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Market Based Solutions to Climate Change: An ethical investigation into the nature of the European Union Emission Trading Scheme in the context of the climate crisis

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Market-Based Solutions to Climate Change

An ethical investigation into the nature of the European Union Emission Trading
Scheme in the context of the climate crisis



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1. Introduction

Pollution has become an increasingly pressing issue since the negative consequences are becoming more visible (Intergovernmental Panel on Climate Change, 2018). An example is the alarming climate change resulting from CO₂ emissions. Recently, scientists (PAGES 2k Consortium, 2019) showed that the current rise in temperature is visible in 98% of all places on earth, a historically unique rise. The impacts of climate change are profound, and we are currently facing a real climate crisis with significant effects on health and humanity.

So what can one do to tackle this issue? For this, economic analysis becomes of relevance because it is one of the most used policy and decision-making tools thus relevant for policy proposals regarding climate change. According to economics, pollution is a form of a negative externality. It occurs due to unenforced or non-existent property rights as visible in the tragedy of the commons, i.e., a deviation from or absence of a perfectly competitive market. Policy instrument choice is made on the grounds of reaching the highest amount of *social welfare*, measured within the framework of (social) cost-benefit analysis. To reduce pollution, governments have adopted several forms of regulation one of those are market-based solutions to climate change. By creating a market for pollution, economics can ensure we limit pollution in an efficient way, meaning at the lowest costs. A widespread option is creating a market for CO₂ emission rights, of which the European Union Emission Trading Scheme (hereafter EU ETS) is the largest.

In the (e)valuation of various economic regulations, the *efficiency* argumentation dominates the debate, i.e., limiting pollution at the lowest costs, to reach a most cost-effective balance. However, due to the considerably large impact of climate change, discussions continue to exist on whether the efficient level is also a fair solution. Thereby, these discussions make economic regulation in the context of climate change a pressing *philosophical* question as well. *What are the ethical limitations of market-based solutions to climate change? And how can we use these limitations to reform EU ETS?*

In this thesis, I claim that considering the efficiency advantages of emission trading, one can still take several steps in reforming EU ETS. This is because the way economics values nature suffers from serious ethical issues. This thesis will examine the economic solutions, more specifically the trade of emission permits, to the problem of pollution, understood as CO₂ emissions, to analyse the efficiency and implicit ethical consideration of such solutions. I will not debate the exact extent of the climate crisis, but I assume the existence of a will to take countermeasures. I base this assumption on consensus among academia that climate change is a phenomenon in which humanity plays a role (Cook, et al., 2016). That climate change is an issue, has been discussed in several scientific literature/studies¹. By diving into public policy, I implicitly assume a particular role for the government or other institutions to solve this issue—the degrees to which will be something that I will discuss.

In this thesis, I will defend the claim that the way economics values nature is not without ethical

¹ See (Intergovernmental Panel on Climate Change, 2018).

limitations making room for improvement of EU ETS. To do so, chapter 2 discusses the relevance of an ethical analysis focussed on economic theories. This is because some claim economics is value-free and ethical discussions are another domain, to be separated from economics. I claim this is not the case, as many economic theories -like welfare economics and rational choice theory- make assumptions that touch upon the normative domain. Furthermore, due to the severity of the impacts of climate change, this specific context raises ethical questions as well. This relevance is vital to illustrate the existence and importance of a role of ethics in economics. Chapter 3 illustrates the economic background on which climate change reduction policies occur. Specifically, market-based solutions like emission trading are dealt with. The chapter ends with explaining why emission trading is considered an efficient solution to climate change and why this is an advantage. Subsequently, in Chapter 4 I will problematize the market-based solution to climate change. This is because the way nature/the environment is valued does not correspond with the total value of it and takes current distribution as the starting point and thereby continuing any possible unjust distributions. However, what does this imply? Should we abandon all market-based solutions, or is there a way to combine the efficiency argument favouring market-based solutions with the issues I have highlighted? Chapter 5, the discussion, combines the ethical limitations to EU ETS thereby combining it with the efficiency argument. I list two recommendations for a possible reform of EU ETS, namely, to introduce a minimum price for CO₂ and stop the allocation of these emission rights for free.

2. The relevance of an ethical analysis

Before this thesis leaps into an ethical analysis of market-based solutions to climate change, the relevance of an ethical analysis in this specific context needs to be established. Why does an ethical analysis in the case of solutions to climate change matter at all? Why would one care to investigate the ethical limitations of market-based approaches to climate change? For one to care about this, one needs to know why normative questions are of usage in the context of economics and climate change. This section illustrates that economics cannot be disentangled from normative judgements. If economics would be a purely value-free science, the ethical analysis and discussion would touch upon another domain and not economics. But since ethics and economics cannot be separated and economics is not purely value free, an ethical analysis is of relevance. Also in the context of climate change, ethics has a role due to the profound and often unequal effects on all, thus leading to the conclusion that an ethical analysis does matter.

The relevance of climate change and the urge to act, I assume, is known to everyone. But, as a reminder, and to grasp the complete context, hereby a short refresher on the context of climate change and the role of economics. In October 2006, the Stern Review on the Economics of Climate Change argued for immediate and urgent action to mitigate global climate change (Stern, 2007). Later, the calculated effects of climate change turned out to be much more extensive and impactful than expected. Meaning the negative impacts were proceeding even faster, thus leading to more significant damages (Jowit & Wintour, 2008). The growing problems due to climate change were once again highlighted by Goulder & Pizer (2006) who illustrated the major impacts of climate change on the well-being of humans and other living beings/species. Long story short, due to a human-caused increase in carbon dioxide emissions, average temperatures have been rising, resulting in problems like water shortages, heat waves, melting icecaps and the inevitable rising of sea levels. Climate change is, therefore, an important scientific and public issue. In response to such research, the 2018 report of the Intergovernmental Panel on Climate Change (IPCC) emphasised the necessity of "rapid, far-reaching and unprecedented changes in all aspects of society" (IPCC, 2018) if the rise of temperatures are limited to a level below 1.5°C² increase. Due to the seriousness of the situation, the British newspaper the Guardian (2019) decided to no longer refer to this issue by climate change but by the climate crisis or climate emergency. The scientific consensus is, once again, visible in a declaration from more than 11,000 scientists³ in November 2019 which stated that "clearly and unequivocally ... planet Earth is facing a climate emergency" (Ripple, Wolf, Newsome, Barnard, & Moomaw, 2020, p. 8). They argue that "[s]cientists have a moral obligation to clearly warn

² Why 1.5°C? This increase is being referred as the 'global mean surface temperature (GMST)' in current year in comparison with temperatures in 1850-1900, in 2006-2015 the GMST increase by 0.87°C. (IPCC, 2018). According to the IPCC (2018), global warming of about 1.5 - 2°C already has impacts for sea levels, number of heatwaves and the condition of sea life. The 1.5°C is the scenario that can be reached, according to the IPCC, if action is being taken. So, a lower level will not be very feasible since levels are already around 1°C. Furthermore, a larger increase already has substantial effects, half a degree already does and even larger effect. Also, tipping points can occur which means certain ecosystems will not be able to repair after this point. At 2°C coral reefs are at danger of completely vanishing (IPCC, 2018).

³ For the list see supplementary files on <https://academic.oup.com/bioscience/article/70/1/8/5610806>.

humanity of any catastrophic threat and to tell it like it is" (Ripple, Wolf, Newsome, Barnard, & Moomaw, 2020, p. 8). Moreover, last year, the European parliament declared a global "climate and environmental emergency" (the Guardian, 2019); (European Parliament, 2019) and expressed the ambition to limit global warming to 1.5°C. So how do we limit global warming? This is where economics appears. Economics being the study of scarcity and how these scarce resources are allocated, can help guide policies aiming to mitigate climate change.

So, we can now see the relevance of climate change in general. Where in this story do ethics come into play? In this section, I argue for the relevance of ethics, actions to mitigate climate change are of too much importance to leave to economics alone. Because economics is not value-free since it is making ethical assumptions and thus ethics should be involved. To illustrate this, I will go into the distinction between positive and normative economics and claim that economics cannot be seen as completely value-free. Furthermore, I will go over the arguments of Hausman, McPherson & Satz (2017) on why ethics is relevant for economics. Finally, I apply this to the context of climate change. This argumentation leads to the conclusion that economics is not purely positive, and ethics has a role in economics and especially in the context of climate change. Since I will start my ethical critique on market-based solutions to pollution in the next chapters, it is of importance to first establish this connection between ethics and economics.

2.1 Normative and positive economics

For an examination of the role of ethics in economics, the positive-normative dichotomy is relevant because it gives an insight into the connection between the two. This all illustrating how ethics is relevant for economics. This is important to demonstrate because some, as becomes visible in this section, believe ethics and economics to be "not at the same place of discourse" (Robbins, 1935, p. 148).

John Neville Keynes (1917) makes the separation between positive and normative science in economics. Positive economics deals with questions on 'what is' and is different from normative judgements, which deal with 'what ought' questions. Keynes did leave room for normative concepts in economics (Hands, 2012) by claiming economics becomes normative as soon as it gets to the application to practice (Keynes, 1917, pp. 12-13). Later, Milton Friedman ([1953] 2007) also distinguished between positive and normative economics. Economics is, in Friedman's view, a positive science in similar ways as physics is, being free of value judgements by simply describing 'what is'. According to Friedman, positive economics is independent of any normative position, making economics an objective science. For Friedman, different opinions about an economic policy like, for example, minimum wage are discussions about the effects and therefore positive. People can disagree on the effects of the implementation of a higher minimum wage for example, which is a positive and not a normative question. Economics can calculate the effect of a minimum wage in way physics can show the effects of gravity, meaning these are 'what is' questions and therefore not a question on 'what ought' like one does not ask whether there should be gravity or not. While it looks like different values are involved, on a deeper level,

the discussion is about the effects of policy and, thus, positive. According to Friedman, the consensus in economic policy depends on positive economics and not on normative economics. Friedman, therefore, said valid economic policy depends more heavily on the progress in positive economics.

Keynes aimed to separate the normative from the positive science but did not aim to eradicate the normative completely. In contrast, others argued for the prohibition of the normative because it "was scientifically illegitimate" (Hands, 2012, p. 221). A supporter of this prohibition is Lionel Robbins, who argues there is no place for normative propositions within economic science. In mid-twentieth century, this view became essential and made it the goal of economics to produce positive economic science (Hands, 2012).

Some strong opposition to the inclusion of value judgements such as Friedman's is that they are two realms that should be separate. However, we can see that in most fields within economics it is not easy to distinguish the positive from the normative easily. This we see in two examples: welfare economics and rational choice theory. Welfare economics is the visibly normative part of economics which I will examine more extensively in chapter 3. Welfare economics is, in short, the study of evaluating the social desirability of different economic states (Rosen & Gayer, 2014). It is, therefore, a form of normative economics (Hausman, McPherson, & Satz, 2017). The second example is rational choice theory, the building block of microeconomics. Rational choice theory refers to the theory that states that agents have well-ordered and defined preferences, and it explains their behaviour in a rational way by those preferences. These concepts do not originate from the systemic observations of economic agents' actual preferences, but they are assumptions necessary for preferences to be rational. According to Friedman ([1953] 2007), a theory does not have to be in accordance with the real world for it to contribute to science⁴. However, it does indicate that rational choice theory might not fall into the positive category. Hausman and McPherson (1996) defined this theory as normative because it refers to "how one ought rationally to prefer and to choose" (Hausman & McPherson, 1996, p. 29). Also, Robert Nozick (1993) says "[a]lthough its adequacy as a description of actual behaviour has been widely questioned, it stands as the dominant view of the conditions that a rational decision should satisfy: it is the dominant normative view" (Nozick, 1993, p. 41). These two examples illustrate how this strict absence of the normative in economics is not always the case in economics today.

