the idea that

according to mainstream economic models, people, in general, are perfect and predicting the future. Veblen argues, instead, that the principle of sufficient reason, an idea that dates back to Leibnitz in the 17<sup>th</sup> century and which underpins marginalist utility maximization models, is only useful to the extent that people are actually reasonable. “It deals with this conduct only insofar as it may be construed as rationalistic, teleological terms of calculation and choice” (Veblen 1909, 134). In this way, Veblen wrangles in the scope of what economics is capable of doing for the same reasons that Smith and Mill identified. The marginalists equate utility and monetary value and take the nuance and dimensionality away from actual human behavior, and this, in Veblen’s opinion, is economics’ cardinal sin. Smith and Mill both observe that how one *ought* to act is frequently antithetical to what maximizes personal utility; but after the marginalists had their say, acting in a way that maximizes one’s utility is the only way one *can* act. To tirelessly pursue the accumulation of wealth became *the right* way to act in the world since theory posits that it leads to socially efficient outcomes. Behavioral biases and systematic failures in human rationality are explained away in the aggregate because there is no longer an action that is not considered ‘economic’ in nature. This shift in thinking is subtle yet its impacts on the development of capitalism over the proceeding century are immeasurable. The shift led to the rise of what Veblen coins the “hedonistic calculus” or the “direct and unhampered quest of the net sensuous gain” (Veblen 1909, 137) and the normalization of consuming today at the expense of tomorrow. The virtuous person that Smith portrays in his work who, against their inner passions, consumes in moderation is thrown out of mainstream economic thought and is replaced with a hyperrational hedonist. “[We] mediate between the pain cost and the pleasure gain of

hedonistic choice, without a lag, league, or friction; they are conceived simply as the immutably correct, God-given notation of the hedonistic calculus” (Veblen 1909, 138). In mainstream models, the impartial spectator is always in the driver's seat, and is always making the correct judgments and predictions about the world, which differs vastly from the observations of the economists on whose writing mainstream models are based! How one ought to act and how one acts become two sides of the same hedonic coin and systematic failures are assumed to not exist.

In rebranding mainstream models as “hedonistic calculus,” Veblen gets at the heart of what is wrong with mainstream economic theories. Not only does the calculus require flawless logic and reasoning, but it also extends itself into every nonpecuniary aspect of human life. This overextension of economic theory into noneconomic matters is no longer merely an abstraction of human action, but a complete fantasy. Veblen writes that it is important to delineate between the pecuniary and nonpecuniary areas of life, whereas mainstream economic theory makes no such distinction. Thus, the logic applied to the pursuit and accumulation of wealth extends itself into every area of human life including art, science, philosophy, and religion. The different ends of these different areas of human life are flattened into one, all-encompassing goal: to maximize one’s utility as measured by economic activity. This premise seems at best, overly simplistic, and at worst, alarmingly incorrect.

The price system dominates the current commonsense in its appreciation and rating of these non-pecuniary ramifications of modern culture; and this in spite of the fact that, on reflection, all men of normal intelligence will freely admit that these matters lie outside the scope of pecuniary valuation. (Veblen 1909, 138)

Veblen argues that limiting the motivations of human actions to the hyperrational acquisition of wealth strips us of our humanity, that ignoring Smith's partial spectator is effectively the same as ignoring the true motivations of human action. "The wants and desires, the end and aim, the ways and means, the amplitude and the drift of the individual's conduct are functions of an institutional variable that is of a highly complex and wholly unstable character" (Veblen 1909, 136). Veblen recognizes the same behavioral blind sights as Smith and Mill. The hyperrational hedonists who operate in normative models do not resemble real people in the real world and this oversight has far-ranging consequences. Hedonism begets hedonism and behavioral failures begin to snowball. The conclusions drawn from the hedonist calculus are, by their construct, incomplete, and thus, any theory that fails to account for irrational behavior is incorrect. "But since it is in just this unhedonistic, unrationalistic pecuniary traffic that the tissue of business life consists... any theory of business which sets these elements aside or explains them away misses the main facts which it has gone out to seek." (Veblen 1909, 141). While the classical and marginalist schools of thought explain away systematic error in the aggregate, Veblen argues that this is impossible because both are based on fantastical, unrealistic assumptions about human rationality. Thus, mainstream models miss the main facts which they seek to discover; by not considering behavioral factors, economics fails at achieving its self-stated objectives. In fact, Veblen concludes his essay by stating that if human action *was* subject to the assumptions of classical and marginalist economics, "it is not conceivable that the institutional fabric would last overnight" (Veblen 1909, 142). The marginalists, by introducing normative models based on rational utility maximization, inadvertently designed economies around hedonistic tendencies and

labeled them rational. The embrace of the hedonistic economy has led to systematic, self-fulfilling market failures created by inescapable failures in human reasoning and has thus been a major contributor to global climate change.

Perhaps it is unsurprising that an economic outsider like Veblen finds the lack of consideration for behavioral factors in normative theory to be a critical flaw for economics as a whole, but economists from various backgrounds make similar observations. Frank Knight, one of the founders of the Chicago school of economics, criticized economics for trying to prove itself as a “hard” science in his essay “Economics and Human Action” (1935). In Knight’s view, economics wants to operate in the same realm and command the same pragmatism as applied mechanics, which uses normative models that apply to the real world. Similar to how mechanics begins with the assumption of a frictionless world (e.g., modeling the motion of an object in a vacuum) and then adds complexity, economics starts with a state of perfect competition and builds in complexity. According to Knight, the desire to draw the parallel is a fundamental error, “Perfect competition is, among other things irrelevant here, errorless competition; fundamentally it is not comparable to a frictionless machine...” because not all people are acting rationally or striving for “an objective result, but only as a tendency to conformity with the intent of behavior, which intent cannot be measured or identified or defined in terms of any experimental data” (Knight 1935, 103-104). In other words, human behavior is driven by conformity to dynamic social norms, not by an all-consuming pursuit of maximizing personal utility. In confusing one for the other, the tools economists can offer to solve human problems are inherently flawed and can have the effect of normalizing problems rather than fixing them. “There seems to be no

possibility of making human problems real, without seeing in human activity an element of effort, contingency, and, most crucially, of error, which must for the same reasons be assumed to be absent from natural processes.” (Knight 1935, 101). The assumption of flawless economic reasoning does not result in an “abstraction” of real human behavior; it strips economics of its usefulness. Knight concludes that what is abstracted in utility maximization models is “the fact of error in economic behavior” (Knight 1935, 103). That is to say that the only actionable takeaway from equilibrium price theory is the fact that people do not act in accordance with utility maximization models.

Similar to the other economists mentioned in this chapter, Knight recognizes the fact that normative models overextend themselves into areas of human life that are well beyond the scope of economic transactions. While mainstream economic theory posits that humans are in tireless pursuit of maximizing personal utility, a sizeable percentage of human actions are in the pursuit of nothing tangible at all. “Indeed, the bulk of human valuations, in connection with truth, beauty, and morals, are largely or altogether independent of desire for any concrete thing or result” (Knight 1935, 102). In addition to overextending itself into the non-economic realms of life, utility maximization models reliant on revealed preference theory are insidiously destructive. Human actions, according to Knight, are motivated by conformity to social norms, so acceptance of revealed preference theory gives way to an ever increasingly hedonistic society. Emphasizing maximized utility under the pretense that it is rational erases the distinction between what is "right" and what maximizes short-term pleasure. Since the decisions of individuals necessarily reveal what rationally maximizes their short- and long-term utility, behavioral biases and errors become rationalized. The partial spectator starts

wearing the mask of the impartial spectator, and systematic failures in human psychology become normalized and rebranded as reasonable. Economics becomes a self-fulfilling and self-cannibalizing machine.

Society cannot accept individual ends and individual means as data or as the main objects of its own policy. In the first place, they simply are not data, but are historically created in the social process itself and are inevitably affected by social policy. Secondly, society cannot be even relatively indifferent to the workings of the process. To do so would be ultimately destructive of society and individual alike. This conclusion is strongly reinforced by the fact that the immediate interest of the individual is largely competitive, centered in his own social advancement relative to other individuals. (Knight 1935, 105)

In other words, treating subjective actions as objective data, as perfect insights into what rationally maximizes one's utility, as the product of an infallible calculus which can accurately assess and forecast one's long-term needs, as the consequence of reasoning made by an "impartial spectator" leads the entire field of economics to draw incorrect conclusions about human behavior. The subjective becomes absolute. Since the assumptions of mainstream models require perfect information and perfect valuation, the ends of actions are given; intentions and actions become one and the same. Once behavior is reduced down to the product of a statistical system, the question is no longer, 'what motivates a person to behave in a particular way?' but 'how do mainstream rationality based theories about human behavior explain why people behave the way they do?' The end is given; whatever actions a person makes are already explained; human behavior is rational; there is nothing left to understand. This is what opens the door for normalizing the hedonistic, consumer-driven, industrialized, environmentally ruinous economy of the modern world. Knight, echoing the sentiments of Veblen before him, notes that the rationality assumption points to a fundamental, logical error underlying the

classical economists' normative approaches to economics. "Notoriously, they were hedonists; their argument for liberty made it instrumental to pleasure, on the ground that individual is a better judge than the government officials of the means to his happiness." (Knight 1935, 105). Knight, using the same terminology as Veblen, spots the philosophical departure from classical understandings of morality and ethics. The endless pursuit of maximizing pleasure is the antithesis of Smith's "virtuous" man. Classical economists treat individual liberty as if it is an inalienable right, when, like the rest of human existence, it is a social value in the same way institutions and communities are the products of commonly held social values. That is not to say that individual liberty is a corrupt value to uphold, far from it. However, since mainstream economic models assume that maximizing individual utility is the only *objectively* moral way to act in the world and that doing so will result in societally beneficial outcomes, hedonistic consumption has become a widely treasured social value in the modern world and has made government intervention the enemy of pro-social, utility-maximizing outcomes. Knight concludes that the motivations of human behavior are so integrally intertwined with societal norms and expectations, that it is impossible to treat them in scientific terms. "[The] current standards of thinking have come under extreme domination of the scientific ideal, which has little if any applicability to the problem" (Knight 1935, 106). Any attempt to objectively analyze the motivations of human behavior requires something impossible on the part of the researcher: to remove themselves from the social context in which they live and operate. This inescapable conflict, between the desire to know the objective and the veil which makes it impossible to do so, is not unique to the field of economics. Knight writes that "the philosopher or methodologist cannot possibly

take sides. The question whether economics as such should... is to be answered only by recognition that it must be both" (Knight 1935, 106). Knight, echoing his contemporaries in continental philosophy, recognizes the same paradox that Mill observed decades earlier: economics uses scientific tools to explain human behavior, which cannot be fully understood through scientific means. This is not a dead-end for the field as a whole, but, once again, an important acknowledgment of epistemological limitations. Knight would end up instructing some of the most influential economists of the 20<sup>th</sup> century, including Milton Friedman and George Stigler, yet few seemed to take these limitations seriously or incorporated them into mainstream economic thought.