Role of ethics in economics

So, economics consists of normative aspects, which Hausman, McPherson and Satz (2017) also illustrate in their book *Economic analysis, moral philosophy and public policy* and add how moral philosophy can enrich economic analysis regarding public policy. Economics is often framed in terms of a positive science that is based solely on technic knowledge (factual claims), therefore staying away from evaluative claims (Hausman, McPherson, & Satz, 2017, p. 13). So that economics is a positive science like physics

⁴ According to Friedman ([1953] 2007), the theory should have predictive power and assumptions are therefore a contribution as long as they can help us predict phenomena. The question on whether people actually behave this way is not so relevant.

without the normative aspect, as the section above highlights. The authors argue that economics is not a mere technical science, and it is not purely value-neutral either. The authors reject the view of economics being value-free -also referred to as the standard view- by means of rebutting two main arguments, namely that economists are like engineers and positive economics is value-free.

Firstly, the standard view -that economics does not touch upon the ethical domain- argues that economists are like engineers. What they do is relevant for policy-making but "only in the way that civil engineering is" (Hausman, McPherson, & Satz, 2017, p. 338). Economics only provides policymakers with causal information; *positive* economics provides the consequences of several policy proposals. The question of which one is most desirable is a task solely for ethics. However, is it possible to give such purely technical and value-free advice? According to Hausman, McPherson and Satz (2017), this rarely works in practice. To provide an overview of the consequences of proposals, one needs to understand moral values shaping the range of alternatives considered, and the weights placed on the advantages and costs. An economist rarely stumbles upon purely technical problems like civil engineers. The tools used in the research and the selection of the relevant problems involve evaluative judgements. Ethics is inevitable in the thinking of relevant problems and the correct methods used to evaluate the alternatives. For example, if one would ask an economist to guide governments in managing debts and economic growth, one would need to have an understanding of the political background. Because history and the political context determine the options an economist has in managing debts and economic growth. Even if this government would provide the economist with all the possible alternatives, economists still need to touch upon the ethical domain. This is because to come up with all the relevant policies, they will need to understand ethics and moral values (Hausman, McPherson, & Satz, 2017, p. 340).

Secondly, the standard view can acknowledge that indeed ethics plays a role in the questions asked by economists, as proposed in the economics as engineers above, but it does not play a role in the answers that follow those questions. The essence of this argument is that there is a distinction between facts and values and that positive economics is value-free ("the standard view" (Hausman, McPherson, & Satz, 2017, p. 341)). The science of economics deals with questions of facts and ethics focuses on value questions. Therefore, the standard view concludes that economics can be value-free. This perspective does not deny the influence of values towards the inquiry of economic research and evaluations. This view argues that economics is value-free because values do not influence a question's answers. The positive side is that these inquiries are relevant because the answers are value-free and can illustrate which policy succeeds in reaching the valued goals. However, the inquiry cannot be value-free because values play a much bigger role. Not only in what questions to ask, as the point above illustrates but also in what methods one uses. Consequentially, values influence the methods that can even be regarded and whether they will be conducted.

So how can knowing ethics contribute to positive economics? Why does ethics have a larger role in economics, than the standard view allows it to have? Ethical commitments are not something exogenous from economic institutions and outcomes. Moral beliefs and preferences influence economic outcomes, and economic institutions influence what people believe and prefer. This interaction cannot be

understood when economics denies the relevance of ethics. So economic agents' moral commitments play a role in the causes and effects of economic phenomena, making ethics essential in both positive and normative economics.

To conclude, the standard view from the twentieth century -the desire of economics to be a purely positive science, of which all normative aspects can be disentangled and removed in practice- encounters a wide variety of problems. This conclusion is relevant because if economics were purely positive, the ethical critique of market-based solutions to pollution would become less relevant. We would then conclude based on only empirical research on the effectiveness of this solution to pollution. In contrast, this briefly highlighted discussion on the nature of economics as a science touches on my thesis's exact point; how a desire of purely positive economics falls short in practice. Economics is not purely positive and therefore not disentangled from normative judgements.

2.2 Context of climate change

Now that the relevance of an ethical analysis in general in the context of economics has been established, this section dives into the context of climate change. Why is climate change an ethical issue as well? In *Debating Climate Ethics*, Philosopher Stephen Gardiner and Economist David Weisbach (2016) engage in a debate about the role of ethics and economics concerning climate change. According to Gardiner (2016), "climate change is fundamentally an ethical issue" (p.7), and ethics should, therefore, play a more significant role in international climate policy. Ethics is necessary to identify the relevant problem and to make the necessary decisions. Climate change, therefore, requires serious ethical analysis. Furthermore, Gardiner lists several aspects of climate change policy that are essentially ethical, like intergenerational justice and the fragmentation of effects, which will come up in this thesis later on. Intergenerational justice refers to the uneven distribution of the harms of climate change across (future) generations and fragmentation of effects concerns the ethical issue of harms being mostly felt by poorer nations. Gardiner argues against the economic realist view –the view that ethical concepts are unfit for solving climate change–, of which Weisbach is one, in that their view of the problem is flawed.

Weisbach, in response, highlights the problems with climate ethics. His response criticises philosophical approaches, because "by focusing on climate change and ignoring the broader policy context, the arguments risk producing policies that fail to achieve any of their stated goals in an effective manner" (Gardiner & Weisbach, 2016, p. 141). Furthermore, ethical suggestions often lack feasibility. Also, the economic concept of self-interest would, inreality, result in ambitious climate policies since preventing it is in our self-interest. Interestingly,

Table 5.1
EMISSIONS OF GHG'S INCLUDING LAND USE CHANGE, VARIOUS YEARS
(DATA FROM WRI CAIT)

	Country	1992	2010	Percent increase	Cumulative 1990–2010
1	China	3,362	9,387	179%	112,668
2	United States	5,730	6,254	9%	130,616
3	European Union (28)	4,933	4,386	-11%	99,706
4	India	1,120	2,304	106%	31,738
5	Russian Federation	3,035	2,134	-30%	50,136
6	Indonesia	1,134	2,033	79%	32,183
7	Brazil	1,757	1,393	-21%	39,070
8	Japan	1,146	1,120	-2%	24,991
9	Canada	621	842	35%	16,361
10	Germany	1,037	827	-20%	20,011
11	Mexico	469	706	50%	12,100
12	Iran	310	695	125%	9,871
13	South Korea	316	630	99%	9,657
14	Australia	437	592	36%	10,987
15	United Kingdom	728	579	-20%	13,880
	Rest of the World	12,022	14,877	24%	273,232

Figure 1: Emissions 1992 and 2010 (Gardiner & Weisbach, 2016, p.164)

Weisbach ends by highlighting some raw data on emissions listed per country (see figure 1 for emission levels per country in 1992 and 2010). He highlights this to emphasise the urgency of adopting policies to control emissions. An absence of these policies would result in an increase in emissions from developing countries because emissions have increased the most in the period between 1992 and 2010 (Gardiner & Weisbach, 2016, p. 164).

This type of thinking illustrates the point that ethics does play a role in economics. Firstly, what is behind these figures? These figures show an increase in emissions in developing countries, but completely neglect the world economy's context, which is highly globalised. Weisbach provides us with no context on the origin of these emissions or the impact of the world economy's level of globalisation. He illustrates here that we need to look for policies that ensure emissions will not increase even more, especially in developing countries, since the largest increase will be seen there. This raises the ethical question of why and how we can claim we should aim at keeping emissions in developing countries low. Aren't the developed countries, who made a profit out of emissions of decades, the ones who should play a larger role? Regardless of the answer to this question, it illustrates that the aim of Weisbach – to leave ethics out of the picture– cannot be achieved. Secondly, I wonder where this increase comes from? Are these countries –like China– polluting to produce goods for themselves? Or are other countries involved as well? This graph does not provide answers to these questions. But I think it is not an overstatement to claim these levels of emissions are not as isolated as this graph suggests. How many products from China are you wearing at the moment? If you had to throw away everything you own made in China, what would you have left? Probably not much, illustrating my point. Weisbach fails to acknowledge that there has been a shift of production to low-income countries and that this has inevitably affected the levels of emissions. These are types of questions that we need to ask ourselves when looking at this type of data.

Moreover, this highlights the exact importance of asking normative questions, in this case; should we only look at country levels of emissions? Or, should we take into account the relationship between countries? On an international political level, this 'value-neutral' data would suggest that developing countries should lower emissions and make amends for climate mitigating policies, while developed countries are getting on the right track (or at least their emissions are not rising as much as the others). Framing emissions as something that can be separated on a country level is already a normative statement, when a consumer buys a good made in China, China will inevitably 'own' this emission while the consumer's country will not. An illustrative example of this point is the global waste trade. Wealthy nations export their waste to developing countries (Lipman, 2002) since this is considered to be cost-effective. Moreover, it also relieves rich-nations from some of the pressure from environmentalists protesting against garbage dumps (Nixon, 2011). Besides the obvious issues to developing nations having to deal with all the negative consequences of this (toxic) trade for their public health and their land prospects, this is also problematic since it alleviates rich countries from the direct local impact of their pollution. I am not saying that developing countries are not polluting, since due to rising GDP and other factors there will be increased pollution. However, my point is that one's position on these types of questions and discussions plays a role when someone, like Weisbach, mentions research on emissions

levels. Looking at country levels does not make sense when having these kinds of practices in mind. This kind of comparison of country emissions includes implicit normative judgements. So, even if one does not want a role of ethics in the discussion, implicit normative judgements are still present.

Climate change as a moral issue

Besides the technical discussion, which the section above illustrates cannot be isolated from the normative domain, climate change also raises questions of morality. Its effects will harm humans, and other forms of life on earth, impacting human welfare in morally relevant ways. Furthermore, among the nations that contribute to pollution, the largest polluters are not necessarily suffering from the consequences. Hence, the effects of climate change have an unfair impact, which raises questions of fairness.

Climate policy is not merely a matter of economic optimisation, but "often framed in moral and ethical terms" (Monast, Murray, & Wiener, 2017, p. 136). Rights to a stable climate and future generations' rights are examples of arguments used to mitigate CO₂ emissions. Think about the impacts climate change has and will have on the well-being and health of people. The Dutch Supreme Court recently ruled that the Dutch State should reduce greenhouse gas emissions by 25%. The basis for this ruling can be found in "the Dutch State's legal duties to protect the life and well-being of citizens in the Netherlands, which obligations are laid down in the European Convention for the Protection of Human Rights and Fundamental Freedoms (the ECHR)" (Hoge Raad, 2019). Also, climate change has a disproportionate effect due to the inequality between countries vulnerable to the impacts of climate change and countries with the highest levels of emissions (Althor, Watson, & Fuller, 2016).

A real-world example that illustrates how ethics comes into play when talking about pollution is the World Bank memorandum published in *The Economist* in 1992 (Hausman, McPherson, & Satz, 2017). The Economist published an internal memo by Lawrence H. Summers, the Chief Economist, of the World Bank in 1992. The memo's main message was that there is an argument for the migration of polluting industries to less developed countries, based on three points. First of all, the health-related costs associated with pollution depend on the loss of earnings due to increased mortality. These costs will be lowest in countries with low wages making the move of polluting industries to low wage countries cost-efficient. Secondly, the costs of pollution are non-linear, making it more effective to move pollution to areas that are not facing high levels of pollution. In the memorandum, these countries are called 'under polluted' countries. Thirdly, demand for a clean climate has high income-elasticity, which means that this demand for clean air and climate increases substantially when income increases, making it welfare-enhancing to move pollution to countries where overall income levels are lower. "A given amount of health-impairing pollution should be done in the country with the lowest cost, which will be the country with the lowest wages," said the memo. This memorandum illustrates the existence of normative economics (Hausman, McPherson, & Satz, 2017). It shows how economic logic can lead to conclusions on which few would call 'value-free. Later in this thesis, I will come back to the World Bank Memorandum case. To sum up, talking about the economics of climate change touches upon various ethical issues and also the discussion

on the positivenormative dichotomy in economics.