Another pioneer of neoclassic theory, Irving Fisher, whose ideas built the backbone of the life-cycle model and helped mathematize the field of economics as a whole, was deeply conscious of the importance of behavioral factors in economic decision making. Fisher was fully aware of the fact that his models and theories about interest rates and money supply were only valid in a world in which everyone has “foresight” or rational expectations. Rather than discussing the philosophical underpinnings of normative models, Fisher bases his critique on the limitations and biases of human psychology. Throughout his book, *The Theory of Interest* (1930), Fisher uses the term "impatience" interchangeably with time preference. According to Fisher, six components make up a person's impatience: foresight, self-control, habit, expectation of lifespan, concern for the lives of others, and fashion (Thaler 1997). All of these factors are, of course, subjective in nature and not accounted for by models based on rationality assumptions. Fisher writes that in the real world, the size of income has a major effect on someone's impatience, “the smaller the income, the higher the preference for present over

future income, that is the greater the impatience..." (Fisher 1930, 72). This is a direct contradiction to the life cycle hypothesis which assumes that people rationally smooth their consumption over their lifetimes regardless of income. Fisher attributes this discrepancy between the models and real-life to pragmatic motivations and psychological shortcomings in human reasoning. "The irrational aspect of the matter is often to relax foresight and the self-control and to tempt us to 'trust the luck' of the future, if only the all-engrossing need of the present necessities can be satisfied" (Fisher 1930, 73). In other words, a person of little means may prioritize present utility over future utility more than someone in the middle class out of necessity. A person struggling to afford food and housing will not prioritize saving per the life-cycle hypothesis because the realities of their lives will not allow for it; if someone's daily focus is on survival, having a comfortable amount of money in a retirement account for consumption that is decades away does not play a major role in their economic decision making today.

Fisher attributes a considerable amount of what makes up one's impatience to pure, unexplainable irrationality, to the fact that "the future is seldom considered in its true proportions." (Fisher 1930, 82). This is evident in our lives daily. Almost everyone has heard stories of people procrastinating on changing the oil in their car, each time rationalizing it as 'I can make it to the store and back' or 'the car *seems* like it's running well, so it must not need oil *immediately*.' Yet this story always has the same ending: the engine seizes, and the car owner is left with a repair bill many multiples higher than the cost of an oil change. If humans are expert forecasters, everyone can anticipate the costs and benefits of an oil change in relation to ruining the car and buying new engine and then rationally decide to always keep their car's oil new, so this should never be an issue.

Fisher uses the somewhat morose example of alcoholic working men who, "...could not resist the lure of the saloon on the way home Saturday night, many persons cannot deny themselves a present indolence, even when they know what the consequences will be" (Fisher 1930, 83). Fisher identifies why mainstream models are not good at describing the real world: people tend to be lazy and lack self-control. Human action is subject to irrational passions, subject to the whims of partial spectators. While normative models capture how rational agents *should* act with the explicit goal of maximizing their utility over time, real human beings *do not* act in a way that maximizes their long-term utility. Forecasting the balance of future consumption in relation to present consumption requires critical *thought*; self-control requires *will-power*. No law of human behavior states people have to participate in either, yet, as Fisher acknowledges repeatedly, mainstream economic models, including his own, consider them to be ubiquitous. Fisher continues by writing that no area of human life exemplifies a wholehearted embrace of self-perpetuating, irrational behavior more than fashion. He writes that the only reason the fashion industry exists is "to stimulate men to save and become millionaires, and, on the other hand, to stimulate millionaires to live in an ostentatious manner" and concludes that fashion is one of the most "potent yet illusory social forces which follow the laws of imitation" (Fisher 1930, 88). In this quote, Fisher observes the same phenomenon as Veblen and Knight before him: a significant portion of consumer culture is based on either acting or aspiring to act ostentatiously, in a manner which is solely focused on gaudiness and creating envy within peers, in a manner that is not societally beneficial. This idea is similar to the hedonist economy outlined by both Veblen and Knight, and even echoes Adam Smith, who, nearly 200 years earlier, had written of people ruining

themselves on “trinkets of frivolous utility.” By including these complicating factors, these behavioral insights into his writing, Fisher implicitly admits that his own theories on savings rates, his titular Fisher equation, is not a good description of the world (Thaler 1997).

Fisher, Knight, Veblen, Mill, and Smith come from a variety of historical eras and ideologies, yet they all agree upon the importance of psychological and philosophical limitations to the rationality assumptions that underpin mainstream economic theories. The tendencies of people to value present utility over future utility, to act on passions rather than reason, to fall victim to cognitive biases are all assumed away as ‘rational’ in mainstream models and hedonistic consumption becomes the predominant cultural value. Acting in the pursuit of maximizing one’s utility becomes virtuous rather than acting in conscious self-moderation. After all, in a world of rational agents with perfect information, everyone *should* account for the value of consuming today at the expense of tomorrow. Everyone *should* plan for the future and consume accordingly. Even with environmentally destructive behavior, it is assumed that suppliers can properly value the environment, and it is assumed that the market demand for an environmentally destructive good *should* reflect a price that accounts for the present *and* future consumption. The market equilibrium price of nonrenewable goods, since it is arrived at through a rational market of rational agents, *should* reflect the fact that they are nonrenewable. This is how the assumptions of normative models have normalized overconsumption and hedonism. If markets are assumed to be efficient, the market equilibrium price and quantity of a good *are* the environmentally sustainable price and quantity. The market should be behaving in perfect proportion to perfect expectations

about the future. The propagation of hedonistic economics and a worldwide embrace of consumer-driven, free-trade globalization becomes status quo. This has not necessarily been a bad thing as billions of people have been able to escape poverty and standards of living have generally risen for the last half-century. However, to argue that the spread of neoliberalism has not left people behind and created its own, unique problems is ignorant. The world is currently facing an unprecedented global climate change crisis, which can trace its roots to the same failures in human rationality first identified by the economists discussed in this chapter. Revisiting these economists and their ideas, ignored for being too qualitative and ill-defined, is necessary for determining how economics can aid in the fight *against* climate change, rather than contributing to it.

#### **2.4 The Neoclassical Perspective**

It is abundantly clear that classical economists from varying perspectives agree that the omission of behavioral factors from mainstream economic models presents an inescapable and dangerous obstacle to the development of economic theory. While normative models are capable of describing how rational agents should act given a context of incentives, they fail to describe how people act in the real world. Mainstream models are useful at describing how people should save and consume in order to maximize utility across their entire lifetimes, or how business owners can maximize their profits, but there are no *a priori* rules of human behavior that require they act accordingly. The consequences of confusing the abstraction speculations of normative theory for truths of human behavior are dire; they lead to the rise of a hedonistic zeitgeist and the normalization of unsustainable consumption. But if classical economists from

Smith through Fisher were aware of these shortcomings, how did economics get where it is? How has the global economy reached the point of creating and sustaining a global ecological crisis?

The belief that profit and utility optimization models describe actual human behavior overtook the field of economics like a tidal wave, partially at the hands of economists already cited in this paper. Since William Stanley Jevons<sup>1</sup> first attempted to mathematize the study of economics, to put it amongst the natural sciences like physics, chemistry, and mechanics, it had been trending in an increasingly normative direction. Smith's partial spectator receded into the background of economic thought and was replaced by the idea that "a person procures such quantities of commodities that the final degrees of utility of any pair of commodities are inverse as the ratios of exchange of the commodities" (Jevons 1871, 139). Fisher, Edgeworth, von Neuman, and Morgenstern were also amongst the mathematically inclined economists of the first half of the 20th century, all of whom contributed to the mainstream acceptance of normative models based on rationality assumptions as useful tools for understanding and regulating markets. The concepts of utility and value exited the abstract dialectics of philosophers and became the objective measures of what is good in the world, made quantifiable through money and markets. von Neumann and Morgenstern, in their book *Theory of Games and Economic Behavior* (1944), explicitly argue that mathematic models are the only legitimate way of studying economic behavior. "We hope to establish satisfactorily, after developing a few plausible schematizations, that the typical problems of economic

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<sup>1</sup> The Jevons Paradox, that a focus on maximizing energy production efficiency results in more, not less, consumption of natural resources, shows that he too was well aware of the shortcomings of normative economic theories.

behavior become strictly identical with the mathematical notions of suitable games of strategy" (von Neumann & Morgenstern 1944, 2). Throughout the book, the authors provide laudable levels of mathematical rigor to structure their theories, notably among them, that people maximize utility relative to a budget constraint over time. Additionally, since economists cannot resist the temptation of drawing a parallel to another science to support their methodology, von Neumann and Morgenstern compare the development of economics to that of physics. Physics provides overly simplistic generalizations on the nature of movement in the universe without providing an underlying logical superstructure. The authors acknowledge that "mathematics has not been successful in economics" but attribute the lack of success to "unfavorable circumstances, some of which can be removed gradually" (von Neumann & Morgenstern 1944, 4). Physicists start by modeling motion in a vacuum and then add complexity as they become aware of it; economists can do the same but are limited by the tools which are used to measure outcomes. There are no perfect vacuums in the real world, yet the models proved useful in describing movement in the world. Pioneers of chemistry and physics in the 16th century did not have the same tools as modern scientists, but that did not stop them from being as normative and quantitative in their thinking as their technology would allow. It is what allowed those sciences to develop new methods and learn new truths. In the same way, the authors figure, economics will continue to develop new methodologies to get closer and closer to the truth behind human behavior (von Neumann & Morgenstern 1944, 6). Therefore, by this line of thinking, economics isn't faced with the paradoxical choice outlined by Mill, it must wholeheartedly embrace the scientific method, and continually update its practices as the pursuit of scientific knowledge becomes more

finely tuned. "The theory finally obtained must be mathematically rigorous and conceptually general" (von Neumann & Morgenstern 1944, 7). This outlook is logically sound but runs into the philosophical problems outlined by Knight decades earlier. Any theory which is centered on utility and profit maximization is implicitly assuming that the outcomes of human decisions are an objective measure of utility maximization, rather than the product of dynamic social values. Economic theories based on rationality are missing a core component of human behavior: error. Discrepancies between expected utility and realized utility, miscalculations in appropriately consuming today and saving for tomorrow, and widespread flaws in risk assessment based on limited information are considered irrelevant factors. Despite these oversights, rationality assumptions continued to dominate mainstream economic theories throughout the mid-20th century; economics entered an era of increasingly clever normative models, and the hedonistic economy became status quo.

In 1953, Milton Friedman wrote one of the defining essays of modern economics: "The Methodology of Positive Economics." In this essay, Friedman acknowledges all of the valid critiques of mainstream theory and attempts to put an end to the discussion around the practicality of normative models. He writes that "the assumptions of 'perfect competition' or 'perfect monopoly' said to underlie neoclassical economic theory are a false image of reality" (Friedman 1953, 153), that this critique is used to argue that the assumptions of classical theory are too simplistic to describe reality, and therefore, normative theory cannot be useful. This line of thinking, according to Friedman, is sorely mistaken. Friedman writes that economics as a positive science, in its ability to analyze "what is" rather than "what ought to be," is aimed at identifying societal goals and road

mapping how those goals can be obtained. This results in economists taking the same set of data and information about a common goal and arriving at an array of solutions based on different theories. Friedman uses the example of achieving a “livable wage” for everyone in a society. Some economists will look at the labor market and argue that raising the minimum wage will result in higher wages for workers at the bottom of the income distribution; others will argue that raising the minimum wage will result in a rise in unemployment that will outweigh the gains made in higher wages. The only way that either of these theories can be accepted or rejected is based on empirical data. This, according to Friedman, means that the "correct" policy "depends much less on the progress of normative economics proper than on the progress of a positive economics yielding conclusions that are, and deserve to be, widely accepted" (Friedman 1953, 148). In this, Friedman appears to be conceding the point that economic theory does not justify its own existence and is only useful to the extent that its theories can be applied to the real world. But rather than taking this point to be critical of mainstream theories, Friedman argues this in favor of accepting mainstream profit and utility-optimization models of economic behavior and that the abstractions and assumptions of economic theory are what make it useful in the first place. "A hypothesis is important if it ‘explains’ much by little, that is, if it abstracts the common and crucial elements from the mass of complex and detailed circumstances surrounding the phenomena to be explained..." (Friedman 1953, 153). The *point* of simplistic economic models is that they do not describe the world as it is, but that they strip away the complexity of the real world to get to the measurable dynamics of a certain truth.

At this point, Friedman fulfills his role as an economic historian and offers his own comparison to the natural sciences. Friedman chooses physics (a historically popular choice) and reiterates the metaphor of starting by simulating movement in a vacuum and gradually introducing complexity based on context. He points out that the equation  $s=1/2gt^2$ , which describes the time it takes for an object to fall in a vacuum, is only useful or descriptive of the real world in limited contexts: dropping a cannonball from a tall building can be described using the general formula, but the equation is terrible at describing how a feather will fall when dropped out of an airplane. Does the failure of the latter scenario mean that the equation is useless? Of course not. The equation is limited by the contexts in which it is applicable, by the contexts which are *close enough* to a vacuum to be useful (Friedman 1953, 155). This changes the nature of the problem with normative models. Their inability to describe the real world is what makes them useful, so the question of whether or not to accept a given theory becomes ‘is this theory *close enough* to reality to apply to solving this particular problem?’ By this line of thinking, the assumption that humans live in a vacuum is undoubtedly false, but that does not mean that normative theories are useless. Underlying assumptions do not *determine* the circumstances in which a theory holds true; assumptions *specify* circumstances to get at the essence of what a theory is hypothesizing.

Friedman then introduces what would become a famous metaphor for normative economic methodology. He writes that the game of billiards involves complicated physics and geometry, a precise understanding of angles and momentum, and sophisticated mathematical reasoning, yet a billiards player does not need to be mathematically inclined to excel at the game. "It seems not at all unreasonable that

excellent predictions would be yielded by the hypothesis that the billiard player made his shots *as if* he knew the complicated mathematical formulas that would give the optimum directions of travel..." (Friedman 1953, 157). The expert billiards player instead relies on something primal, on instincts acquired through years of practice in order to achieve their desired outcome. It makes no difference if the player has an advanced degree in theoretical physics or if they have just been playing a lot of billiards throughout their life, the effect is the same, otherwise, they would not be considered experts. As Friedman puts it, the player "just figures it out" (Friedman 1953, 158). He extends this thinking to economic methodology. Do owners of businesses bring out a whiteboard, calculate demand curves, and then produce at a quantity at which marginal costs equal marginal revenue? Of course not, but that misses the point of the maximization theory. Businesspeople do not *have* to understand the complex equations that are behind achieving Pareto efficiency or a Walrasian market-clearing equilibrium; they simply need to act in their own self-interest, in a way that allows them to stay in business and this will necessarily fulfill the outcomes predicted by Pareto and Walras.

It is only a short step from these examples to the economic hypothesis that under a wide range of circumstances individual firms behave *as if* they were seeking rationally to maximize their expected return... and ahead full knowledge of the data needed to succeed in this attempt; *as if*, that is, they knew the relevant cost and demand functions, calculated marginal cost and marginal revenue... and pushed each line of action to the point at which the relevant marginal cost and marginal revenue were equal (Friedman 1953, 158).

Friedman justifies this line of thinking by invoking the language of social Darwinism. He assumes that any behavior which does not act in accordance with economic theory will be punished by the market. If businesspeople act in a way that is inconsistent with maximizing returns, "it seems unlikely that they would remain in

business for long" and "natural selection" will correct the error in their ways (Friedman 1953, 158). Friedman is not explicit in terms of what means the market has for correcting behavior, but he makes it clear that the consequences are swift and dire. Sure, individual human beings are prone to psychological blunders and are prone to short sidedness, but those issues should not aggregate on a market scale because irrational behavior is punished by the market. A consumer does not need to have a precise understanding of the slopes and shapes of her indifference curves relative to a budget constraint to act *as if* she wants to maximize her utility. A business owner does not need to have a full understanding of marginal cost and revenue curves to act *as if* she wants to maximize her profits. This is essentially presenting the law of revealed preferences in a new manner; it provides a new justification for interpreting economic decisions as objective data points of rational behavior. The general premise, 'business owners act in ways which maximize returns for their businesses' is hard to disagree with, therefore, according to Friedman's logic, using models which assume consumer behavior is necessarily utility maximizing (both in the short- and long-run) is completely reasonable. With the threat of swift market retribution keeping people in line, "given natural selection, acceptance of the hypothesis can be based largely on the judgment that it summarizes the conditions for survival" (Friedman 1953, 158). Since there are *enough* situations in which individuals act *as if* they want to maximize their profits and utility, normative economics justifies its existence, "to 'assume' single-minded pursuit of pecuniary self-interests by employers... works well in a wide variety of hypotheses in economics" (Friedman 1953, 164). It is appropriate to update theory as scientific knowledge progresses, but throwing away rationality hypotheses without having a suitable replacement is counterproductive.

Friedman notes that a perfectly predictive model would have to incorporate things like the character and education of individual traders, "the color of each trader's hairs and eyes" and concludes that "achieving this kind of 'realism' is certain to render a theory utterly useless" (Friedman 1953, 165). Thus, the issue of unrealistic assumptions is a nonissue. It is not the objective of theory to be realistic; the focus is on finding the contexts in which theory is applicable. Empirical contradictions to general theory do not leave a theory useless but present limitations on the contexts in which general theory can be applied. The assumptions of general theory are not realistic, but that's the point; the simplified world of economic theory contains "only the forces that the hypothesis asserts to be important" (Friedman 1953, 171). Humans may be prone to psychological shortcomings in reasoning, but the *market* behaves according to strict laws of utility and profit maximization; any behavior that deviates from rationality models will be swiftly and mercilessly punished by the market. Over time, as people become experienced market participants, their behavior becomes more rational, more in line with the predictions of mainstream theory. Thus, market behavior can be confidently classified as "rational" since irrational behavior is weeded out by the incentive structure of the free market.

Friedman's essay was well received by a widely sympathetic audience. He, along with Samuelson and Modigliani, used this reasoning to formalize normative models such as the life-cycle hypothesis, permanent income hypothesis, and the discounted utility model (Thaler 2015, 98). The takeaway of these models: markets achieve societally beneficial outcomes because markets are assumed to be efficient in the long run. The Chicago school of economics, which preached the gospel of laissez-faire government

regulation and economic growth through profit maximization, became the prevailing philosophy of economic development. Friedman does not deny the existence of Smith's "partial spectator", but greatly diminishes its role in economic decision making. As long as the impartial spectator is making *enough* of the decision *enough* of the time, mainstream theories remain entirely valid. Throughout the proceeding decades, economists such as Hicks, Arrow, and Samuelson, despite coming from "different sides of the aisle", all continued in the proud tradition of mathematizing economics based on rationality assumptions. Psychological factors were considered to be true but insignificant; normative thinking became status quo.

## **2.5 Behavioral Beginnings**

Starting with Herbert Simon in the 1950s and followed by Kahneman, Tversky, Thaler, and others in the 1970s and 80s, several economists and psychologists attacked Friedman and his Chicago School contemporaries for being too quick to explain away role of human psychology and its impact on economic decision making. Instead, they argued that the 'errors' of human rationality do not cancel out on a market level; they result in systematic market failures and help explain phenomena such as housing market bubbles, unsustainably low savings rates, and the perpetuation of global climate change. Friedman's ideas seem logically sound, but he also introduced new assumptions about the efficiency of market incentives and disregarded the question of whether maximizing profits and utility is desirable or ethical. Addressing this issue is at the core of solving the climate crisis.

Herbert Simon, an early proponent for incorporating psychology into economics, wrote one of the earliest critiques of Friedman's essay. Simon observes that Friedman's arguments pick and choose what is convenient in the methodology of natural sciences without providing a clear connection to economics. Essentially, mainstream approaches can be boiled down into three propositions:

1. Business owners want to maximize their profits.
  2. Business owners know the course of action necessary to maximize their profits.
  3. Observed market prices and quantities maximize profits across the entire market
- (Simon 1963, 180).

The same logic, applied to consumers, yields similar conclusions:

1. Economic agents want to optimize their long-term utility subject to a budget.
2. Actors in the market know the course of action necessary optimize their utility.
3. Observed market prices and quantities maximize consumers' long-term utility.

According to Simon, in arguing for a theory consisting of these three arguments, "Friedman asserts that it doesn't matter if [1] and [2] are false, provided [3] is true" (Simon 1963, 180). This line of thinking relies on the assumption that [3] is empirically tested and observable and that [1] and [2] are impossible to observe. This, too, is absurd since utility is an inherently subjective concept and testing profit maximization requires immaterial counterfactuals. Economics, yet again, ends up in a self-justifying tautology in which there is no differentiation between ends and means, between intentions and consequences. The observable actions of businesses and consumers are necessarily rational because of the assumption that markets reward rational behavior and punish

irrational behavior; people who act irrationally quickly learn to act rationally (although the consequences of not doing so are left ambiguous). Simon continues by taking issue with Friedman's baseless comparison of economics to physics. "Was Galileo also guilty of using the invalid principle of unreality? I think not. I think he was interested in the behavior in perfect vacuums not because there aren't any in the real world, but because the real world sometimes sufficiently approximates them" (Simon 1963, 181). Simon takes Friedman's argument and flips it on its head. Astrophysicists are justified in creating models in vacuums because approximate vacuums actually exist and are directly observable. Galileo had no concept of relativity and calculus was in its infancy when he upended the classical understanding of the solar system, however, the simplifying assumptions he made were justifiable because observable phenomena were *close enough* to his general theory. The same cannot be said about rationality assumptions. Perhaps there was a point in human history when something resembling perfect competition actually existed, but in the modern globalized world, using perfect competition as the 'vacuum' through which to analyze economic behavior is to completely disregard reality. "Unreality of premises is not a virtue in scientific theory; it is a necessary evil – a concession to the finite computing capacity of the scientist..." (Simon 1963, 181). This is at the center of Simon's argument: consumers, producers, and "objective" social scientists are *all* subject to the limitations of human computing abilities. Even if consumers are acting *as if* they want to maximize their utility, the realities of human psychology *guarantee* they will miscalculate. Even if producers are acting *as if* they want to maximize profits, risk preference and errors in forecasting *guarantee* they will fail. This idea, which Simon dubbed "bounded rationality", was a radical departure from the

conclusions mainstream economic thought, yet it closely resembles Smith's "partial spectator", first theorized 200 years before the Simon v. Friedman debate.

Simon concludes his essay by pointing out a dangerous implication of Friedman's arguments: there is no discernable difference between "not measurable" and "unimportant." Friedman explains that the power of normative thought lies in its ability to understand phenomena through "only the forces that the hypothesis asserts to be important." But this implies that the forces which are *not* included in the theories are necessarily *unimportant*, which provides a self-justifying reason to omit human psychology from mainstream economic models. According to Simon, this is a critical mistake, and his work in economics, psychology, and political science started the momentum for a behavioral revolution. Simon wanted to shift the model of economic thought away from "[t]he rational man of economics" who is a "maximizer" and "who will settle for nothing less than the best" and towards the role of the partial spectator, who is compulsive, bad at math, and good at disguising itself as rational. Economists, two centuries after they were first instructed to do so, started to grapple with the behavioral roots of human decision-making. Simon, like Smith, Mill, and Knight, argues that error is an integral component of human decision-making, both within and well beyond the realm of economic choice.