Let us revisit the main theme of this chapter, namely the relevance of an ethical analysis for the study of climate change. We can conclude that 1) there is no pure positive economics, and 2) economics is not purely positive and therefore not disentangled from normative judgements. Finally, in the context of climate change, ethics has to play arole and economic analysis trying to be completely 'positive' makes many implicit value judgments leading to conclusions far from 'value-free'.

3. The economic approach to climate change

An ethical analysis in the context of the economics of climate change is of importance. This brings us to the next stage of this thesis, namely the economics of climate change and specifically emission trading. Before I start the ethical analysis, this chapter describes the economic background on which climate change reduction policies take place and the efficiency arguments in favour of emission trading. By answering the following questions: *what is the economic approach to climate change, specifically emission trading, and its efficiency argument?*, in this chapter, I will explain the economic approach to climate change, welfare economics, cost-benefit analysis and emission trading. The latter is of importance to grasp since it is the economic basis of the EU Emission Trading Scheme (EU ETS), regulating 45% of European greenhouse gas emissions making it the largest emission trading system in the world (European Commission, 2021). The economic approach to climate change gives a basis on where the reasoning for emission trading derives from. Welfare economics is the branch of economics that enables us to conceptualize the effects on welfare for society. This is important when climate change policies are put in place since welfare economics enables one to illustrate the effects on welfare. In policy-making/analysis cost-benefit analysis is the tool used to abstract the welfare consequences. This theoretical background will be of importance to the ethical analysis in the following chapters in which I will illustrate the ethical limitations of the economic approach and later the recommendations for reforming EU ETS.

3.1 Economics and climate change

When referring to the economics of climate change, there are two main theoretical approaches: environmental and ecological economics. Environmental economics began as a sub-field of neoclassical economics incorporating the notion of sustainability. This branch will be the focus of my thesis because this is still widely considered 'the economics approach' to climate change, and the basis for emission trading can be found there. A different school of economic thought is ecological economics, which considers the economy to be part of a larger ecosystem and therefore taking a more interdisciplinary and pluralistic approach to environmental issues. It combines the fields of ecology, "the study of the relations of animals and plants to their organic and inorganic environments", and economics, "the study of how humans make their living, how they satisfy their needs and desires" (Common & Stagl, 2005, p. 1). Ecological economics, therefore, deals with the interactions between ecological and economic systems, the latter being a partly subfield of ecological systems. Within neoclassical economics, this relationship between humans and nature's housekeeping is mostly ignored. Both ecological economics as well as environmental economics focus on environmental problems and economics; however, they differ in seeing economics as part of the large ecosystem. It is good to be aware that also within economics there are other approaches, like ecological economics. However, when I refer to the economic approach in this thesis I refer to the neoclassical economic approach. I will elaborate on the neoclassical economic view since this is the branch of economics guiding policies with the most influence (Atkinson & Hackler,

2010).

Environmental economics

The focus of the economic approach to climate change is found within environmental economics, but what does this economic approach entail? The branch of economics concerned with environmental problems is referred to as environmental economics.

"Environmental and resource economics is concerned with the allocation, distribution and use of environmental resources" (Perman, Ma, McGilvray, & Common, 2011, p. 56).

Environmental economics studies market failures, specifically externalities, and their means for correction by for example government intervention. An important theoretical basis for the study can be found in welfare economics, a framework that enables economists to make inferences about designs of economic activity like the allocation of resources and their effects on welfare. Economists can use this method to rank different states of the world against a social welfare function. To compare policies, economists and researchers use cost-benefit analysis as a tool to compare several policy options with a range of effects after deducing the costs and benefits. A more profound analysis of welfare economics and cost-benefit analysis is given in the following parts of this chapter. But for now, let us return to environmental economics, its involvement with climate change and the options economic theory gives us to deal with climate change.

Why is economics involved with climate change at all? Economic instruments are said to contribute to cost-effective control of pollution. Climate change's impact causes the necessity of changing current consumption and production (Fullerton, Leicester, & Smith, p. 427), which leads to effects on the economy as well. Different economic instruments can be used to limit pollution which all have different costs associated. Governments use these different economic interventions to reach climate goals (Fullerton, Leicester, & Smith, p. 427). Economics, the study of analysing the allocation of limited resources, price, and income formation (James, Jansen, & Opschoor, 1978), is an important arena for developing strategies to limit pollution and reach climate goals. Natural resources are, after all, also scarce resources and a domain economics is concerned with. Besides reaching climate goals, another question pops up for which economics comes to play a role as well. This has to do with economic growth, which can be used to contribute to the alleviation of poverty by enlarging the total amount of resources available (the size of the pie). However, natural resources are scarce and thus limited, resulting in the "sustainability problem" (James, Jansen, & Opschoor, 1978, p. 16), referring to the tension between alleviating poverty (enlarging the size of the pie) but at the same time looking at the scarcity of natural resources. This problem raises questions of how to alleviate poverty without devastating future economic prospects due to the natural environment's effects. Natural resources are scarce, which poses a potential issue in achieving (future) economic progress. So consequentially, economic approaches to the environment pose new questions on how to deal with this scarcity. A solely *positive* approach to economics is not always enough, as I argued in the previous chapter when I illustrated how the positive and the normative parts are linked. The former being concerned with descriptive questions, the latter answer questions on what one

ought/ should do under specific circumstances⁵ (Perman, Ma, McGilvray, & Common, 2011).

Why does climate change occur according to environmental economics? The theory of market failure becomes important when trying to understand how economics explains climate change. Environmental economics is concerned with market failures and how to correct those. Market failure is a situation in which the distribution of goods and services in a market is inefficient. According to economics, the economic situation in which there is no market failure is when this allocation is completely efficient. This is referred to as a perfectly competitive market. Under a list of assumptions, which will be dealt with more extensively in the section on welfare economics, a perfectly competitive market equilibrium is reached and there are no ways of improving efficiency. Pollution, which in turn leads to climate change, occurs, according to economics, because of a market failure of the type externalities. Economics regards pollution as a negative externality; “if environmental deterioration takes the form of an addition to the environmental factors, we may speak of pollution” (James, Jansen, & Opschoor, 1978, p. 7). Why does it occur? Pollution occurs due to the non-existence or non-enforcement of property rights and shared use of the environment leading to a lack of responsibility (Perman, Ma, McGilvray, & Common, 2011). *The tragedy of the commons*, which states the process that a common natural resource being used by a group of people will become extinct if everyone would use it for its gain, describes this phenomenon (Hardin, 1968). The impacts of pollution on the economy are described in the theory of externalities, defined as: “a cost or benefit that occurs when the activity of one entity directly affects the welfare of another in a way that is outside the market mechanism” (Rosen & Gayer, 2014, p. 73). Externalities are situations in which one person’s or firm’s behaviour affects the welfare of another outside the market (Rosen & Gayer, 2014). For example, a firm pollutes the air which makes others worse off. However, since there is no market for clean air, the polluter does not pay for this effect on others welfare. Due to market failures like externalities, governments can regulate the market and create/mimicking the (perfectly competitive) market⁶. Therefore, the equilibrium reached on the market is different from the socially optimal equilibrium. In the case of negative externalities, this will cause prices to be lower than desired and output to be higher, leading to lower social welfare. In the case of pollution, there is too much production. If external costs were to be internalised, another equilibrium would be reached.

Now that the theoretical basis has been established, how can one correct these market failures? Market failure is often used as an incentive and justification of government intervention (Perman, Ma, McGilvray, & Common, 2011). Due to a suboptimal level, there is a possible improvement in market conditions. There are different ways for the government to intervene in the market (or correct it) when presented with externalities or other types of market failures. Governments can make use of direct or indirect interventions. Direct interventions consist of the prohibition of certain forms of polluting actions by regulations or emission standards. These instruments make use of obligations or restrictions regarding the behaviour of firms and consumers (Perman, Ma, McGilvray, & Common, 2011). Indirect

⁵ For discussion on whether this is a dichotomy or not see: (Hands, 2012) (Friedman, [1953] 2007).

⁶ There are many forms of market failures, of which externalities are one of. Others are information asymmetries, monopolies, public goods and common pool resource (Lodge & Wegrich, 2012).

interventions consist of a tax on negative external effects (Pigouvian tax⁷) and therefore creating an incentive to reduce this negative activity by making polluting behaviour more costly. Putting a price on the external effect of for example pollution, makes it more costly to pollute and, therefore, the total level of pollution will decrease. An alternative approach to the problem of externalities is the market approach (also known as cap-and-trade) (Rosen & Gayer, 2014), which I will touch upon in the next section. There are different criteria applicable to choose between instruments, of which cost-effectiveness has been a dominant one. The appropriate level of pollution that ought to be reached in a perfectly competitive market is determined by measuring the costs and benefits (cost-benefit analysis) to determine the optimum level of control.

3.2 Welfare economics

Another field of economics that is an essential contribution to environmental economics is welfare economics. As seen above, it is of importance in environmental economics to see the welfare effects of several options it proposed to deal with market failures like pollution. Welfare economics enables economics to evaluate the desirability of different economic situations. Welfare theory "focusses on the desirability of reaching certain outcomes of the economic process described, given a range of possible outcomes achievable via explicit changes in the basic variables" (James, Jansen, & Opschoor, 1978, p. 3). This theory can be used to reach these socially desirable situations by differentiating situations where markets perform well from when they fail. Desirability in welfare economics is dependent on both efficiency and equity. This desirability is visible in the two fundamental theorems of welfare economics, efficiency in the first welfare theorem and equity, being the normative aspect, in the second welfare theorem.

The first welfare theorem states that "[e]very competitive economy is Pareto-efficient" (Nas, 2016) which means that any economy in coherence with the conditions of a perfectly competitive market will reach Pareto-efficiency. A perfectly competitive market assumes that there are many sellers and buyers, products are homogeneous, and there is perfect knowledge. Firms can freely enter and exit the market, and all have the goal to maximize profit. This way, demand and supply will meet at an equilibrium which is Pareto efficient (Fleurbaey, 2016). This theory has its origins in the invisible hand idea of Adam Smith (1776) (Hausman, 2018). Pareto efficiency refers to a situation where one cannot be made better off without making another worse off, i.e., no potential Pareto improvement possible (Nas, 2016, p. 15). A Pareto improvement is a change that makes at least one individual better off without making any other individual worse off. Nevertheless, this perfectly competitive market is not something that we see occurring in the real world. As illustrated by Friedman ([1953] 2007), these assumptions are not problematic if they help the economic model to gain predictive power. Market failure, being a deviation from this perfectly competitive market, is visible everywhere. One can ask whether this perfectly

⁷ A Pigouvian tax is a tax based upon the theory of Pigou (1920). He argued for a tax at the level of the negative externality. So if buying a product cause harm to another third party, Pigou would suggest to put a tax on this product at the level of the harm caused. That way the costs are internalized into the market transaction.

competitive market even exists. The answer to this question would be: only in economics textbooks. A perfectly competitive market illustrates the market that would exist in case all assumptions would apply. Products are not often homogenous in reality, and competition is also not always perfect like the theory assumes. Also, consumers do not always have complete information on the different suppliers and externalities -impacts on third parties that are not part of the exchange- often occur in reality. However, what this theory does provide us with is that if these conditions were to be satisfied, perfectly competitive markets will lead to Pareto optimal outcomes.