Economists have always been aware of the importance of psychology in economic decision-making. Adam Smith, the inventor of the invisible hand, wrote extensively about the influence of our "partial spectators" who frequently convince us to act in a way that is against our best interests. The partial spectator does not have free reign over our actions, as we consult the "impartial spectator" to judge past actions, but Smith makes it

clear that the tendency to appease the partial spectator "is the source of half the disorders of human life." These warnings were heeded by many classical economists including Mill, Veblen, Knight, and Fisher. These economists, especially Veblen and Knight, emphasize not only that humans are deeply irrational beings, but also that building models based on the assumption humans *are* rational has alarming consequences. Despite these warnings, economics evolved in a hyper-normative direction in which the homogenous agents in a market behave according to rational thought and in the unhampered pursuit of maximization. Producers produce to maximize profits; consumers consume to maximize utility. Producers do not need to calculate marginal revenue and marginal costs in order to act *as if* they can; consumers do not need to have perfect knowledge of their utility preferences in order to act *as if* they do. Anyone acting irrationally faces the rigid retribution of the free market and will act rationally in the future. However, this justification of using rationality models introduces new assumptions to those models and does not address the core philosophical issue of hyper-normalizing economic models. First, the justification of mainstream models lies on the assumption that markets quickly and efficiently correct irrational behavior like a strict teacher. Secondly, this justification does not address the philosophical issues first identified by Mill and expanded upon by Knight and Veblen. If actions and intentions are treated as though they exist in perfect harmony, if people's consumption behavior is *necessarily* rational, utility-maximizing behavior, and the behavior of business owners is *necessarily* rational, profit-maximizing behavior, if there is no differentiation between how one *should* behave and how one actually behaves, hedonism becomes the predominant societal doctrine. This exposes how economics has and continues to directly

contribute to global climate change: the modern globalized economy is emitting carbon well beyond a sustainable level, yet market equilibrium prices are considered to be rational! Since markets are efficient, the market price is *supposed* to reflect environmental costs, yet economic tools for calculating and correcting externalities have not led to ecologically sustainable outcomes. If economists want to aid in the fight against climate change rather than contribute to it, behavioral insights need to come back to center stage. Mainstream economic theory provides a thorough framework through which we can understand our impartial spectators, but that is only half of the story.

## Chapter 3: Refocus on Behavior

### 3.1 Behavioral Deviations

In the 1970s and 80s, largely influenced by Simon's idea of bounded rationality, social scientists from various backgrounds started to notice of the limitations of mainstream economic models. In the early 70s, a pair of Israeli psychologists, Daniel Kahneman and Amos Tversky, started to test systematic deviations in human behavior from mainstream predictions, and their ideas inspired a new offshoot of economic study: behavioral economics. Friedman argues that people will maximize utility by acting *as if* they want to optimize consumption; Kahneman and Tversky argue that people are terrible at acting *as if* they want to optimize consumption. Mainstream neoclassical economists contend that expert billiards players do not need to understand geometry and physics in order to act *as if* they do; behavioral economists argue that humans are terrible at playing billiards (Thaler 1981). According to behavioralists, people's preferences are not well ordered and stable, they are dynamic and influenced by arbitrary queues. Since Kahneman and Tversky started publishing their research, several economists including Thaler, Lowenstein, and Chetty, have contributed to a growing body of literature revealing systematic failures in rational choice. These errors do not 'cancel out' at a market scale; they create and amplify wide-scale market failures; they are consistent, predictable, and exploitable. Many outcomes assumed to be rational utility-maximizing

behavior by neoclassical models are, in reality, the opposite. This allows unsustainable, hedonistic consumption to be branded as societally beneficial behavior and subsequently normalized. Therefore, the denial of behavioral biases' profound effects on markets has directly contributed to a societal tolerance of untenable levels of carbon emissions. Behavioral economists' conclusions compel a critical review of the role governments play in markets and how to achieve sustainable social and ecological outcomes through public policy.

One of the heuristics that Kahneman and Tversky first identified was the "availability heuristic," or the idea that people do not try to use the *most objective* information when making predictions: they use the most *readily accessible* information. In other words, when judging the probability of a hypothetical outcome, humans base their estimates on how easily similar instances come to mind (Kahneman 2011, 425). The availability heuristic, or availability bias, results in consistent misjudgments about the world and how to act within it. This bias also results in small sample sizes or irrelevant data having a large influence on behavior. Researchers found that people will frequently make "confident estimations about the future based on little or no knowledge and will frequently base their estimates on arbitrary queues" (Kahneman 2011, 429). Availability bias extends itself into numerous areas of life and is the cause of stereotyping and anchoring effects. Kahneman notes that the human brain understands the world in generalities, and that this is not always a malicious thing. For example, a hiker wandering in the woods may hold the belief 'all bears are dangerous', and while it is not *technically* true, the stereotype is useful for survival. Human rationality is bounded; critical thought is costly, so working in generalizations allows the hiker's brain to save energy and focus

on other tasks like not getting lost. While stereotyping is a useful survival tactic, it also leads to gross mischaracterizations of events and inaccurate predictions about the future. The anchoring effect "occurs when people consider a particular value for an unknown quantity before estimating the quantity" (Kahneman 2011, 119). In several experiments, researchers manipulated subjects' answers to trivia questions, predictions about the future, and willingness to pay responses when valuing ecological processes with great success using arbitrary anchors. This was true even when the anchor was an obviously absurd or unrelated number. In one study, researchers asked people for estimations of Gandhi's age upon his death. One group was asked the absurd question, "was Gandhi older than 144 years old when he died?" before being asked for their own estimates, and a second group was asked, "was Gandhi older than 34 years old when he died?" before being asked for estimates. The former group predicted a significantly higher age than the latter, despite both groups being fully conscious that the anchoring number was absurd (Kahneman 2011, 122). This is one innocuous example of the anchoring effect, but it shows the malleability of human judgment on both conscious and subconscious levels. Due to mental shortcuts like stereotyping and anchoring, human beings, across the board, make poor predictions about the future due to poor interpretations of the past and incomplete interpretations of the present. Mainstream models assume that actors within a market are operating on the same basic set of objective facts; availability bias shows that judgments and decisions do not need to be based in fact at all. This puts *salience* at the center of economic decision-making. People shape their ethical beliefs based on the information that is most available, not based on what is true or optimal. People's risk assessment is based on arbitrary data points, and this means risk is subjective and

arguably unmeasurable. Salient and dramatic outcomes play an outsized role in risk assessment, which results in wide discrepancies between public perceptions and quantifiable facts.

Kahneman and Tversky's early work on the availability heuristic and the predictable biases it creates inspired a new generation of economists to develop a new economic framework that incorporates rationally bounded human beings into the center of its models, flaws and all. Kahneman and Tversky formalized their findings into the Two-System Framework, in which people make decisions through two cognitive systems which are sometimes at odds with each other. System 1 thinks quickly and impulsively; System 2 “is in charge of self-control” (Kahneman 2011, 26). System 1 is automatic, and System 2 is reflexive (Thaler & Sunstein 2008). This language is remarkably similar to that of Adam Smith who wrote about people containing both “partial” and “impartial” spectators; the partial spectator prone to succumbing to the whims of irrational passions—the impartial spectator in charge of judging past actions and keeping long term goals in sight. In this way, the wave of behavioral economics was not spontaneous; it was long overdue. Economists started to notice Smith's ideas and began to accept that only through incorporating real human behavior can economics ensure its usefulness at addressing global problems.

### **3.2 Errors in Rationality and Their Contribution to Carbon Emissions**

Since Kahneman and Tversky’s early research, there has been an explosion of research investigating the role of behavioral biases in decision making. Speaking broadly, behavioral economists identified three bounds of human psychology: bounded rationality,

bounded willpower, and bounded self-interest (Thaler 2015, 258). These boundaries have numerous consequences, affecting both economic and non-economic decision-making.

Take the availability heuristic for example. People's tendency to base their predictions on the most salient information rather than the most accurate information has dramatic effects on how people behave. People make confident estimations about the future based on little or no knowledge and frequently base estimates on arbitrary contextual clues (Kahneman 2011, 130). This means people overestimate the likelihood of salient, attention-grabbing events and underestimate the likelihood of invisible outcomes; this has significant effects on people's risk assessments and aids in the normalization of hedonism. A consistent finding across the literature is that people overestimate the likelihood of rare, eye-catching events. In one study, 80% of respondents judged accidental death to be more likely than death by stroke, despite strokes causing twice as many deaths as all accidents combined. Respondents believed that death by disease and by accident to be roughly equal, yet in reality, death by disease is 18 times as likely as an accidental death. Tornadoes were predicted to be bigger killers than asthma, but asthma causes 20 times as many deaths as tornadoes (Lichtenstein et al. 1978). These misperceptions of risk are directly attributable to availability bias and exemplify the power of media coverage in shaping public perceptions (Kahneman 2011, 138). This contributes to climate change on a couple of levels. It helps explain why 20% of the American population does not believe human activity is contributing to global climate change despite near-unanimous acceptance amongst climate scientists that climate change is primarily caused by human activity (Pew 2019). Unless people are deliberately going out of their way to gather the most objective information on climate

science, they tend to blindly accept whatever data is most readily accessible. Availability bias is not the only explanation of climate denialism, but it does help explain why climate denialism persists despite overwhelming evidence to the contrary.

The other way that availability bias contributes to climate change is by making us underestimate the likelihood of non-salient events. Since many of the catastrophic outcomes of climate change are decades away, and many of the current effects of climate change occur far away from centers human civilization, the risks of climate change are fallaciously diminished in our collective social consciousness. "The human mind does not deal well with nonevents" (Kahneman 2011, 200) and many of the existential threats climate change poses are, for the time being, nonevents. The list of potential outcomes of climate change is extensive. Rising oceans result in the reduction of land area, especially beaches and wetlands, and in the potential displacement of hundreds of millions of people. As carbon emissions continue to be absorbed by oceans, ocean acidification begins disrupting the long-term feasibility of marine ecosystems. Rising temperatures result in the loss of species and forests, the disruption of water supplies and agriculture, and increased deaths due to heatwaves and tropical diseases. In addition to these basic predictable outcomes, there are a plethora of unknown effects of climate change: weather patterns will change, and extreme weather like tornadoes and hurricanes may become more frequent; potential shifts in the Atlantic Gulf Stream could change Europe's climate into current day Alaska's; the melting permafrost may result in rapid increases in methane emissions and accelerate climate change beyond hope of human intervention (Harris & Roach 2018, 326). All of these outcomes seem like pitches for bad sci-fi movies, yet they are also fairly likely without radical transformations in carbon-emitting

behavior. So why isn't there a global panic and movement away from extreme consumerism? Why is the political movement behind environmentally sustainable growth considered fringe if climate change truly presents an existential threat to the planet and society as we know it? Availability bias helps answer these questions. Many of the cataclysmic events outlined above have not yet happened, other events are invisible. It is impossible for people to fully grasp the likelihood of an event that has never happened before for precisely that reason: it has never happened before. The threat of Europe's climate resembling that of current-day Alaska is unthinkable because, throughout modern history, Europe's climate has never resembled Alaska's. An increase in deaths due to heatwaves is not as attention-grabbing as a violent attack, so people overestimate the likelihood of the latter and ignore the former. Another important component of climate change is that not all areas are affected equally. Many of the most noticeable effects of climate change are occurring far away from most people's day-to-day lives. The areas of permafrost in Siberia and the Northwest Territory are sparsely populated, and the effects of its thaw are essentially invisible, therefore, the risks are underestimated. Island nations like Kiribati and Tuvalu, whose respective carbon emissions are amongst the lowest in the world, are beginning to disappear as ocean levels rise, but are located in remote regions with relatively small populations (Rytz 2018). The leaders of island nations have been pleading to developing countries to cut back on carbon emissions for decades to no avail. In 1997, the former president of Kiribati described their predicament like being "ants" in elephants' drinking water. "The problem isn't the ants' behavior. It's a problem of how to convince elephants to be more gentle" (Kristof 1997). The Pacific Ocean slowly swallowing the homelands of Pacific islanders is a slow, untheatrical tragedy that

will never garner the same media attention as celebrity gossip, a provocative tweet, or armed conflict. People in developed countries (Americans in particular) consume at a rate that is well beyond ecological limits because the negative effects of excessive consumption are, for the time being, felt by people other than themselves. Since salience shapes our beliefs around costs and benefits, it is easy to normalize excessive energy consumption, car and plane travel, and other carbon-emitting activities because the effects are non-salient to consumers. Thaler and Sunstein, who coauthored many studies with Kahneman and Tversky, sum it up. "The underlying problem is that energy is invisible, so people do not know when they are using a lot of it" (Thaler & Sunstein 2008, 196). Availability bias undermines the prospect of the rational consumer; consumers cannot possibly act rationally due to human psychology. Any consumer acting *as if* they want to maximize their utility will inevitably draw false conclusions about the costs and benefits of their actions due to arbitrary queues they pick up from the environment. Someone might overestimate the possibility of being attacked by an axe murderer after watching a horror movie on an international flight and be completely blind to the environmentally detrimental effects of taking the flight in the first place.