The second welfare theorem entails that any Pareto optimal state is achievable with perfectly competitive markets as soon as there is a redistribution of initial endowments. So, this theorem introduces the notion of redistribution. The first fundamental theorem of welfare economics gives information on all Pareto efficient points, but not yet on the final distribution⁸. To make these types of decisions, one should make value judgements since it requires one to make up a social welfare function (Rosen & Gayer, 2014, p. 45). Value judgements are necessary because, given all the possible efficient points that can be reached, one can choose which one to go for depending on what distribution is considered fair. If one could pick two different efficient allocations, one could decide that the worst off should benefit the most (as under the difference principle⁹ of Rawls (1971)) and pick this allocation. The second fundamental theorem of welfare economics illustrates that "society can attain any Pareto efficient allocation of resources by making a suitable assignment of initial endowments and then letting people freely trade with each other" (Rosen & Gayer, 2014, p. 45). So, in conclusion, it can ensure equity without giving up on efficiency.

How are welfare economics and environmental economics connected? Welfare economics provides the basis on which economic tools for evaluating environmental policies are based (Gowdy, 2004). The two fundamental theorems of welfare economics provide a basis "for employing benefit-cost analysis, that is, for searching for policies that maximize the positive differences between benefits and costs" (Stavins, Wagner, & Wagner, 2002, p. 5). Cost-benefit analysis, which will be discussed in chapter 4 more extensively, is one way operationalizing the theoretical findings of welfare economics. And, it is also one of the main tools used in environmental economics to provide policy advice. Hence, in essence, environmental economics and welfare economics are linked, and welfare economics provides a basis for analysis in environmental economics.

3.3 Emission trading systems

So, now that reasons for government intervention have been established, this part dives further into the market-based approaches. A market for emission permits sets a limit on the total quantity of emissions, but the regulator does not determine the allocation of the emissions among a set of sources (Rosen &

⁸ The improvement is grounded on the Hicks-Kaldor improvement, which is a change where gainers are able to compensate losers.

⁹ In Rawls's *Theory of Justice*, he introduces the difference principle as a guiding principle of justice. It means that social and economic inequalities are justified if they benefit the members of society who are least-well off (Rawls, 1971).

Gayer, 2014). This system is also referred to as a *cap-and-trade system*. It consists of a cap, which is the total quantity of emissions allowed, and it is possible to trade emissions between the participants of this system. The rule is that it is impossible to pollute beyond the number of emission permits one has, otherwise, there will be a penalty or another sufficient deterrent mechanism. An assigned authority decides the initial allocation of permits. This allocation can be done based on different methods: selling permits through an auction (Perman, Ma, McGilvray, & Common, 2011, p. 225) or allocation through a distribution rule. If the permits are freely allocated at the start, on what grounds are they distributed? The first option is *Grandparenting (or grandfathering)*, which assigns permits based on emissions' historical account. Another option is *benchmarking*, in which firms receive allowances based on specific performance standards. These standards can be established for different sectors (Fixed Sector Benchmarking). So, to sum up, there are three different methods possible for the initial allocation of emission permits: grandfathering, auctioning, and benchmarking (International Carbon Action Partnership, 2017). Once the allocation of permits is established, there is trade possible between the different polluters (firms) (Perman, Ma, McGilvray, & Common, 2011, pp. 223-224). The rule of supply and demand determines the price for these emission permits. If firms find ways to reduce emissions below the level of their permits, they can sell these permits to other firms that have higher levels of emission.

How and why does this trade work? The trading system introduces a market for emission permits where before there was no financial incentive to reduce emission levels. This trading system introduces a trade-off for firms in the following way. Due to the market system, a firm either has to reduce total emissions or buy permits to legally emit their pollution (otherwise they can be fined). Firms can acquire additional emission permits on the market for emission rights. This market for emission rights is an economic market where buyers and sellers meet and, on this market, there is a single equilibrium price at which firms can trade. Firms that have more permits than they emit can sell them on this market. On this background, the following section will go into the critique of this type of solution to climate change: namely, the market-based solution.

In practice, this approach has been applied to several parts of the world as part of governments policy to reduce CO₂ emissions. In 2005, the EU implemented the first international emission trading system remaining the largest in place today (European Commission, 2021). During the years the EU Emission Trading Systems (EU ETS) had many phases in which revisions have taken place. Starting with a pilot in 2005, several phases have made several changes to the system as we know it today. Free allocation of emission permits has been reduced, non-compliance penalties have been increased, the pace of emission cuts has been increased and the Market Stability Reserve was introduced in 2019. The latter is a reserve of surplus on this market for emission rights to increase resilience to demands shocks by for example economic crises. Since this system is the largest in place today, the ethical limitations to emission trading, as becomes visible in chapter 4, can be of usage for possible reforms of EU ETS in the future.

3.4 The efficiency argument of emission trade

What are the advantages of a market approach like EU ETS? On what grounds can there be a preference for an emission trading scheme over other environmental regulation types? The arguments for such a system, in short, is the following: market solutions are a more efficient way of reaching reductions in pollution. In the next chapter I will touch upon the ethical critique on such an approach, but, for now, the following section explains the argumentation for this effective way of reaching targets by the usage of emission trading.

Emission trading ensures that emissions are cut where the cost is the lowest. It gives a financial incentive for polluters to cut back to meet the target and/or sell permits in case reduction is cheaper than permits' costs. This argumentation is put forward by Faber (2012) in the following way:

- 1) The government decides a hypothetical threshold of air pollution, making up the reduced level desired.
- 2) Thus set an overall limit of emissions (a cap)
- 3) Allocate this amount of emission permits
- 4) The market (trade) of these permits will lead to the most cost-effective way to reach this solution
- 5) Because firms with the lowest costs for emission reduction will trade to the more costly firms.
- 6) Total emission control costs are minimised (Faber, 2012).

So, creating a competitive market for pollution will result in an equilibrium where the cap (total amount of emissions) is reached at a point where “no further trades are possible because total emissions control costs have been reduced as much as possible” (Faber, 2012, p.6). So, the main idea of a cap-and-trade system is that emission trading enables to reach the desired level of pollution reduction with overall relative lower costs compared to a direct regulation like a tax. According to Schleich & Betz (2005), the emission trading instrument's objective is cost-efficiency, defined as: “to achieve a given environmental target at minimum costs” (p.1496). This is because the abatement costs will be included in the market price for emission permits. Furthermore, this market price will “induce demand for innovative, energy/carbon saving processes, products and services”. So, emission trading will introduce demand for research and the invention of innovative solutions to reduce emissions. This makes emission trading “a demand-oriented regulation” (Schleich & Betz, 2005, p. 1496).

4. Ethical analysis

Now that we have established the relevance of an ethical analysis in combination with the economic approach, this section touches upon the ethical issues with this economic approach to climate change. Therefore, this section answers the following question: *what are the ethical limitations of market-based approaches to climate change?* This is to illustrate the role of ethics in the economics of climate change and specifically market-based solutions. I will illustrate that the way market approaches value nature suffers from several ethical problems and by its reliance on willingness to pay it bases this value on what people are able to pay. An ethical analysis of market-based approaches illustrates and deepens the understanding of how the two are interlinked and what are the limitations of a solely economic approach. Also, I will illustrate how more inclusive concepts like total economic value can help us get closer to incorporating some of the limitations (but not all). This all serves as a basis for the next section in which I will apply the issues emerging from this analysis to an actual market-based solution to climate change in place: European Emission Trading Scheme (EU ETS) in order to answer the following question: *How can we use this ethical critique to reform market-based solutions, specifically EU ETS?*

Before diving into the several ethical issues that arise from the way the market approach values nature, I will start with an example of how economists look at the problem. In the ethical analysis, issues might, at first, seem very abstract and far detached from the urgent reality of climate change. This example aims at illustrating what happens when we let the issue at stake in hands of economists alone. As shown in chapter 2, leaving it alone to philosophers might not be an answer to that. Because in the end, this issue is real and urgent, meaning simply listing the problems might not be the most helpful approach. In the next chapter, I will, therefore, illustrate how we can use this critique within the existing economic framework of emission trading by giving several recommendations for the next phase of EU ETS. After all, what would be the use of my critique if one cannot apply it?

Economic optimum but uninhabitable world

Economics, being the study of scarce resources, seems the perfect domain for questions about climate change. The challenge is how to reduce CO₂ emission at the lowest costs while keeping up with, for example, enough jobs for everyone. However, solving climate change is not done by simply calculating the optimal level of pollution (and global warming), like famously done by Nordhaus (2018). An example of how economists look at climate change is visible in the study of Nordhaus (2018), who won the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. Nordhaus was awarded this prize for his work on incorporating climate change in macroeconomic analysis. A field in which he has done much research on the interactions between climate and the economy, that is being used for analysing the effects of climate reducing policies. In one of his studies (2018), he illustrated that the future total costs depending on the total increase in temperatures in the world would optimally be 4 degrees Celsius. Last year, Nordhaus told that the 2-degree scenario, as set out in the Paris agreement, is not possible to reach (Swissinfo, 2020).

To argue against this 4 degrees scenario, Steffen (2011) describes how this world would look. The consequences of this higher temperature vary from areas too hot to live for humans to the devastation of large areas due to the rise of sea levels 20-40m. These are all leading to an estimated maximum carrying capacity in the world of around 1 billion people (to illustrate, today's population is 7.5 billion). According to Keen (2020), the economic forecast on the economic damages caused by climate change has been quite optimistic compared to climate scientists. Many reasons underlie this difference, one of those being the absence of tipping points in calculating the damage global warming causes on GDP (Keen, 2020). A tipping point is a small event or change which has a disproportionately larger effect in return. Once a smaller increase in temperature is reached, this can cause certain other events to happen with a much larger total effect. An example of a tipping point is the melting of ice, due to rising temperatures ice is melting. Once the top surface of ice is slowly melting, which is happening in Greenland for example, the ice sheet will move down. Temperatures on mountains get warmer once one climbs down. Thus, if ice melts and moves down, temperatures there are even higher causing even more ice to melt. This feedback loop is an example of a tipping point with potentially huge effects. The ice sheet of Greenland could, in total, make sea levels rise by seven meters (The Guardian, 2020). Once a tipping point is reached, the damages are irreversible (Lenton, et al., 2019). A tipping point could already be reached at 1,5°C with many more to follow. It remains hard to see how 4°C can be the optimum considering the number of cities (including large capitals) below the new sea levels. Ignoring tipping points in economic analysis, as Nordhaus does, can be very problematic in understanding the effects of climate change on society but also on the economy. In the case of the tipping point of melting ice, the resulting additional rise in sea levels can have enormous effects on the economy since many places will become part of the sea and thus inhabitable. According to Keen (2020), this discrepancy between what climate scientists claim would be the 'optimal level' of temperature increase and economists like Nordhaus, lies in the assumption economists make about the damages of climate change on the economy. Part of this is the ignorance of the existence of climate change, but also there is the assumption that 90% of GDP will not be affected by climate change at all.