### **3.3 Mis-forecasting Future Utility**

The availability heuristic undoubtedly aids in explaining why markets tolerate and encourage conspicuous consumption, but it is far from the only systemic limitation of human psychology that contributes to climate change. A number of studies have revealed people's inability to forecast accurately future utility. Over 200 years after Smith first wrote of people ruining themselves by spending all their money on "trinkets of frivolous

utility,” and 150 years after Mill wrote of “discrepancies between anticipations and the actual fact,” economists finally started to take notice of peoples’ forecasting inadequacies. Friedman argued that people need to act *as if* they want to optimize their utility in order to accomplish their goal; behavioralists argue that people do not act *as if* they want to optimize their utility, and even when they do, they inevitably fail.

Saving habits in the United States are an obvious example of systematic failure to optimize long-term utility. According to the Life-Cycle Hypothesis, people set aside a certain percentage of their income in savings to ensure they will have money to continue consuming after they have stopped earning a wage. The logic is simple: people should start retirement accounts because everyone wants to retire. Behavioral analysis has shown that while people *should* save to optimize long-term utility, few succeed. Studies estimate that between 80-85% of people are “passive” savers (Chetty 2015) and that defaults have a dramatic effect on people’s saving behavior. In one study, researchers found that only 10% of employees contributed to a 401(k) plan when non-enrollment was the default option upon accepting the job. This number increases over time, with around 50% of employees enrolling in the plan after 2 years, but suboptimal saving behavior is normal because a lot of people do not actively monitor and optimize their saving behavior. This problem was easily corrected by automatically enrolling employees in the 401(k) plans and giving them the option to opt-out of contributing. The opt-out employees saw an 80-85% participation rate which stayed constant across time and income levels (Madrian & Shea 2001). How is this possible? Both groups of employees are presented with the same fundamental problem: how much to contribute to a 401(k), yet both groups seemed to revert to a ‘default is best’ heuristic rather than actively optimizing their saving habits. To

put it another way, 80% of people "chose" the default saving rate regardless of the optimal or 'correct' rate. This resulted in one group of employees adopting healthy saving habits, and the other dramatically under-saving and undervaluing their future utility. Smith wrote that we tend to undervalue our utility "ten years hence" and 21<sup>st</sup>-century economists confirmed this notion. Left to our own devices, we tend to consume today at the expense of tomorrow.

Another reason for systematic discrepancies between expected and realized utility is due to *projection bias*, or the tendency to overweight current emotional states when making decisions. This is such a universally understandable concept that there is a term for making such a decision: the impulse buy. There is evidence of projection bias in the market: one study showed that warm clothes bought on cold days are more likely to be returned than warm clothes bought on other days (Kahneman & Thaler 2006). People step into the cold, have an immediate emotional reaction, and end up purchasing clothes they end up not wanting or needing. The ramifications of market-wide projection bias are another source of ostentatious, unsustainable consumer behavior. It leads to widespread "miswanting" (which is impossible under the assumptions of revealed preference) and "makes us prone to exaggerate the effect of significant purchases or changed circumstances on our future well-being" (Kahneman 2011, 406). This research challenges the neoclassical assumption that rational agents with stable, well-defined preferences interact in a marketplace to find a market-clearing price and quantity. "[F]orecasts of future hedonic and emotional states are anchored in the current emotional and motivational state" (Kahneman & Thaler 2006). When people approach a decision while in a heightened emotional state, rational considerations fall by the wayside, and people

are prone to making senseless decisions. One obvious example is the emotional motivation of craving. “Craving, like depression, not only motivates certain behaviors, but it crowds out virtually all considerations,” and in the most extreme circumstances, “nourishment, sleep, money, loved ones, responsibility, and survival lose all significance” (Camerer 2003). Craving manifests itself on several levels; there are the noticeable examples of drug and alcohol addiction, but it also creates a more societally pervasive *focusing illusion*, or the idea that “nothing in life is as important as you think it is when you are thinking about it” (Kahneman 2011, 402). People overestimate the gained utility from buying a new car or a new house. Research has shown that people buy more food if they are hungry while shopping and buy less food if given a muffin before entering the store (Gilbert et al. 2002). The allure of sugary, high-fat foods is diminished if the emotions that accompany hunger are reduced. The focusing illusion also makes us prone to misjudge our own happiness, as well as the happiness of people around us based on arbitrary anchors (Kahneman 2011, 404). This creates a detrimental cycle in which people underestimate their own happiness relative to others, become hyper-focused on compensating for this gap through additional consumption, end up disappointed that the additional consumption did not actually result in higher utility, and thus, start the cycle over again. On a societal scale, gold-plating and competitive consumption is evident in television commercials and on every social media app. People feel envious of their friends with new, shiny, expensive things and become convinced they must consume the same things to be as happy as their peers. When people are inevitably disappointed that buying a second home, new sports car, Wi-Fi-enabled stationary bicycle, golf vacation in the Caribbean, or third private plane did not make them as happy as expected, they

compensate with even more consumption. Kahneman identifies the underlying danger of the focusing illusion, "it makes us prone to exaggerate the effect of significant purchases or changed circumstances on our future well-being" (Kahneman 2011, 406). The focusing illusion distorts the valuations of various goods and prices become reliant on arbitrary factors. We end up building a capitalistic Tower of Babel, in which everyone is trying to out consume each other with no limit or goal in mind. In this way, accepting peoples' consumption choices as rational ignores a key component of human psychology: even if people act *as if* they want to optimize their utility, they are inevitably terrible at doing so. Therefore, accepting revealed preferences as rational results in the societal acceptance of hedonism and unsustainable carbon-emitting behavior.

In addition to projection bias, people fail to accurately forecast utility due to the *planning fallacy*. The planning fallacy is responsible for the difference between what we *plan* to do and what we *actually* do. Researchers have consistently found that people's forecasts of personal projects tend to be unrealistically close to best-case scenarios (Kahneman 2011, 250). The list of examples is extensive. A 2011 study of farmers in Kenya found that while 97% of farmers said they planned to use fertilizer on their fields in the upcoming year, only 37% actually fertilized their crops, which resulted in suboptimal crop yields (Duflo et al. 2011). Predictably, differences between the planner and the doer result in systematic suboptimal outcomes. Irrational optimism is a significant source of unnecessary risk-taking in the market. Only 35% of small businesses in America survive 5 years, yet entrepreneurs estimated this number to be around 60%. Furthermore, four in five entrepreneurs gave themselves at least a 70% chance of succeeding, with one in three entrepreneurs giving themselves a *0% chance of failure*

(Cooper 1988). Of course, these results aren't necessarily surprising, what's the point of starting a business if you believe it is going to fail? But it does reveal the hopelessly romantic side of human psychology; we cannot help but think things will work out, that *we* are the exception to the rule. A young entrepreneur may think, 'sure only 1 in 3 businesses survives at least 5 years, but *my* idea is *good*, and that's what separates *me* from everyone else.' According to neoclassical models, people make risks based on market information and respond quickly to failure; behavioral research suggests this is not the case. Studies of inventors who were told their inventions had a minuscule chance at success have shown that only around one-half of the inventors gave up on their inventions, despite having been told their chances of success are only around 1%. "Evidence suggests that optimism is widespread, stubborn, and costly" (Kahneman 2011, 257). This, combined with irrational entrepreneurial optimism results, shows that unlike Friedman's world, in which irrational market behavior is punished and corrected, the real market does not incentivize people to act rationally, it capitalizes on their optimism bias to keep the capitalist engine running smoothly. The market is full of irrationally optimistic people with failing businesses and bad ideas who choose to persevere in the face of adversity rather than accept that their idea is bad. The true probabilities of gains and losses are unknowable, so people overestimate the probability of gains and underestimate that of losses. Subsequently, the planning fallacy results in artificially high levels of market risk. The gap between the far-sighted, level-headed 'planner' and the short-sighted, lazy, compulsive 'doer' is remarkably similar to the two-agent model proposed by Smith in *Theory of Moral Sentiments*. It is important to work in a framework in which decisions and actions, while contemplated and acted out by an individual human being, are being

influenced by two countervailing forces. In fact, to not view human decision-making in this framework is to deny the concept of 'self-control' (Thaler 1981, 294). Taken together, the planning fallacy and projection bias create a snowball effect in their contribution to global climate change. The planning fallacy results in unreasonably high levels of risky behavior to sustain untenable levels of consumption: consumption, which is propped up by projection bias, resulting in a hedonic race against ourselves with no goal or finish line.

The last behavioral insight which directly contributes to climate change is *status quo bias*, which is the tendency to go along with the status quo rather than actively monitoring, optimizing, and re-optimizing consumption. The literature focused on status quo bias is wide ranging. College students tend to sit in the same seat every day even without a seating chart (Thaler 2015, 8). As mentioned before, 80% of savers were shown to be “passive savers” who blindly followed the default (status-quo) option because the cost of keeping everything the same is perceived to be very low (Camerer 2003). “Generally, the status quo serves as a reference point; people conserve on cognitive effort by evaluating new consumption alternatives in isolation, rather than by integrating them with existing plans” (Lowenstein & Prelec 1992). A series of studies across politics, food consumption, city planning, and financial market behavior found that “subjects... adhered to status quo choices more frequently than would be predicted by the canonical model” (Samuelson 1988). One illustrative example is New Coke. New Coke performed better in blind taste tests than traditional Coke, yet people changed their preferences after finding out that it was a departure from the status quo (Samuelson 1988). The environmental implications of status quo bias are perhaps the most obvious of all the

aforementioned behavioral biases. Since the status quo, especially in America, is to emit carbon at a rate well beyond ecological limits, we fail to perceive the costs of *non-action*. To complicate things further, public education campaigns will not be enough to change hearts and minds. Research has shown that people go out of their way to keep their heads in the sand, an idea called strategic self-ignorance. Strategic self-ignorance is the use of ignorance as an excuse to over-indulge in pleasurable activities that may be harmful to one's future self (Thunstrom et al 2016). One study on food information and its effect on consumption showed that a majority of participants actively chose to ignore the information about the health risks of food they were about to consume. Additionally, those who intentionally ignored the health information consumed significantly more than those who chose to educate themselves about the food options (Thunstrom et al. 2016). Humans are comfort creatures; we actively *lie* to ourselves to justify hedonistic behavior. Even when presented with relevant information, people actively ignore that information if it intervenes in over-indulgent hedonic behavior. This means that informing people about the facts and risks of climate change will not be sufficient to change social attitudes towards a green future. It is also necessary to actively fight against misinformation to combat people's availability bias and strategic self-ignorance.

The heuristics and biases listed in this chapter are a small portion of all the biases that have been studied by behavioral economists, but they are arguably the most important biases that systematically contribute to the normalization of conspicuous hedonistic consumption and the ongoing climate crisis. Many of the effects of climate change remain invisible from most Americans' day-to-day lives. Underestimating the risks of invisible outcomes, falling victim to status quo bias, and falling into the hedonist

trap created by projection bias continues to worsen climate change, and we cannot propose effective solutions without acknowledging the role these biases play in behavior and shaping cultural norms. The empirical problems of revealed preference theory show that relying on mainstream models, which have homogenous rational agents at their core, is not only inaccurate, but also surreptitiously destructive. Policymakers aiming to curb carbon emissions must therefore reevaluate conclusions founded on economic rationality. Behavioral insights and human psychology must play an integral role in any economic proposal for solving climate change because they open economics up to a new set of policy tools that provide more cost-effective solutions than traditional neoclassical economic models.