This is just one example of how the way some economists look at the effects of climate change does not correspond with the real-world consequences that follow. Nonetheless, one could claim that assumptions are needed to be able to make predictions at all. So, arguing that the assumptions are not following the reality is not enough to claim that it is a problem. According to Friedman ([1953] 2007), assumptions are necessary to make correct predictions. Assumptions are always unrealistic; they are allowed based on the predictive accuracy of the model's implications. So, there would be no issue with using unrealistic assumptions as long as this results in accurate predictions. This view has been very dominant in economic methodology, and one can undoubtedly criticise his theory on many grounds¹⁰. We can consider the realism of assumptions and the discussion on whether assumptions have to be realistic at all. According to Friedman, the accuracy of the model's prediction is all that matters and the realism of

¹⁰ See (Ivarola, 2018), who gives a critique on this theory of Friedman.

assumptions is not of importance. Others, like Mäki (2009), argue differently since they test models through the accuracy of the assumptions. So, there are certainly those who claim that unrealistic assumptions are problematic. However, even if one would agree with Friedman's approach, there are also grounds based on predictive power on which the examples I have proposed above are problematic. How can a model, which assumes the non-existence of tipping points, successfully predict the effect global warming will have on global GDP? I guess time will tell whether these models succeed in predicting the effects of climate change on GDP. But with recent IPCC (2021) report in mind, this 4 degrees scenario sounds far from desirable.

Value beyond the market domain

To come back to the claim of this thesis, there is room for improvement within EU ETS found in the critique on market-based approaches to climate change and the ways they value nature. This section will touch upon several issues with the way nature is valued. After a short refresher on how the economic, and specifically market approach, deal with valuing nature and an explanation of cost-benefit analysis, several issues with this approach are the guideline of this chapter. I start with explaining the distributional issue, which refers to the blindness of cost-benefit analysis to distributional issues and following how cost-benefit analysis reliance on willingness to pay also ignores distributional issues. Following, I explain the second issue with cost-benefit analysis namely the incommensurability issue, the issue of how to measure the unmeasurable, of which the notion of willingness to pay, non-economic value and reducing the environment to a marketable good are associated issues.

4.1 The tool cost-benefit analysis

In chapter 3 we have seen how welfare economics lays the theoretical basis for (environmental) economics to studying the effects on social welfare. To compare policies on their relative effects on welfare, cost-benefit analysis is often used. Cost-benefit analysis is a (comparative) tool from economics that can be used as a technique to compare net social benefits and costs of a specific action, plan or policy (Hanley, 2013). It can be used to compare policies or other plans by assessing the difference in effect on well-being, by measurement of all the economically relevant values. It proceeds by calculating the social benefits and costs, discounting these over the entire run of the plan and followed by a comparison. The costs and benefits are articulated in monetary values, based on willingness to pay and opportunity costs. The difference indicates the change in net social welfare. The establishment of this method came from a desire to compare different actions based on their outcome. Welfare economics managed to develop this tool (decision-making rule) from society's perspective (Hanley, 2013).

How does cost-benefit analysis rely on welfare economics? The Kaldor-Hicks compensation test provides the background framework of cost-benefit analysis. This test asks whether the 'losers' can be compensated by the 'winners' and still be better off. This test leads to the principle as "the basis for evaluating contributions to social well-being" (Hanley, 2013, p. 17). According to the Kaldor-Hicks principle, a policy or plan improves social well-being if this test is met. The "Pareto criterion for an

improvement in overall well-being" is the justification for this (Pearce, 1998, p. 85). Pareto criterion refers to the Pareto efficiency notion introduced in chapter 3 (stage reached where no one can be made better off without making someone else worse off). Although there are many objections and arguments to be made against this approach, clearly there are some rationalities to this way of thinking making it a "reasonable basis for making a decision on what society should do" (Hanley, 2013, p. 21). In the same way that Pareto Optimality serves as a basis for what goals are desirable, as illustrated by Anderson (1993), in cost-benefit analysis desirability is derived from maximising Pareto improvements where possible. Because, since it is possible to select a policy in which there are fewer costs or more benefits, one has the option to pick the policy option with fewer costs or more benefits and compensate the 'losers' (Anderson, 1993).

Cost-benefit analysis helps create a clear image of the impacts of several policy proposals on society, i.e., for comparison (OECD, 2018). Therefore, it is "extremely valuable information for decision-makers" (OECD, 2018, p. preface). Various techniques are developed through the years in the area of environmental cost-benefit analysis. A reason to use cost-benefit analysis is that it "provides a model of rationality" (OECD, 2018, p. 32). First of all, cost-benefit analysis insists on including all gains and losses and therefore helps to widen the view of decision-makers. Secondly, it gives a series of options. It can give "the optimal scale of the policy" (OECD, 2018, p. 32), in which benefits are maximised. From a societal perspective, cost-benefit analysis –used as a conceptual framework– compares several policies by their corresponding net welfare effects on society (Nas, 2016). Compared to a *baseline scenario* –the welfare developments without the action– the approach calculates the welfare changes. To do so, cost-benefit analysis first describes the market failure and thus, the policy problem followed by the baseline scenario and the actual intervention in the form of a policy. It is necessary to quantify the costs and benefits relative to the baseline, to compare policies. Usually, this is done based on market values. However, often there is no market available, or valuation data are absent (non-market goods). Non-market values can be both of use and non-use, and there are different methods to value these (Nas, 2016, pp. 107-117). Thirdly, it includes the factor of time by using discount rates. These are rates used to give value over the costs and benefits across time (Nas, 2016, p. 146). Fourthly, it includes individual preferences and therefore argues that preferences count. Preferences are categorised into individual preferences. Finally, cost-benefit analysis favours explicit values expressed in monetary terms (OECD, 2018, p. 33).

Issues with cost-benefit analysis

Cost-benefit analysis is thus an approach used in many different fields and levels to determine whether a particular action (A) is to be taken or not by weighing the benefits and costs. So "do A if its benefits exceed its costs, and not otherwise" (Pearce, 1998, p. 1). However, how to determine and measure these benefits and costs? How to arrive at the value that individuals give to things? There are two main problems to cost-benefit analysis: the *distributional issue* and the *incommensurability issue* (Pearce, 1998). Firstly, cost-benefit analysis cannot deal with the socio-economic distributional effects of the benefits and

costs since it looks at the overall net benefit. Secondly, there is the issue of incommensurability: how one can measure two or more things that do not have a standard measure? (Pearce, 1998, p. 84). This issue includes the challenge of finding a correct monetary value for several objects ranging from environmental to health-related. For cost-benefit analysis to meet the government's¹¹ objectives, it needs to find the "shadow prices" meaning the monetary value that can be assigned to goods that are hard to value (Pearce, 1998, p. 2).

4.2 The distributional issue

Cost-benefit analysis provides a map through all the different policy options by looking at the most efficient use of economic resources. However, besides thinking about efficiency, there are other concerns about the desirability of a particular project. When cost-benefit analysis lists the several associated costs and benefits it looks at overall net benefit and costs. By doing so, cost-benefit analysis is blind to the distribution of these costs and benefits. Selected policies do impact the distribution and thus, the social desirability of a project. In this section, I claim this ignorance of distributional aspects is problematic from different points of view. Even if one would claim it is not a problem because the best way is to treat everyone impacted equally, I show that this is an ethical position making cost-benefit analysis therefore subjected to the critique of being ethically ambiguous. In the following subsections, I will dive further into how the distributional issue pops up in using willingness to pay.

What is the distributional issue of cost-benefit analysis in general? Cost-benefit analysis can provide an overview of the net costs and benefits of several options, making it an attractive tool to use. However, while cost-benefit analysis is mainly focused on reaching growth or efficiency, it tends to ignore the effects on distribution. It leaves us in the dark where the net benefits end up and which part of the population is to bear the costs. A net benefit can be very unevenly distributed, the question arises whether this matters (OECD, 2018). The Kaldor-Hicks criterion is the basis on which the claim can be made that it does not matter. Because, after all, if the policy is chosen with the greatest overall net benefits, one could compensate the losers. Because total net benefits are maximized, the size of the pie is the largest and so one can use this to compensate those who bear the costs. Because a Pareto improvement increases net welfare, it creates wealth that can be used to compensate the disadvantaged ones (Anderson, 1993). In this section, I argue that cost-benefit analysis, by doing this, is taking a normative claim and I will illustrate why this is problematic. Furthermore, in the next subsection, I will dive into the concept of willingness to pay and its issues, which are also distributional issues.

As Anderson (1993) shows, the concept of overall net benefit is not concerned with distributional problems, since it neglects the distributional effects of the options nor looks at whether this compensation for the losers actually takes place. The Kaldor-Hicks compensation is a hypothetical situation, and cost-benefit analysis does not require losers to be actually compensated (Richardson, 2000).

¹¹ In public policy (according to welfare economics), the goal is to maximize social welfare (Pearce, 1998, p. 2). What welfare entails is subjected to debate.

There have, however, been made attempts to resolve the distributional issue according to Pearce (1998). But, according to him, it “was never fully resolved” (Pearce, 1998, p. 86) for those who acknowledged and aimed at addressing the issue came up with the solution of applying distributional weights. These are weights attached to a specific cost or benefit depending on the income of the person involved. So, in short, if one cares about inequalities, one can use these distributional weights to the costs or benefits depending on income. There is even an economic theory that gives foundation to this adjustment, namely, the declining marginal utility of income. This, in short, means that the utility one derives from an extra unit of income declines as income increases. So, one who earns not that much and gets an extra euro will derive much higher utility compared to someone with a high income also receiving an extra euro. However, according to Pearce (1998), not all thought distributional issues were best addressed by incorporating them into cost-benefit analysis. Some argued that cost-benefit analysis was not the best arena for addressing distributional issues. Therefore, incorporating distributional issues into cost-benefit analysis remains a debatable point.

So, what is problematic about this neglect for distributional issues present in cost-benefit analysis and welfare economics? The essence of my critique on this neglect can be best illustrated by drawing an analogy to Rawls’ criticism of utilitarianism. In short, this critique comes down to similar objections to the World Bank memorandum case, namely, something can be Pareto efficient but very unjust. This critique is similar to that of Rawls on utilitarianism. Utilitarianism and cost-benefit analysis/welfare economics are not one and the same, but utilitarianism has had a great influence on the development of contemporary economics (Hausman, McPherson, & Satz, 2017). Just like welfare economics, utilitarianism focuses its “assessment entirely on the consequences for individual well-being” (Hausman, McPherson, & Satz, 2017, p. 107). Consequently, we can look into utilitarianism’s main critiques to find some of the issues with cost-benefit analysis. When looking at cost-benefit analysis at first, one might intuitively feel there is much to say in favour of it. Because, if you have to make choices, why not make them at the least cost? Moreover, only if there is more benefit to society for it than actual costs? However, in this lies the tendency of economics as a discipline to become ‘value’ free, as illustrated in chapter 2, where I show how ethics plays a role in economic thinking. However, this way of thinking about whether an action is good or not is, in essence, a philosophical endeavour, just like utilitarianism explains why maximising net benefits is desirable like famous utilitarianists, Bentham (1907) and Mill (1843), claim. To illustrate this issue with cost-benefit analysis, I will first explain the essence of utilitarianism and some of its main critiques. This is followed by applying this critique on cost-benefit analysis by highlighting the distributional issue further.

Utilitarianism, having varying forms, in essence views something to be morally right if it produces the most good (Driver, 2014). According to Bentham (1907), actions are right if they promote happiness (or pleasure) and are wrong when they result in unhappiness or pain. Mill (1843) followed up on this theory and distinguished between different types of pain and pleasure (where Bentham focused only on quantity). A utilitarian is, accordingly also a consequentialist, referring to “the doctrine that one

should judge things morally by their intrinsic value and by the value of their consequences” (Hausman, McPherson, & Satz, 2017, p. 109). The intrinsic value for utilitarianism is welfare or well-being . What exactly entails this welfare or well-being is subject of debate within utilitarianism. . Maximising welfare or wellbeing is the main goal and, although some differ on whether this is total welfare or average welfare, the actual distribution of welfare is not of importance. The lack of attention towards distribution is an issue posed by John Rawls in his *Theory of Justice* (1971), in which he also develops an alternative theory. One point of his critique on utilitarianism touches upon the issue of distribution. Utilitarianism is only concerned with the total sum of satisfaction, not so much the distribution. This little concern with distribution within utilitarianism is problematic according to Rawls. This is because it would mean that more significant gains for some are permitted, even if they cause much harm to another (Rawls, 1971, p. 23). A society can maximise satisfaction but be very unjust, in the sense that people could be suffering a lot as long as enough others benefit just a bit more. This ignorance of distributional issues goes against a common-sense intuition that each member of society should have fundamental rights and liberties, on different foundations and grounds. Even someone else’s well-being cannot overrule these fundamental rights and liberties. Under utilitarianism, these fundamental rights and liberties could potentially be restricted if there would be greater benefits to others (Wenar, 2021).. Tolerating this limitation of rights should not be possible is the intuitive thought behind this critique of utilitarianism.

This critique on utilitarianism links precisely to the issue of economic analysis because it, by giving equal weight to every cost and benefit involved, treats everyone equally. When the utilitarian discourse is used to guide policy, one can imagine the relevance of this issue. This utilitarian discourse is precisely like the economic view that we examined in chapter 2 when we discussed the World Bank Memorandum. Economic thinking usually does not appear as explicit as in the World Bank case but it is the underlying way of thinking and therefore, an essential point of consideration. When looking at policies aiming to reduce climate change in the real world, one sees how mostly the costs are disproportionately distributed among income groups (Rooijers & Smit, 2016) (CPB, 2019). This disproportionate distribution plays a role on a national and an international level (Vergeer, Rooijers, & Davidson, 2017). The effects of climate reducing policies raise the question: who should bear the costs and who the benefits? Treating unequal people equally will result in a higher burden for lower-income groups¹² (on an international level on lower-income countries (UNDESA, 2020, p. 85)).

Even if one could be able to assign distributional weights to cost-benefit analysis, which in practice is and can be happening, there remains the question of justice. Because what weights would you then assign? Would you only look at the difference in income per person or also include total wealth? What all these questions illustrate is that cost-benefit analysis ignores questions of justice and often policies are endorsed which maximize net benefits but will make others worse off. At these moments questions of fairness pop up and need to be addressed. Without any distributional weights attached, the (implicit) bias

¹² See article of Dutch Newspaper on the burden of climate policy on lower income groups:
<https://nos.nl/nieuwsuur/artikel/2168856-armste-nederlanders-draaien-op-voor-het-klimaatbeleid.html>

against those, in general, being the worst off is more than clear. Should policy not be directed towards those people in the first place?

4.2.1 Willingness to pay and ability to pay

The next issue with cost-benefit analysis is its heavy reliance on willingness to pay. Willingness to pay is an economic concept that refers to the maximum amount of money a consumer is willing to pay for a certain product. This can be measured in different manners; one can ask someone their willingness to pay directly or can indirectly derive it based on the choices consumers made. It is an important aspect of cost-benefit analysis because it enables one to quantify costs and benefits depending on this willingness to pay. This reliance raises two ethical issues, namely: someone's willingness to pay depends also on their wealth, therefore, touching the distributional issue and secondly, it is a quite one-dimensional way to value nature. The second problem I will investigate in the section on the incommensurability problem. For now, let us turn to the distributional issue. This might seem obvious at first but does pose some relevant questions towards the usage of willingness to pay: one can only pay what they have. One is willing to pay what one is able to pay. Meaning that in short, willingness to pay depends on what one has and thus using willingness to pay to derive value is highly influenced by people's wealth. This I claim is problematic.

Value in cost-benefit analysis, and welfare economics, is derived from willingness to pay. As Posner (1998) shows, willingness to pay is a function of the distribution of wealth and income in society. Since willingness to pay depends on the distribution of wealth, and are weighed on basis of monetary values, the poor have little of this and thus have a lower willingness to pay (Posner, 1998), making their preferences count less than those of the rich. This makes willingness to pay a function of the already existing distribution in society (Baker, 1975). So, if one can derive actual market prices, these prices are at their level only because people were able and willing to pay. There were perhaps people willing but not able to pay. When one asks someone, there could still be the willingness to pay but no ability to pay. However, if one asked what to pay for conserving a place, the whole perception of money determines how much someone would be willing to pay. For example, having 1000 euros in savings or no savings at all could already set the basis on which one would think about willingness to pay. Another example is posed by Posner (1998), in this case, a poor family has a child who would be a dwarf if not given a specific medicine. However, the market price of this medicine is too high for this family so they cannot buy it. In contrast, a rich family has a child who will reach normal height, but they decide to buy this medicine to add some extra inches to the child's height. Is the medicine more valuable to the rich family? If one uses willingness to pay as a measurement of value, the answer is yes. So, what one owns (ability to pay) can already determine what one is willing to pay. It comes down to the question: how capable is willingness to pay to account for someone's preference? Distributional issues play a role here since the rich's ability to pay is higher but does this make their preferences automatically stronger? In the case of the medicine, I would claim it is clear the poor family would have stronger preferences for it, and it would have been of greater value. This is because the rich family only decided to buy it for some extra height

but without any medical reasons and the benefits of this specific transactions are -as far as I know- unknown. Sen (2000) highlights similar distributional issues with cost-benefit analysis due to the reliance on willingness to pay. According to Sen (2000), cost-benefit analysis raises distributional issues by weighing everyone's willingness to pay the same irrespectively of for example poverty.

Hausman, McPherson & Satz (2017) also refer to this issue in the World Bank Memorandum case. Someone living in a high-income country would be willing to pay a few hundred of euros for a new phone, while someone living in a low-income country would not even pay this for health-related expenses. Ability to pay is essential in determining someone's willingness to pay and it, therefore, fails to take into account real preferences. So, to sum up, by its reliance on willingness to pay, cost-benefit analysis has the risk of neglecting the real value one attaches to something due to the difference in their ability to pay for something.

4.3 The incommensurability issue

Another problem associated with cost-benefit analysis is the problem of environmental valuation. "How to measure all non-market environment impacts in monetary terms?" (Hanley, 2013, p. 20). Since the monetary value of goods that are not sold on a market, non-market goods, lack a market price and therefore need another valuing method (Layard & Glaister, 1994). This issue, the incommensurability issue, is a complex and profound challenge for applying cost-benefit analysis to the environment. The essence of the incommensurability issue comes down to the following question: how to assign a monetary value to something that does not have a common value? In some cases, value is quite obviously out there, like the value for products you buy in the supermarket. However, for some things it becomes quite hard to derive their value. How would you value a human life for example? Specifically, I will look into the issues with assigning value to the environment since this is the context of this thesis. However, there are many other cases in which this issue reveals itself, for example when in cost-benefit analysis the effect on life is measured, it raises the question of what is the monetary value of a life? For the incommensurability issue in the context of cost-benefit analysis, I will look at the issue of using willingness to pay, non-market/economic values and how still these approaches only allow one to value the environment as a commodity, while one could value it not as a *homo oeconomicus* but as a citizen or human being.

To understand the incommensurability issue, it is of importance to know how cost-benefit analysis values the environment. As illustrated above, cost-benefit analysis lists the costs and benefits associated when evaluating policies. The value of these costs and benefits in cost-benefit analysis is assigned based on people's willingness to pay. How does one derive value from willingness to pay in the context of climate change? Some environmental goods, like forests or lakes, are currently on the market and value can be derived by looking at market choices. On the market, people reveal their preferences and by looking at their behaviour one can derive a corresponding willingness to pay. However, often this market is not present for environmental goods, and one cannot find willingness to pay, and thus value, from this market. Which, in turn, raises a need for another evaluation method. One can derive this

information through surveys, by asking people what they are willing to pay for it, this is called the contingent valuation (CV) method (Nas, 2016). This holds that one asks people how much they would maximum pay for something to happen, or how much one would accept if the project would not take place (Anderson, 1993). All different ways to still acquire data on how much someone values a certain project. Finally, another method is to use information expressed in other markets and apply those to create information on the nonmarket value. There might be other domains in which people express their value for environmental goods on an existing market. An example of this would be how much people pay for a better view from their window on the housing market. Or in the context of valuing life, how much additional compensation one is willing to accept for more dangerous jobs.

4.3.1 Willingness to pay and value

By relying on willingness to pay, cost-benefit analysis also touches upon the incommensurability issue. In this section, I highlight why willingness to pay not only raises issues on distributional terms but also in valuing nature itself. As seen above, there are some options for cost-benefit analysis to acquire someone's willingness to pay. In this way, people's willingness to pay identifies, as a consumer, how they value the environment. However, does willingness to pay reflect how individuals value it? I claim that willingness to pay is a too narrow domain for environmental value.

In cases where market values do not exist, economists, under cost-benefit analysis, use, as illustrated above, different methods to still derive value by looking at willingness to pay. This all to acquire a monetary value for a certain good by each individual. In the context of climate change, this becomes problematic. The reason for this is that this is based on the assumption that people value the environment in a certain way, namely through the market itself, though mimicking the market or by asking what people would be willing to pay. All of these different methods have one thing in common: they are all attempts to obtain value in the market domain. As I have shown in the section on distributional issues, this reliance on willingness to pay is not without issues. Because, due to this reliance, value depends on people's income and consequentially, goods become more valuable as people have higher income. Because the higher someone's income and/or wealth, the more someone is willing to pay. Making it economically sensible to move polluting industries to those places where income and wealth are the lowest, as the World Bank memorandum case shows us. But, besides these problematic consequences with regards to the distributional assumptions of willingness to pay and thus cost-benefit analysis, we can indicate additional issues with regards to the value of the environment.

Firstly, people are, according to cost-benefit analysis, unable to value the environment outside the market domain. Meaning that if someone is not willing (or able) to pay for it, it is not of value. Concerns of the environment only make it through the selection of cost-benefit analysis when one is willing (and able) to pay for it. Otherwise, it is left outside the picture. So, the issue with willingness to pay is that it cannot consider the full value of nature. According to Anderson (1993), willingness to pay is too narrow because people value the environment in many ways that cannot be expressed in their

willingness to pay. This reliance on willingness to pay reduces the environment to a commodity and leaves no room for the environment as a “higher-good” (Anderson, 1993, p. 193). It is solely a good one can value on the market, not outside. But “environmental goods are intrinsically valuable” (Anderson, 1993, p. 206). Many people appreciate nature and therefore value it in ways purely aesthetic, which contrasts with an economic point of view. For example, people value environmental goods, like the rain forest, without having a personal involvement in it. I might value the mere existence of certain groups of animals that are getting extinct, but I do not value these goods extrinsically -that is to say only in the sense that a good contributes to human welfare. So why do many people dedicate their welfare for the sake of preserving nature then? Any case about preserving environmental goods because we value them intrinsically is left outside the cost-benefit analysis picture. This value of the environment cannot be measured in terms of people’s willingness to pay (Anderson, 1993). As Anderson (1993) argues: “we value some environmental goods in higher ways than we value pure commodities” (Anderson, 1993, p. 208), and a market norm cannot express this. So, willingness to pay does not capture everything about how people value the environment. Moreover, values expressed in a consumer’s role does not always include how citizens value nature.

Cost-benefit analysis, therefore, makes assumptions about how people express their value for something. People can only express their values in the market domain, by their willingness to pay. Nevertheless, people value the environment not only because it has an instrumental value –contributing to our welfare– but it also has intrinsic value. As I argue in the next section, another issue with cost-benefit analysis, besides that willingness to pay is a too narrow domain, is that it leaves solving climate change up to the market. The environment is more than a commodity. Later I come back to additional issues that follow from this, namely that reducing the environment to a mere commodity is an inappropriate way to deal with it.