## **Chapter 4: What Works?**

We have established how the omission of behavioral insights from economic theory has contributed to the rapidity of global climate change, but as Friedman pointed out, identifying problems without a proposed solution is counterproductive. This chapter reviews various approaches to solving climate change including neoclassical approaches in addition to alternatives proposed by the behavioralist and ecological viewpoints. The validity of these approaches is measured on both empirical and philosophical grounds. The evidence is overwhelming: when attempting to change people's habits to encourage more pro-social behavior, behavioral interventions tend to be significantly more cost-effective than neoclassical solutions. Several studies have shown that mainstream theory fails to capture the true value of the ecological processes, that the price mechanism is less effective at influencing behavior than normative theory predicts, and that low-cost behavioral interventions can be significantly more successful at achieving pro-social behavior.

### **4.1 What Should Have Worked (but Hasn't)?**

A core premise of neoclassical theory is that people respond to incentives. If the price of something goes up, people consume less of it, and vice versa. Therefore, the primary tool neoclassical theories have to combat climate change is the price mechanism.

Everything, including nonmarket goods, is valued and monetized, then incentives take over to guide markets to achieve efficient outcomes. Neoclassical economists readily admit that there are negative externalities coupled with carbon-emitting development, but they also contend that the costs associated with these externalities can be accurately measured and accounted for. There is a general acceptance of using cost-benefit-analysis (CBA) to understand and solve a wide array of human problems, including the climate crisis. The conceit of CBA is pretty simple: all the forecasted costs and benefits of a certain course of action are weighed against each other, and decisions are made in pursuit of optimizing expected net benefits. If the costs outweigh the benefits, reevaluate your options; if the benefits outweigh the costs, green light the proposal. In a market full of rational agents operating on perfect information, this methodology is sound, but as has been repeatedly showcased, people do not act rationally or on accurate information. CBA is based on the assumption that economic tools provide an accurate valuation of environmental processes and is the justification for environmentally degrading development. More than half of all carbon emissions released since the 18<sup>th</sup> century have been released since 1988, well past the point when environmentalists started bringing attention to the troubling climate trends associated with high carbon emissions (Frumhoff 2014).

CBA, when done correctly, should maximize benefits to society while minimizing costs. This *should* result in societally beneficial outcomes. So why hasn't it? Why do carbon emissions continue to rise, oceans continue to acidify, fields of permafrost continue to melt, and extreme weather events continue to intensify? CBA carries some of the blame. CBA assumes that survey methods can accurately measure how much people

value the environment. Willingness to pay (WTP) measures are one example. WTP measures, as the name implies, attempt to capture the value of environmental goods (clean air for example) by asking people how much they are willing to pay for them. Opposite of WTP measures are willingness to accept (WTA) measures. WTA measures attempt to capture the value of environmental goods by asking people how much they are required to be compensated to accept environmental destruction. For example, if a utility commission is deciding whether or not to build a new fossil fuel-run power plant, it may ask people living in the area how much they would have to be compensated to accept the environmental degradation. Both the WTP and WTA measures are accepted as mainstream methods of accurately capturing the value of environmental processes and are even treated as interchangeable ways to measure the value of the environment (Knetsch 1991). Several studies have thrown the practice of treating WTP and WTA measures interchangeably into question. Theoretically, the amount people are willing to give up to avoid the loss of a resource should be equivalent to the amount of money they require to accept it. Yet empirical studies show that using these two methods to value the exact same piece of the environment yields vastly different estimates. Asking people 'how much are you willing to pay to prevent a coal plant from being built down the road?' results in a significantly lower answer than asking 'how much will the coal company need to pay you to build a new plant down the road?' A series of studies have shown that WTA measures of value are consistently 3 to 9 times larger than WTP measures (Knetsch 1991). These differences reveal a key issue with using survey results to determine environmental value: there is no consideration of wealth distribution. This oversight has other repercussions. Because WTP measures are inherently coupled with income, using

WTP to value the environment gives disproportionate weight to the preferences of high-income individuals. For instance, say there is a town next to a forest with three citizens, one of whom is considerably wealthier than the other two. Let's say the wealthy individual is willing to pay \$10,000 to cut down the forest and turn it into lumber, while the other two residents are each willing to pay \$1,000 to prevent this development. Speaking democratically, the forest should be preserved because a majority of the town opposes the development; but according to CBA, the failure to cut down the forest results in a societal net loss of \$8,000. This inherent wealth bias is baked into the methodology of CBA and explains the modern predilection for environmentally degrading development (Frank 2000). Because the opinions of people and nations with high levels of capital are valued above those of small developing countries, the outcomes of these people are cast aside. The United States, Canada, China, and other high carbon-emitting countries can sit and watch Pacific islands disappear into the ocean while hiding behind the moral shield of CBA because CBA inherently favors rich individuals and developed countries.

Another shortcoming of CBA is its reliance on a discount rate to determine present and future values. Discount rates are founded on a logical premise: due to inflation, a \$100 cost today should not be valued the same as a \$100 cost in 10 years. Therefore, projected costs and benefits should be discounted relative to current costs and benefits. Discount rates are used to project benefits and costs across time and are therefore critical in the CBA process. The first methodological issue is that due to the mathematical structure of discount rates, the future is only considered when the discount rate is incredibly low. For example, if the discount rate is 5%, it is not worth investing

even \$10 today to avoid a \$100 loss 50 years in the future (Harris & Roach 154). A higher discount rate results in even less weight to future costs and benefits, so ensuring a low discount rate is low is crucial when addressing environmental issues. Also, behavioral studies have shown that people do not discount future utility in a manner that is consistent with neoclassical theory. The results of several experiments suggest that people do not discount future costs and benefits exponentially, as discount rate models assume, but hyperbolically (Frank 2000, 927). This means that people are much more prone to present bias, that is, are prone to discounting the future much more dramatically than is modeled through discount rates. This manifests itself in policy decisions in troubling ways. When deciding between expanding existing fracking capacity and investing in green technology, we underestimate benefits when they are only realized in the long term. Because fracking provides relatively cheap oil to sustain an infrastructure already dependent on fossil fuels and the benefits of investing in green alternatives are realized in the long run, our flawed psychology underplays the costs of destroying the environment. We choose a small, short-term benefit over a large, long-term benefit and this helps explain how untenable carbon consumption has been normalized. Thus, due to the combination of inflation rates inherently devaluing the future and the human tendency to hyperbolically discount future utility, CBA fails at weighing future costs and benefits in their true proportions (Frank 200, 928).

In addition to identifying methodological shortcomings, numerous studies have shown that the price mechanism is inadequate at achieving carbon-cutting objectives. For example, one study found that Carbon Cap and Trade programs, which are reliant on market forces to find the price of carbon, have not reduced carbon emissions rapidly

enough to meet the goals put forth by the Paris Agreement (Dietz et al. 2009). The obvious neoclassical solution is to raise the price of energy to reduce demand, but studies have shown that a 10% increase in energy prices only results in a 2.5% reduction in carbon emissions (Azevedo et al. 2011). Another issue with the price mechanism is determining the *right* level of taxation to achieve societally efficient goals. There are large variations in quantifying the ‘right’ Pigouvian taxes, which are supposed to account for the cost of externalities. Some economists argue a gasoline tax should be over \$10 per gallon to properly reflect the externalities of gas consumption, others say the figure is closer to 60 cents (Harris and Roach 2018, 297). One 2015 estimate from the International Monetary Fund found that while global subsidies for fossil fuels amounted to over \$300 billion, the *true* subsidy is closer to \$5 *trillion* when accounting for externalities (Harris and Roach 2018, 293). Another study found that after accounting for behavioral factors, “the optimal environmental tax should exceed the standard Pigouvian tax” (Shogren & Taylor 2008). The up-front costs of shutting down a coal power plant and switching to solar or wind energy are high, so we tend to ignore the long-term costs of sticking with the status quo. We underestimate the costs of externalities because environmental degradation is seen as necessary for economic growth and is incredibly difficult to estimate in monetary terms. After all, how does one put a dollar sign on the cost of Florida being swallowed by the ocean in a hundred years? In addition to underestimating the true costs of building and sustaining economies on fossil fuels, we also underestimate the positive externalities of investing in a greener economy. It is estimated that the pollution from coal power plants leads to the deaths of more than 13,000 people in the US every year, yet the cause and effect are not immediately salient,

so we underestimate these externalities, bury our heads in the sand, and tolerate a status quo of unsustainable carbon emissions (Harris & Roach 2018, 283). Therefore, because CBA fails to account for behavioral biases, because it assumes the probabilistic forecasts of costs and benefits to be complete and accurate, and because it fails to account for how people conceptualize value, it perpetuates the climate crisis rather than providing pragmatic solutions.

The magnitude of monetary incentives' effects is limited because people are not rational economic agents. For instance, the promise of energy savings is not enough of an incentive to break people out of their energy-inefficient habits. One study estimated that \$520 billion spent on transitioning away from old, inefficient technologies could result in a 23% reduction in energy consumption and accrue \$1.2 trillion in long-term benefits (Allcott & Mullainathan 2010). The U.S. Environmental Protection Agency has noted improving efficiency in homes, businesses, schools, governments, and industries "is one of the most constructive, cost-effective ways to address the challenges of high energy prices, energy security and independence, air pollution, and global climate change" (Harris & Roach 2018, 217). More recent estimates project that adopting new energy-efficient technology has the potential to reduce energy use by 40-60%. The upfront costs are high, estimated to be around 0.2% of global GDP, but the long-term benefits are undeniable (Harris and Roach 2018, 296). This is free money sitting on the table! Yet present bias, which leads people to overestimate short-term costs and underestimate long-term benefits, prevents us from picking it up. Monetary savings have been repeatedly shown to have negligible effects on energy consumption and sometimes even backfire (Bator et al. 2019). This is because people do not respond to incentives in a way that is

consistent with neoclassical theory. Quite often, people understand paying for something as a moral license to do something not socially desirable (Ariely & Jones 2008). Asking someone to pay for bad behavior can result in increased bad behavior since the individual feels morally vindicated in their actions due to their payment.

Upon closer observation, the solutions to climate change proposed by neoclassical economics are not solutions at all; they contribute to the problem. CBA fails to capture how humans interact with and value the natural world and provides a convenient moral framework to justify continued unsustainable levels of environmentally destructive consumption. Unwavering faith in CBA has resulted in an unreflective capitalist hivemind rapidly consuming all of the world's natural resources with little to no regard for future generations. People are prone to status quo bias, availability bias, and loss aversion which means we are not as responsive to monetary incentives as mainstream models predict. Additionally, current methods for establishing value estimates of the environment are biased, inaccurate, and chaotic. "Money, as it turns out, is very often the most expensive way to motivate people" (Ariely & Jones 2008, 94). According to mainstream economics, behavioral factors are irrelevant, but incorporating these psychological realities into models of human behavior provides economists with more tools to encourage sustainable growth and consumption. One study, which compared a series of behavioral interventions against energy discounts for good behavior, found that behavioral nudges were 9 times more cost-effective at reducing energy consumption than monetary discounts (Benartzi et al. 2014). This is because, unlike monetary solutions, behavioral interventions account for things like intuitions, emotions, and an imperfect decision-making process. It is *rational* to want to save the world. It is *rational* to

consume within the ecological boundaries of the planet. Yet we (especially those in developed nations) do not consume sustainably because we are not rational. Human psychology guarantees irrational behavior; therefore, we need to be reminded to act rationally; we need to keep our partial spectator in check. Shifting mainstream models away from rational agents and towards human beings is the first step for more pragmatic and cost-effective approaches to curbing hedonistic consumption.

#### **4.2 What Shouldn't Have Worked (But Has?)**

Thus far, this thesis has covered systematic failures in human rationality that directly contribute to the climate crisis. However, these failures in rationality are not explicitly bad. The modern capitalist world exploits these systematic biases to propagate short-term hedonistic consumption, but these biases can also be used to our advantage. That is to say, we can use these psychological heuristics to change behavior for the better. An array of literature has shown that nonmonetary incentives are, in many circumstances, more effective than monetary incentives at achieving a given goal. This includes reducing carbon emissions, habituating sustainable consumption, and properly valuing the environment.