4.3.2 Non-economic value

Entities can have instrumental value or non-instrumental value due to their mere existence (James P. S., 2015, p. 65). Nature can be seen as valuable from an intrinsic or instrumental point of view. Nature receives value since it gives us many things, therefore contributing to human welfare. However, does it have value beyond this? In the cost-benefit analysis we have examined so far, nature is treated to have only instrumental value. The intrinsic value of nature compasses the idea that nature can have a value in itself, independent of the human experience. Instrumental value relates to the economic value assigned to nature which is represented in welfare economics as people’s preferences and their derived utility. However, there are some potential problems to addressing nature as having merely instrumental value. The alternative, intrinsic value -the value of an entity in itself not as a means to an end but the end itself, consists of two different views: subjective and objective intrinsic value (Sandler, 2012). Subjective intrinsic value assigns intrinsic value to something based on how the valuers see this entity. So, because of the way something is judged by the valuers and their attitudes, judgements and/or beliefs, this entity

gets value. It is different from instrumental in that the entity does not serve a specific good. Someone can value the existence of a certain endangered species in itself and thus through subjective intrinsic value. This person does not value it instrumentally because they do not value it in an instrumental way, i.e., wanting to use it for something (Sandler, 2012).

My first point of critique on the instrumental way of valuing nature also touches upon subjective intrinsic value, namely that both ways of valuing are inherently anthropocentric approaches. Meaning that both valuation methods are based upon the assumption that value can only be described based on how humans value. If humans would not exist for example, the thing/object being valued does not have any value. Value (dis)appears based on the presence of humans. If for example, there would be a tree in a place at earth, but no human has yet seen it, and no one knows of its existence. If we would value nature instrumentally or via the subjective intrinsic valuing way, this tree would have zero value. But does this make this tree valueless? An alternative valuation way that is not human centred is objective intrinsic value. Something has objective intrinsic value independently of someone's attitudes. This entity has value in what it is and not because of the way other's value it. An ecosystem can have value in itself independently of how humans value it; humans do not create this value. Anthropocentric value theory assigns only intrinsic value to human beings, and all other things only have instrumental value. Everything except human beings matters only to the extent they serve as a means for human beings. Where non-anthropocentric value theory also assigns intrinsic value to non-human beings (Callicott, 1984). This non-anthropocentric theory views other living creatures to consist of intrinsic value as well, in contrast to the instrumental view which commodifies nature to merely a service provided to human beings. It remains questionable how to assign intrinsic value to the whole ecosystem. How does one do so? For the non-intrinsic value theory, one can make use of cost-benefit analysis since this tool assigns value based on how something provides benefits to humans. It is, therefore, also an anthropocentric way of assigning value.

4.3.3 Environment as more than a commodity

Reducing the value of the environment to monetary/financial terms is an inappropriate attitude. Apart from the methodological problems with the concept of willingness to pay, it also reduces the environment to a marketable good, a second problem of cost-benefit analysis. So, environmental goods are intrinsically valuable (Anderson, 1993), independent of people's preferences (Pearce, 1998). Nature has value independently of people's preferences. As illustrated above, cost-benefit analysis fails to consider people's value outside the market domain (Anderson, 1993), reducing the environment to a marketable good. Which is problematic because, as seen above, the market domain is only one area in which people express their values. However, we are not only economic rational beings, but we are also part of a society and as such we, humans, express our values in a much broader context. Considering the impacts of climate change and the urgency, leaving this up to the market would, I argue, be problematic. This way, distributional issues and questions are unaddressed and those having to deal with most of the negative

consequences of climate change will pay the bill.

Alternatives to cost-benefit analysis

Can cost-benefit analysis overcome these issues? For Anderson (1993), cost-benefit analysis cannot overcome these issues in the case of matters of health and environmental issues (“non-commodity values” (Anderson, 1993, p. 210)). These are political goods and need a democratic procedure and institution. A democratic alternative to cost-benefit analysis enables citizens to engage and express their values outside the market domain, making institutions not similar to the market (Anderson, 1993). In a democratic institution, citizens deliberate without influencing how much they are willing to pay for it. Anderson (1993), refers to cost-benefit analysis as a procedure by “economic technocrats” (p. 211). Democratic institutions create a platform where citizens can express values that cannot be expressed in the market domain. furthermore, these institutions support an environment in which citizens can all contribute and express their concerns instead of merely depending on specialists.

Welfare economics idealizes the role of the state as similar to the market. Meaning the state should be based on promoting efficiency by mimicking markets. However, democratic institutions are different from markets and consequently concern different ways people are valuing goods. Political institutions are, therefore, not to become more like markets. A democratic platform would enable people to express values for the environment, other than the ones they are having as consumers or producers.

Importance of monetary value

But, why is it still important to put a monetary value on the environment in the first place? As Pearce (1998) argues, policies regarding environmental protection and conservation does not occur for nothing. In reality, it is very expensive, and therefore there is a necessity for putting monetary costs on the environment. By putting a monetary value on environmental damage, one ensures this is taken into account, and the costs are being paid. Where I have indicated above that there is debasing element in putting a monetary value on the environment, money can also serve as a context in which trade-offs can be made (Pearce 1998).

Possible counter-arguments to this view are that a democratic alternative to cost-benefit analysis enables citizens to engage and express their values outside the market domain. Institutions should not become like the market. Therefore, putting a monetary value on the environment reduces it to a marketable good. A democratic institution would enable a discourse leading to a broader value of the environment (outside willingness to pay). Therefore, I agree with Anderson on the problems associated with willingness to pay. It indeed is a narrow concept and therefore, unable to grasp the environment's value in the best way. However, I go further and argue that a democratic participatory decision-making process will not always be in the environment's best interest either. For, it makes major assumptions regarding the functionality of these democratic institutions and the human decision-making process.

First of all, it assumes people can conceive the objective importance of environmental issues and

are willing to make decisions that will have enough effect, i.e., are willing to make sacrifices. The advantage of economic value is that there is a representation of the benefits and the costs. As Anderson (1993) notes, people object to putting a monetary value on the environment due to its intrinsic value which cannot be expressed in monetary values. However, where does this type of behaviour lead us? If no one is actually at the end of the day willing to pay for the costs, how is environmental degradation to be solved?

Furthermore, representative democracy has different potential problems; it assumes representation reflects citizens' preferences, there is only partial information in democracy, and the potential problem of powerful interest illude the process. In reality, democracy is a more profound and difficult process. Decision making in politics highly comes rational, games are played to get to decisions and not to forget to mention the industry of lobbying in democracies. One possible counterargument to the usefulness of assigning monetary values to the environmental goods would be that an alternative approach such as democratic processes would work better in the valuation of environmental goods. Here, I will not go in an in-depth examination of the problems of democracy. I will limit myself, instead, to a potential problem with using a democratic procedure for the valuation of environmental goods. Part of democracy is that political leaders are selected for a limited time. This to ensure 'the people' are able to choose their leader and have, once every few years, the opportunity to express their values and opinions during new elections. However, in the case of valuing environmental goods, there is a tension here. Namely, that this short temporary election period of leaders in democracies also pushes them to focus on reaching targets within this time limit. In the context of climate change, action must be taken now to avoid further damages in the future. This future lies outside of the election period, and therefore a not necessarily popular objective to reach if one aims to get re-elected. Environmental issues are mainly long term issues. The real problem will emerge in the late future, not soon. However, political actors are selected for a limited time, meaning they will prefer policies that reach short term objects instead of long term results.

At the same time, environmental conservation is not costless, leading to the importance of putting monetary costs on the environment (Pearce 1998). The OECD (2006) refers to this as a total "economic value of any environmental asset" (p. 19), including use and non-use value and other methods to arrive at these valuations (OECD, 2018). However, nature's intrinsic value is still not fully incorporated into this concept of *total economic value*. Although people's willingness to pay and other benefits and costs associated with the "ecosystem" (OECD, 2018, p.41) represent nature's intrinsic value, this is only one part of the story. The OECD (2006) argues that, especially in environmental issues, the following goes "if individual preferences cannot be counted on to fully reflect this importance, there is a paternal role for decision-makers in providing this protection" (OECD, 2018, p. 25). Thus meaning that in the case of environmental value, individual preferences are not the whole image -or are sometimes not known- and decision-makers should know this and go further in trying to protect the environment. This because its value is not only a sum of individual preferences. Can total economic value be the best of both world? Being both a tool to put monetary value on environment and thus adhering to the urgency to do something

while at the same time having a tool with a broader definition of value?

Total economic value

So an alternative to the value derived from willingness to pay is *total economic value*, which aims at valuing something not solely on the basis of individual preferences. It includes the use and non-use values, measured by different approaches. It still does not include full intrinsic value, but it is more encompassing than simple willingness to pay (OECD, 2006). However, this concept of total economic value is still an *economic* value and therefore not all-inclusive. As Hubin (1994) argues, all cost-benefit theories rely on willingness to pay for information, and by doing so these theories are taking a moral standpoint. So, also here, cost-benefit analysis and the way economics values nature is again not 'value neutral'. This leads us to the conclusion that democratic ethical judgements rather than aggregative willingness to pay are indispensable.

The goal of cost-benefit analysis is to guide policy-making which it can do in different ways. According to Sunstein (2005), it can serve this function in three different ways: firstly, by adopting regulation which states that the option that maximises net benefits will get selected. Secondly, it can make decisions because they generally require benefits to exceed costs, but the outcome of cost-benefit analysis is only a presumption but no more. Alternatively, thirdly, by considering the outcomes cost-benefit analysis alongside other variables deemed relevant. The first and in part the second way would be problematic under the critique posed above. The first way would entail values of those who are able to pay more will be selected easier. Because, if another option would mean more for low-income groups than another option for high-income groups, the latter will be more likely to be selected. This is because, as shown above, those who are able to pay more are also willing to pay more (and the other way around). The second way would be a bit less susceptible to the critique above, but still, the assumption that cost-benefit analysis serves as a rationale for desirability is not always the case. Because something is more cost-effective does not mean it is what we want as a society. For example, medicine for some rare diseases can be very costly and will, due to the rarity of the disease, only benefit a few people. However, one can still decide, as a government, to fund this treatment. Those who suffered the bad luck of getting this rare disease will not be able to afford it themselves and even though it is not very cost-effective one can decide as a society to enable this small group to be treated. Furthermore, the third way would suggest a possible way to connect cost-benefit analysis with democratic ethical judgements. Because in here, cost-benefit analysis is just one of the methods you can use to make decisions. While in the two other ways, the assumption is still that cost-benefit analysis is the holy grail and deviating from this is either not possible or an exception under the second way.

So, accepting that there are certain limitations to the approach of cost-benefit analysis regarding environmental issues does not necessarily mean we need to abolish it. Cost-benefit analysis is a tool for guiding public policy and is established in democratic institutions. Suppose people democratically determine the value of the environment to select a more costly project/ policy from the alternatives. In

that case, cost-benefit analysis still has a function as a tool but not as a normative framework. Economic analysis can include much information that people in a democratic institution are not able to do individually. Therefore, cost-benefit analysis can complement democratic decision making by providing information on the costs and benefits and trying to grasp the value of the environment as correctly as possible by looking at scientific data on willingness to pay and environmental science/ ecosystems. Whether public policy should maximise social welfare can be debated. Therefore, the policy that maximises cost-benefit analysis's net social benefit is not always the 'best' policy. OECD (2018) argues few indicate that cost-benefit analysis is an "exclusive comprehensive rule" (p. 43). And to come back to the question posed above: can we have the best of both worlds? Maybe we can just try to get closer to incorporating intrinsic value by acknowledging there is a potential issue in ignoring it.

5. Discussion

As argued in the chapter above, there are some serious issues with the market approach to pollution. However, as shown in chapter 3 *the economic approach*, there is an efficiency argument that many find intuitive. What do the issues I have highlighted imply for emission trading? Should we abolish this at all or is there a way out? In this chapter, I suggest some practical reforms which would mitigate the shortcomings of emission trading by applying them to the EU ETS. Since the EU ETS already exists, this approach seems to be the most pragmatic one for there to be a change. A conclusion that emission trading is problematic would, for me, not be enough. Philosophy is more than critique, I think, it should be a contribution to society and, therefore, also acknowledge the reality as it is especially keeping in mind the urgency of the issue of the climate crisis as illustrated in chapter 2. The EU ETS has many phases and will likely face reforms in the future. With the previous ethical critique in mind, I will propose some improvements for the new EU ETS.

An ethical analysis of market-based approaches illustrates and deepens the understanding of how the two are interlinked. Besides, the next section will use the issues emerging from this analysis to an actual market-based solution to climate change in place: the EU ETS. *What are the ethical limitations on the market-based approaches to climate change? How can we use this ethical critique to reform market-based solutions, specifically EU ETS?*

5.1 Recommendation I: ensuring a minimum price

In the previous section, I have illustrated that there are still some significant issues with the underlying way economics values nature. With these issues, the distributional and incommensurability, in mind, how is CO₂ emission valued under EU ETS? The graph below (figure 2) gives an overview of the historical prices per ton of CO₂ under the EU ETS system. By combining the ethical issues from chapter 4 with the reality of CO₂ prices, I conclude that one should ensure a minimum price for CO₂ under EU ETS. In short, because without a minimum price, the value depends on the condition of the economy, and the damage caused by CO₂ does not depend on the economy. Additional CO₂ emissions contribute to the process of climate change and its effects on rising temperatures are not suddenly less due to a change in the economy. Furthermore, a minimum price is more consistent with climate targets, as I show in this section. The market is already a regulated market, so there are methods within the system to ensure a minimum threshold of price per ton of CO₂ about which I will say more later in this chapter.

So firstly, why is it problematic that carbon price depends on the condition of the economy? If we for a moment accept that the market could value nature, we are confronted with another question: *how can*



Figure 2: historical data price EU ETS (Trading Economics, 2021)

emission prices vary so much overtime? As becomes visible from the following graph, prices per CO₂ under the EU ETS have fluctuated a lot over time. Combining this with the issues on valuing nature in the first place, having this value vary so much over time becomes even more problematic. Even if there would be a price that could capture this value, it becomes hard to see how this can then fluctuate that much. Of course, these fluctuations can easily be explained by the economic situation, as one sees a steep decrease in price around the 2008 financial crisis. But does the economic situation today impact the damages of climate change? If economic growth decreases, does this automatically solve part of the issue of CO₂ emission? One might say that because economic growth decreases, total emissions decrease as well, due to lower economic activity, and thus the negative effects of climate change become less. I would agree that there is a relationship between the total amount of economic activity and climate change, since if economic activity slows down, so does CO₂ emissions and thus fewer greenhouse gases are put into the atmosphere. However, this says nothing about the effects of 1 ton of CO₂ can have and thus it remains problematic that price depends so much on the economy. As chapter 4 shows, the way economics values nature is not without problems. It is a very one-dimensional way to look at the value of nature. As chapter 2 shows, the effects of CO₂ are clear and bring us to the stage of a real climate crisis. A system that has the possibility of a CO₂ price even below 10 euro's, therefore, seems absurd.

Keeping the issues with valuing the environment in an ethically satisfying way in mind, I recommend to ensure a minimum price. I base this on the following reasons. First of all, only a minimum price at a certain level enables it to take the climate crisis seriously. Just like Nordhaus' approach was flawed, by not taking into account the actual risks of climate change, a price below 10 euros per ton CO₂ does not take actual risks seriously. Poelhekke (2019) gives an overview of the varying levels of how expensive CO₂ should be. Models including tipping points say the prices per ton of CO₂ start at 126 dollars. But even prices according to Nordhaus's calculations start at 30 dollars. So even a minimum price at the level Nordhaus proposed would be an improvement. Prices under the EU ETS have not reached this level in over a century. With the current expectations for economic growth in the future being very low due to COVID- 19, it is not expected that this minimum price of 30 will be reached soon. This in combination with the issues of ignoring tipping points, I would say 126 dollars would be more a suitable price if one aims at taking the climate crisis seriously. Secondly, as I have illustrated in the section on the problems of valuing nature, the market domain is not capable of valuing nature in an ethically satisfying way. This we can also see when we look at the prices listed in the study of Poelhekke (2019), varying from 126- 164 when including tipping points. Because the market cannot value nature completely, the market prices will always underestimate the value of nature. Which is another reason to introduce a minimum price.

One could say that this question is irrelevant because the deal with the system is that it ensures there will be a reduction of the total amount of CO₂ emissions and prices are not necessary for this. Higher prices could make the reduction happen sooner, but even if prices were low, there would still be 'enough' reduction. This is true, but this rhetoric shows exactly my point at the section on Nordhaus. The huge amounts of extra benefits an even steeper reduction could give us, by reaching fewer tipping points, for

example, are completely ignored in this rhetoric. This tool is more than just a cost-effective way for firms to reduce pollution, it is about surviving the climate crisis. If you look at EU ETS as a way to help us out of the climate crisis, there would be no one against even steeper reduction. On the contrary, we would say that we should use times of lower economic growth to cut CO emissions even steeper. Interestingly, some countries have (tried to) adopt a minimum price per CO₂ in relationship with EU ETS. The UK has had a Carbon Price Floor since 2013, which is a price added to the EU ETS price in case it would become below a certain level (UK Parliament, 2018). Also, the Dutch government has submitted a bill to create a minimum carbon price alongside EU ETS (Government of the Netherlands, 2019). So, to conclude, I recommend to ensure a minimum price because the damages of every extra ton of CO₂ are highly undervalued by the current system (or have the risk of becoming very undervalued) and if one takes the climate crisis seriously, so should the price be. Ensuring a minimum price can be done, because it is a controlled market, by for example adjusting quantities when prices fall below a certain level.

5.2 Recommendation II: abandon free allocation of emissions rights

As becomes visible from the graph above (figure 2), the EU ETS consists of several *phases*. This year, phase 4 (2021-2030) became operational (European Commission, 2021). The previous phase, phase 3, already made some adaptations in the way the emission rights (or allowances) are allocated. This brings me to my next recommendation, namely that the EU ETS should abandon the free allocation of allowances.

The polluter pays principle makes intuitively sense. Simply, let the one who pollutes pay. By allocating emission permits for free, one actually gives these firms additional capital. Because these permits have value.

‘‘Overall, more than 6 billion allowances are expected to be allocated to industry for free over the period 2021-2030’’ (European Commission, 2021).

Why would a government institution, like the EU, give emission allowances for free? According to the European Commission (2021), free allocation is continued due to reasons of international competitiveness. Industrial sections, who always emit a lot, will remain in the EU. Because, if they would leave this would be bad for the international competitive position of the EU’s economy. But also for environmental reasons one could argue similarly. Because if these highly polluting industries leave to countries with less strict climate regulations, they will emit even more. Better to give them part of their emission allowances for free while still having them under the EU ETS which gives them an incentive to pollute less. However, this view is highly flawed and speaks the interest of these high polluting firms instead of speaking in the interest of European citizens and the world in general. First of all, this is not national regulation but EU wide. So, the argument that firms would move loses power because of this. There are many costs associated with firms moving, in this example they would have to move somewhere outside the EU which introduces transportation costs. Also, besides the EU, there are many more examples of emission trading in the world resulting in less alternatives for firms to move to. Secondly, it provides us with a quite narrow minded view of why firms come to the EU at all. The premise of this

argument, namely, is that firms will move if they do not get emission allowances for free. It thereby completely neglects any other reason for firms to come to the EU in the first place, access to the market, strategic position, good institutions only to name a few. Furthermore, should the threat of firms moving to another country/region be a legitimate argument for less ambitious climate policies? Or does this sound more like an excuse. What would be the harm of them moving? I argue this is a narrow minded view and a not fully reliable threat. And even if firms would move, this would pose some harms if they move to countries with less stricter rules. However, there is such a thing as international climate agreements making this less harmful now (and hopefully even less in the future) and moreover, the EU should not let itself be seduced by this line of argumentation by firms. First of all, it is harmful for the climate goals and completely neglects the crisis we are in. An EU which only listens to the interests of firms cannot solve the climate crisis we are in. Secondly, the EU is not powerless and has several counter instruments to make it very unattractive for these firms to leave. Think about an exit fine, which makes completely sense since these firms have benefited from the EU infrastructure. And another counter measurement could be to implement import taxes on goods produced outside the EU and entering the EU market based on environmental harm. By doing this the firm has to pay indirectly for their emissions in the end. Because if a firm decides to move its polluting activities outside the EU due to new EU regulation, they will still pay the fee via the import tax when they sell their products to the EU (which goods produces within the EU are not subjected to). Of course, a firm can still move part of its activities outside the EU and find ways to avoid the full import tax, but this should be part of the policy design of the tax not an argument to avoid it at all. To sum up, allowing firms to keep continuing receiving emission permits for free is an unwise and quite powerless decision of the EU. If the EU takes the climate crisis serious it cannot claim it to be fair to hand out emission permits for free because otherwise these firms would move to less stricter countries. The EU should take the health of the planet and its inhabitants seriously and not only its firms.

6. Conclusion

To come back to the initial question of this thesis; *what are the ethical limitations of market-based solutions to climate change? And how can we use these limitations to reform EU ETS?* In chapter 2 I have established the relevance of an ethical analysis in the context of the economics of climate change because both economics and climate change are not purely value-free domains and ethical analysis can be of contribution. Chapter 3 illustrated the economic approach to climate change and the advantages of market based solutions like emission trading on grounds of efficiency: by using these instruments, one reaches a reduction of CO₂ emissions at the lowest costs. However, as chapter 4 demonstrates, the grounds underlying emission trading solutions are not without problems. Because cost-benefit analysis takes willingness to pay as an indication of how much people value something, it neglects any concerns for people who value something but are not able to pay for this. Therefore, cost-benefit analysis makes the selection of a project that maximizes total welfare but ignores some basic rights to citizens who will bear the costs of this project because they were unable to pay possible. Furthermore, the way cost-benefit analysis values nature is problematic in the context of climate change. The environment is not simply something we value because it gives us something, there are other intrinsic ways in which people value nature.

So how can we use these limitations of market-based solutions to climate change? Simply listing them will not bring us closer to the goal: ensuring a safe world for future and current generations on earth. Since EU ETS is the largest emission trading system in the world, reforming this system would have the largest effects and it could potentially serve as a basis for other emission trading systems. Perhaps in the future, a global emission trading system will be in place making the ethical limitations of even bigger importance. For now, I have two suggestions for reforming EU ETS. Firstly, I propose the introduction of a minimum price. Knowing the limitations of how economics values nature, price should be at least at a level to make up for this limitation. Therefore, a minimum price safeguards that CO₂ emission rights are not to be sold for enormously lower prices due to a change in the economic situation. Secondly, I propose stopping handing out emission rights for free. For the same reasons, it does not make sense to hand out something for free which will cause harm to the earth. The reasoning behind it is flawed and a harmful distraction from the main goal: ensuring the planet stays a place humans can inhabit.

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