Take, for example, the way people respond to man-made ecological disasters such as an oil spill. Because the scale of destruction is so mind-bogglingly large, our brains have a hard time valuing the true cost of the disaster. This is evident in the fact that WTP measures are shown to have little correlation with the magnitude of a disaster. In one large-scale survey, subjects were asked how much they would be willing to pay to save either 2,000 birds or 200,000 birds from an oil spill. Despite the latter number being 100x

larger than the first, the WTP responses were remarkably similar, with the first group averaging a willingness to pay of \$80 to save 2k birds and the second answering \$88 to save 200k birds. However, both groups significantly increased their WTP after being shown pictures of individual birds drowning in oil (Kahneman 2011, 93). This shows that humans are not as receptive to changes in quantities as neoclassical models may assume, but we *are* receptive to emotional queues. Saliency is key in our decision-making, so making an invisible problem visible results in a higher willingness to actually do something about the problem. Many of the negative outcomes of high carbon emissions are, for the time being, invisible, or at least less salient than whatever else is happening in the world on a given day. With this in mind, researchers have tried to make those invisible outcomes more salient through a variety of means and with varying degrees of success. In particular, increasing the feedback that people receive on their consumption habits has been shown to have a significant effect on behavior. In one study, which focused on the behavior of people who did not pay for their own energy usage, behavioral interventions were shown to effectively reduce consumption even though the individuals did not stand to gain monetarily due to decreased consumption (Bator et al. 2019). Another study found that the amplification of the prosocial and private benefits of conservation decreased energy usage for every decile of energy user. It also found that communicating the environmental and health externalities of electricity usage outperformed monetary savings information at driving behavioral change (Asensio & Delmas 2015). Water usage was shown to decrease by 23% in households where water use stickers were placed on showers and appliances, whereas studies using monetary incentives to decrease water consumption are mixed (Byerly et al. 2018). Lastly,

provoking competitive behavior has been shown to be effective at decreasing energy consumption. In one study, neighbors who received energy reports that compared them to their neighbors decreased energy consumption across all deciles of energy users (Schultz et al. 2018). There is a danger in using competitive behavior as you do not want to inadvertently encourage the lowest energy users to consume more, but using this nonmonetary incentive is effective in a variety of contexts. A study involving millions of households showed that increasing feedback could have a scalable impact on energy consumption, concluding that energy reports with behavioral queues could reduce carbon emissions by 0.5% (Allcott & Mullainathan 2010). This is obviously not enough to stop climate change in its tracks, but it's a cheap, politically pragmatic place to start. We also want to avoid falling into a false dichotomy of monetary versus nonmonetary incentives. In fact, research shows that the most effective behavior change comes when behavioral queues are coupled with monetary incentives. In one study a behavioral intervention more than tripled the effect of a monetary incentive, but when the interventions were combined, the effect was 10x larger than that of the control group (Figuroa et al. 2013).

Outside of the realm of energy consumption, researchers have been studying various behavioral biases and how to overcome them. Take the Kenyan farmers from Chapter 2 who fell victim to the planning fallacy: almost all of the farmers said they were planning to fertilize their fields, yet only around 1/3<sup>rd</sup> of them actually did. To overcome this, researchers offered farmers free delivery of fertilizer early in the planting season, when bank account balances are at their highest. This resulted in the adoption rate increasing from 37% to 70% (Duflo et al. 2011). How? By taking advantage of people's present bias and 'tricking' them into acting rationally. By removing the two most salient

barriers preventing widescale fertilization practices (transportation costs and high up-front costs) researchers counteracted the relevant behavioral biases to achieve a more prosocial outcome. As mentioned earlier, switching default 401(k) contributions from an ‘opt-in’ system to an ‘opt-out’ system increased saving behavior by 70% (Madrian & Shea 2001). This takes advantage of people’s status-quo bias and the fact that people will often choose the path of least resistance rather than always actively attempting to maximize utility. These are but two examples of many areas in which behavioral interventions have proven to be cost-effective ways to change behavior. Incorporating behavioral insights into economic theory has influenced college enrollment, the justice system, medicine, savings rates, and insurance (Thaler 2015).

Behavioral insights were omitted from neoclassical models because they were believed to add unnecessary complexity to economic systems. Neoclassical economists did away with the real world and constructed their own in an attempt to understand economic activity and how it *should* work. However, there was a gradual shift in understanding that those models describe how the world *does* work, which normalized unsustainable levels of consumption and carbon emissions. Therefore, neoclassical solutions to real-world problems are inadequate to fix the problem. Acknowledging that people are limited in various ways, and that bounded rationality, bounded willpower, and bounded self-interest are societally pervasive realities is the first step in correcting the course. We need to focus on what actually works.

## **Chapter 5: New Solutions and Old Problems**

The lack of human behavior has plagued mainstream economic theories since their inception in the mid 19<sup>th</sup> century. Widespread acceptance that mainstream theories provide adequate tools for achieving societally efficient outcomes has resulted in the proliferation of hedonistic thought and general overconsumption. Incorporating behavioral insights into economic theory leads to an array of new cost-effective policy proposals for achieving carbon emission goals. However, even with this course correction, behavioral interventions are not capable of cutting carbon emissions alone. In fact, many of the epistemological issues first identified by Smith, Mill, and Knight equally apply to behavioral models as they do neoclassical models. Therefore, policymakers must be aware of potential pitfalls when choosing the objectives of environmental policy, and of the ethical consequences of “correcting” the utility maximizing model of human behavior.

### **5.1 Policy Solutions and Paths Forward**

The main takeaway of behavioral studies is that nonmonetary incentives, which account for the boundaries of human rationality, are frequently more cost-effective at changing behavior than monetary incentives. Since people are not cold, calculating rational agents in endless pursuit of maximization, appealing to emotion, to one's partial

spectator, can be more effective than cash incentives. Behavioral economists have identified actionable solutions in four key areas: defaults, reframing information, cooling-off periods, and limiting consumer choices (Camerer 2003).

For example, when 401(k) tax subsidies are reduced, it is expected that contributions will fall proportionally as people move their assets around to maximize return. Experimental evidence shows that the vast majority of people do not adjust saving behavior at all in response to reduced tax benefits because 85% of people are passive savers (Chetty 2015). This shows the importance of defaults in decision-making. When crafting public policy, politicians need to be especially cognizant of the defaults they are creating and the expected outcomes knowing that people assume the default option to be best. Policy makers need to identify the areas where they can take advantage of people's reliance on defaults (Thaler & Sunstein 2003). This could be extended to expanding programs that encourage updating old technology to energy-efficient modern technology. If people are automatically enrolled in energy savings programs and have to actively opt-out of adopting new, green technology, the passive savers of the world (most of us) will reduce their carbon emissions without even noticing. Information framing was shown to have significant effects on people's valuations of the environment and their own well-being, so reframing the environmental crisis as actively harming people rather than being a necessary trade-off for economic growth leads to a higher valuation of ecological processes. Therefore, reducing pollution will be easier if it is framed as reducing harm rather than improving things. Mitigation policies will be more effective than compensation policies because it prevents loss rather than paying people less than what they feel they deserve for their losses (Knetsch 1991).

Cooling-off periods act as a check on the partial spectator, on the part of us that wants the flashy car, the sugary foods, and the newest generation of smartphone. It is enforced self-control. The National Park System is the most obvious example of environmental self-control policy. Knowing that the capitalistic mindset will inevitably exploit and ruin even the most beautiful and awe-inspiring corners of the earth, the US government decided to set aside areas of the country that could not be developed and were protected by the federal government. Many of the proposals for National Parks cited the same ecological disaster: Niagara Falls. Niagara Falls had been one of the earliest natural wonders exploited by American tourists much to the demise of indigenous people, naturalists, and environmentalists. There were cable cars strung across the river, people consistently threw themselves over the falls in publicity stunts, and the area around the falls was rapidly developed to accommodate a large number of tourists. Numerous proposals for future National Parks used the emotional argument of a desire to “avoid the next Niagara” (Burns 2009). Adam Smith wrote that acting with self-control is to act virtuously and is not a given, so governments should shape policies that encourage self-control. This can include requiring cool-off periods for high carbon-emitting consumption, like buying a car, and restrictions on environmentally degrading development.

Lastly, lawmakers should aim to limit consumer choices in areas where people fragment their time and resources because gains are only realized in the long run. This is in direct opposition to neoclassical theory which holds that more choices allow for greater market optimization and is due to the fact that people are prone to making suboptimal choices when presented with too many options. This is true for insurance

participation, savings plans, and general consumption (Camerer 2003). The benefits of sustainable consumption are not immediately salient, so lawmakers should shape policies that guide people towards acting more responsibly. For example, energy consumption consists of a complex, somewhat subconscious set of choices. Homebuilders frequently opt to forego insulating a new house because the up-front cost is too high. However, the decision to avoid this up-front cost results in a large increase in the cost of heating the home, which, over time, is significantly more expensive and environmentally damaging than insulating the home in the first place (Thaler 2008). Policies that eliminate this complexity from the decision-making process (for example, financing the insulation of the home through energy savings) lead to more efficient societal outcomes.

This is a short, incomplete list of potential government actions that could curb carbon emissions in a cost-effective manner. However, they all are a departure from neoclassical economic theory and the assumption of rational markets. Policymakers should not view their constituents as hyper-rational utility monsters; they should view them as human beings. Human beings are full of confusing, paradoxical, violent, imaginary passions that constantly undermine our long-term self-interests. Not only does this outlook explain why we are on the cusp of an unprecedented climate crisis, but it also provides some paths forward. In recognizing that an unregulated free market does not automatically arrive at the societally optimal outcome, we can reframe the role of government in creating a sustainable future. We do not need to throw prices and incentives out the window, as they can be incredibly useful at shaping demand and perceptions of the world, but we also need to integrate psychological insights into policy solutions. “The best way to help Humans improve their performance is to provide

feedback” (Thaler & Sunstein 2008, 92). In terms of daily habits, there are four areas that individuals, especially Americans and Canadians, can focus on to reduce emissions: eating a plant-based diet (0.8 tons of CO<sub>2</sub> per year), avoiding air travel (1.6 tpy), living car-free (2.4 tpy), and having smaller families. Of course, there is structural inertia that prevents everyone from ditching meat consumption, air, and car travel altogether, but improving feedback on consumption can have a sizable effect. Studies have shown that interventions can curb emissions by 0.6% in the case of meat consumption and 3.2% in the case of car travel (Wynes et al. 2018). Air travel may provide the biggest opportunity for a reduction in carbon emissions, as a person electing not to go on a transatlantic round trip saves as much carbon as 11 households participating in an energy savings program for an entire year. Yet, remarkably, there have been no wide-scale studies that have attempted to curb air travel through behavioral interventions.

## **5.2 Critique of Behavioralists**

While the research of behavioral economists has shed light on numerous flaws in mainstream theory, there are several legitimate critiques of the field and its findings. The first issue is the scale and scope of research that has been done thus far. Many psychological studies suffer from selection bias and struggle to be replicated. This is not as big of a concern in behavioral economics because many of the aforementioned heuristics and biases are observable on a market scale. However, the efficacy of behavioral interventions in promoting pro-social behavior is more subject to debate. Most of the studies done thus far have been limited in their purview and sample size. With few exceptions, it is hard to know whether or not a particular intervention is scalable (Byerly

et al. 2018). Additionally, while studies have identified a plethora of psychological biases and heuristics, we do not understand which type of behavioral interventions work in a given context (Chetty 2015). It is one thing to identify errors in human reasoning and a completely separate challenge to use these errors to our advantage. The only way to overcome these shortcomings is further research. Research needs to increase both in terms of scope and scale to realize the full potential of incorporating behavioral insights into economic theory.

In addition to the pragmatic issues associated with the behavioralists' mindset, there are political problems as well. Most behavioralist economists view the insights of their research as an argument for more government regulation to promote efficient outcomes. Others view these conclusions as a slippery slope to government paternalism and that the errors exposed to us through behavioral studies should make us more, not less wary of government intervention in the market (Glaeser 2006). While this claim is valid (after all government officials are prone to the same biases as those they are regulating) the failures of the free market are too obvious to ignore. Government intervention in the market will never be perfect for the same reason that government nonaction will never achieve efficient outcomes. However, to argue that the existence of behavioral biases should lead to less government in shaping and guiding consumption choices is to ignore virtually all empirical evidence.

Lastly, and perhaps most importantly, there are numerous philosophical concerns with adopting the behavioralist outlook. Many of the epistemological and moral shortcomings first identified by Smith, Mill, Veblen, and Knight equally apply to behavioralist theories as they do neoclassical theory. Behavioralist economists are still

reliant on quantitative methods for determining the truth and modeling human behavior. The two-agent model may be more accurate at describing human behavior than the rational utility optimizer, but it is still a model of human behavior, which is arguably not modellable. One of the primary successes of Behavioral Economics is Prospect Theory, developed by Kahneman and Tversky, in which an agent's current emotional state is what ultimately determines consumption choices (Kahneman & Tversky 1979). However, in formulating the theory, the authors fail to address the underlying misassumptions of neoclassical theories. "The assumptions... of transforming, multiplying, and adding, as well as an exhaustive knowledge of actions and outcomes are equally defensible, or indefensible, since they play nearly identical roles in both theories" (Berg & Gigerenzer 2010). Instead of starting from scratch, behavioral models add new parameters to existing models which automatically increases the R-squared (Berg & Gigerenzer 2010). Additionally, behavioral models cling to the neoclassical assumption that behavior is driven by the pursuit of constrained optimization, even if it is flawed. This assumption is fundamentally different from how people actually value things, both tangible and intangible; literature has shown that people's preferences typically exhibit a "lexicographic structure" where the value of a thing cannot be fully captured through pricing (Berg & Gigerenzer 2010). With lexicographical preferences, people's valuation of often arbitrary objects cannot be captured by an indifference curve. The agent prefers any amount of one good to any amount of another; the utility of certain goods is infinitesimal compared to others. This may exhibit itself as intense brand loyalty, connection to one's hometown or family, or devotion to a religious, political, or cultural

set of values. In ignoring this reality, behavioral economists may have “resold” Friedman’s *as-if* framework rather than transforming it.

Behavioralist models, in addition to only slightly adjusting neoclassical theory, also fall into the hedonist trap first forewarned of by Veblen and Knight. Behavioral economists, including Kahneman and Tversky, assume rational behavior is equivalent to *morally upstanding* behavior, that acting rationally is how one *ought* to act (Berg & Gigerenzer 2010). Therefore, according to behaviorists, the goal of behavioral policy is to motivate people to behave “rationally” because that achieves the best societal outcomes. This assumption is not only dangerous, but empirically misguided. In fact, studies have suggested that human brains are intelligent precisely *because* they make informed guesses beyond a given set of information, not in spite of it (Berg & Gigerenzer 2010). Furthermore, there is no evidence that shows people who fail to act in a rationally consistent manner suffer economic losses, live shorter lives, earn less money, or are less happy than those who do. In fact, the evidence points in the opposite direction. People who violate expected utility and show time inconsistent behavior tend to earn more money than their ‘rational’ counterparts. Furthermore, the beliefs of non-Bayesians tend to be more accurate than those of perfect Bayesians and are “better calibrated to objective risk frequencies in the real-world decision-making environment” (Berg & Gigerenzer 2010). This evidence shows that the *goals* of behavioral policies are limited in scope and erroneous. The investigation of most behavioral studies is limited to testing whether behavior conforms to the normative ideals of neoclassical models, and if not, how to correct that behavior so that it does. This leads behavioralists back to the same conclusions of Friedman, Samuelson, and other neoclassical economists via a different

route; the hedonism-normalizing ends of normative models are once again considered desirable.

The debate can be boiled down to consequentialist versus deontological reasoning. According to the consequentialist viewpoint, the morality of an action is measured by its outcomes. Actions are not judged to be good or bad based on an overarching moral code; there are no actions that are inherently good or inherently bad. Neoclassical cost-benefit analysis falls firmly in the consequentialist camp. Theoretically, any action can be considered advisable as long as the net projected benefits outweigh the costs. Cutting down a forest, stripping the land of its natural resources, spewing unfathomable amounts of carbon into the atmosphere, and leaving the world unfit for future generations is not immoral in and of itself insofar as the benefits outweigh the costs. Behavioralists *also* fall into the consequentialist mindset. The advisability of policy solutions is measured based on their ability to achieve a given outcome. These criteria may differ slightly from those used by neoclassical economists, but they are quantitative in nature. For example, behavioralists have observed vast discrepancies between WTP and WTA measures of environmental valuation but do not conclude that both of these measures are too defective to provide accurate value estimates. They, instead, argue that WTA measures provide a more accurate value estimate than WTP measures. They notice the empirical shortcomings of normative theory and propose a slight modification of the original theory. On the other hand, the deontological viewpoint proposes that actions should be judged based on deontic values, an ineffable sense of right and wrong. A deontological outlook breaks away from the practice of collapsing the value of everything in existence into a single monetary value; it allows for environmental processes to have

value in and of themselves, independent of human utility. Deontic values are often criticized for being arbitrary and self-serving; this is unavoidable. However, the calculus of consequentialist philosophy is what leads to the rise of a hedonistic economy and pervasive overconsumption. Saving the climate requires a shift in cultural values, away from short-term consumption and towards a sustainable future, not because it is the most cost-effective way of living, but because it is the right thing to do.

## Chapter 6: Conclusion

### 6.1 Concluding Remarks

Since the inception of political economy, economists have been acutely aware of the importance of behavioral factors in the human decision-making process. Adam Smith wrote extensively about the ever-present duel between one's partial spectator and impartial spectator and the important role of the "passions" in decisions making. Smith, echoing writers dating back to ancient Greece, observed that human passions and the influence of the partial spectator make people behave in a way that is often in direct conflict with their self-interest. Despite this, the field of economics adopted a methodology that assumes that on the aggregate, people behave rationally. John Stuart Mill and Thorstein Veblen were amongst the first to recognize the dangers of confusing the "abstract" agent in economic models with human behavior in the real world. By focusing solely on outcomes and automatically labeling those outcomes as 'optimal', we normalize societal hedonism and unsustainable levels of consumption. Later, Frank Knight and Irving Fisher recognized that the bulk of human values and behavior are a product of societal context, not an economic calculus. The data used to model "rational behavior" is actually the product of a "historically created process" and does not shed light on what is optimal or how one ought to act in the world. Despite these warnings, economics went down a hyper-normative route which built models on the assumption of

rationality. The neoclassical utility optimization models formulated during the 1940s and 1950s became accepted as truth and people continued to consume more and more with no limit in sight.

Now, we find ourselves in the midst of an unprecedented ecological crisis. Carbon emissions continue to rise, oceans continue to acidify, biodiversity continues to fall, and temperature trends are reaching all-time highs. A world full of rational agents should recognize the problem and adjust their behavior accordingly, so why aren't we?

Behavioral economics contains some answers. Since the 1970s, economists have been exposing behavioral heuristics that cause empirical deviations from neoclassical theories, many of which help explain the perpetuation of climate change. Availability bias, status quo bias, projection bias, and the focusing illusion all have profound effects on people's consumption behavior and how they value ecological processes. Additionally, these biases make it difficult to break people out of unsustainable levels of consumption once they have been habituated to a status quo of overconsumption. However, by acknowledging the existence of these systematic deviations from normative models, policymakers have a new set of cost-effective tools which are more cost-effective at achieving societally beneficial goals. Many studies have shown that behavioral interventions, which incorporate psychological insights, are more cost-effective at changing people's behavior than the manipulation of the pricing mechanism.

While the work of behavioral economists has undoubtedly provided much-needed realism into economic models, they also tend to ignore the epistemological and moral implications of advocating for rational behavior. The main issue is that behavioral economics fully embraces the *same* moral framework as neoclassical economics.

Neoclassical theory uses outcomes as a universal unit of valuation to measure the consequences of actions; the goal of neoclassical models is to optimize welfare as defined by the satisfaction of preferences (Hausman 2006, 230). All other ethical considerations are important, but ultimately outside of the purview of economic thought. In adopting this moral framework, behavioralists committed the same cardinal sin as classical and neoclassical economists. As Smith, Mill, Veblen, and others had previously noted, how one *ought* to act is frequently antithetical to what maximizes personal utility. Both neoclassical and behavioral economists reject this notion and insist that rationality and morality are one and the same. *This* is what opens the door for normalizing hedonism and is the irony of behavioral economics. If we live our lives in the sole pursuit of optimizing utility according to a hedonistic calculus, if we accept that the “direct and unhampered quest of net sensuous gain” is what delineates right from wrong, we can rationalize and morally justify overconsumption today at the expense of tomorrow. Of course, one could also make the argument that when it comes to addressing climate change, rational behavior is *exactly* what we should be aiming for, however, this comes with the necessary caveat to reevaluate the definition of “rational behavior.”

There is no singular path forward for the field of economics. The realities of human psychology will never be fully incorporated into mainstream models because human behavior isn't normative. Behavioral economists made this observation decades ago, yet the branch of study has ended up at the same conclusion Friedman first outlined almost 70 years ago. The insights of behavioral studies are undoubtedly useful and there are many exciting new tools policymakers have at their disposal when it comes to addressing climate issues. Since the goal is to reduce carbon emissions, policymakers can

incorporate knowledge of systematic biases to craft more cost-effective policies.

However, the unquestioned piety to rational behavior, the belief that how one *ought* to act and how one should *rationally* act are the same is insidious and banal. For the climate crisis to be dealt with on its true scale, we need radical and transformative action. Not only because it passes the normative tests of CBA (which it does), but because it is the right thing to do for ourselves and for future generations. In the meantime, it is worth testing the scalability of behavioral interventions in reducing carbon emissions, as well as expanding the use of behavioral interventions to encourage low carbon-emitting behavior. These interventions will not be sufficient to reverse the climate crisis, but they are certainly a step in the right direction. At the very least, we must recognize the failure of the status quo, of using pricing mechanisms to solve environmental issues. Polanyi recognized this reality in the 1940s, "To allow the market mechanism to be sole director of the fate of human beings... would result in the demolition of society... nature would be reduced to its elements" (Polanyi 1944, 76).

There is no silver bullet for solving climate change. There is no global climate czar that has the final say on what development does and does not happen, and even if there were such a person, their job would not be easy. Every corner of human existence is affected by climate change. Transportation, energy usage, inequality, human welfare, and profit incentives are all part of the nexus that simultaneously causes, and contains the solution to climate change. The first step is recognizing the magnitude of the climate problem and addressing hedonistic overconsumption at its roots.

Before the modern age, the American naturalist and philosopher Henry David Thoreau recognized the hedonistic trends of an increasingly industrialized society and the

failure of modern people to consider or recognize the true consequences of their actions. “By conscious effort of the mind we can stand aloof from actions and their consequences; and all things, good and bad, go by us like a torrent. We are not wholly involved in Nature” (Thoreau 1853, 66). This observation is well ahead of its time and gets directly at the heart of today’s climate crisis: we are not wholly involved in Nature. Humanity has separated itself from the natural order and only “know Nature but as a robber” (Thoreau 1853, 81). To achieve a sustainable future, we must reframe this relationship, become more mindful of the consequences of our actions, and redefine what it means to “optimize.” By digging into the history of economic thought, incorporating insights from adjacent social sciences, and understanding the epistemological limits of normative methodology, economics can be useful in the effort to consume less today in order to save tomorrow.

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