Buying Low, Flying High: Carbon Offsets and Partial Compliance

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Abstract

Many companies offer their customers voluntary carbon 'offset' certificates to compensate for greenhouse gas emissions. Voluntary offset certificates are cheap because the demand for them is low, allowing consumers to compensate for their emissions without significant sacrifices. Regarding the distribution of emission reduction responsibilities I argue that excess emissions are permissible if they are offset properly. However, if individuals buy offsets only because they are cheap, they fail to be robustly motivated to choose a permissible course of action. This suspected lack of robust motivation raises both pragmatic questions about the functioning of offsetting schemes and moral questions about the worth of such unstable motives. The analysis provided here also has wider implications for the normative analysis of partial compliance and 'many hands' problems, especially for those cases where compliance levels and costs interact.

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Recently I flew from London to Hamburg. My airline offered 'carbon offsetting' for my flight. For £2.31 I was invited to offset 175 kg of CO_2 emissions 'through UN certified emission reduction projects' (Easyjet, 2012). In my case, I was informed, the money would be used to build a hydro-electric power plant in Ecuador to replace fossil fuel electricity generation. Combining flight and offsetting, my actions would allegedly have been 'carbon neutral.' Some companies even actively advertise their emission causing products by selling them bundled with offsets. Land Rover, for instance, 'enables customers to offset their first 45,000 miles/72,000 km of driving in their new vehicle' (Land Rover, 2012). One can hardly avoid the impression that offsetting is not only used to reduce emissions, but to market particularly carbon intensive products. This impression is reinforced by the fact that current voluntary offsetting schemes are so cheap that the costs are barely noticeable. Offsetting is even used to compensate for the emissions caused by academic conferences, confronting us all with the question whether we want to participate in such schemes (cf. Anderson, 2012).

The current practice of offsetting raises two questions. First, how are we to determine individual emission control obligations when people buy offsets? Second, how are we to evaluate the motives for offsetting if people only buy these products when they are cheap? More generally, the case of carbon offsetting also brings to light issues about the normative and institutional implications of partial compliance settings, especially when the level of compliance interacts with the compliance costs. I provide a more general outlook regarding these issues in the last section.

In recent years, the market for voluntary emission offsetting schemes has grown rapidly. This market must not be confused with wholesale markets for emission permits between states or major industrial emitters (such as the UN Clean Development Mechanism or the EU Emission Trading System). In this paper, I focus exclusively on voluntary solutions for consumers to offset their emissions.

For a first take on the problem, consider the example of F the frequent flier: F flies around the world to visit friends and family and causes a large quantity of greenhouse gas (henceforth: GHG) emissions. However, he buys voluntary emission offsets. Assume that these offsets are genuine offsets, causing true emission reductions equal or greater than the emissions of F's flying. The offsets F buys are very cheap because very few people participate in the voluntary offsetting market. Has F met his obligation to keep emissions at a sustainable level? And does it matter that his offsets were so cheap that he can easily afford offsetting his air travel emissions without significant sacrifices?

I have already hinted that the issue requires two distinct perspectives. First I ask how the responsibility for keeping the total emissions at a sustainable level should be distributed. I will argue for an *Individual Limit Principle*, such that (under suitable *ceteris*

paribus assumptions) individuals are only required to look after their own emissions and that offsets can (at least in principle) be used to stay within one's own permissible limit. With this argument I will reject more demanding claims that individuals should buy the socially optimal level of offsets. Second, however, I will argue that the current offsetting practice rests on motivations that are very likely unstable. In particular, it is likely that the current offsetting practice is only functional because just a small minority of people participates in it, and that it would collapse under full compliance because individuals are unlikely to pay the (much higher) full compliance market price.

The argument proceeds in six steps. In the first section I explain the function of voluntary carbon offsets, and the standards they must meet. Section II sketches the market for voluntary carbon offsets and introduces the problem of undemandingness due to partial compliance. This raises the question of how obligations for emission reduction ought to be distributed under the condition of partial compliance. Section III discusses two competing principles: utilitarian *optimizing* and Liam Murphy's *compliance condition.* Section IV compares these two approaches with the less demanding *individual limit principle*. In section V, I test the robustness of motivations to offset and show that the problem with cheap voluntary carbon offsets is not that they are too cheap – the problem is rather that many customers probably buy cheap offsets for the wrong reasons. The last section draws conclusions and discusses wider implications.

I Voluntary Carbon Offsetting

A virtual consensus exists that the current level of greenhouse gas emissions is unsustainable, and is very likely to have bad if not disastrous effects on the earth's climate.

The best available climate models show that a stabilization of GHG emissions on a low level could lead to a significant but manageable climate change, while business as usual scenarios predict severe changes that could possibly spin out of control (see, among many, IPCC, 2007; Stern, 2007). Thus, despite many uncertainties, most experts recommend reducing the level of emissions and stabilizing them on a sustainable level to avoid potentially disastrous consequences.

The voluntary offsetting market has been developed by non-governmental organizations and private companies. Consumers can buy voluntary emission reductions (VER, not to be confused with *verified* or *certified* emission reductions) to achieve personal emission reduction targets. The provider of the VER invests the consumer's money into a project that yields a reduction of GHG emissions, compared to a baseline scenario without the project. VER are typically linked to specific activities undertaken by the buyer, so that the customer can claim 'carbon neutrality'[1] regarding these specific emissions. The most frequent practice is the link between air travel and VER. Sometimes commercial customers or federations buy VER as well. For instance, the international football association (FIFA) claims that the 2006 World Cup was 'carbon-neutral' because it bought VER to offset the emissions caused by the cup (Schiermeier, 2006).

The ethics of emission trading and carbon offsetting is a new research topic, and the literature is still quite limited. Influential contributions are Michael Sandel's (1997) brief and fierce rejection of emission trading, and Robert Goodin's (1994) more general arguments about the problem arising from 'selling environmental indulgences'. Recently, Simon Caney and Cameron Hepburn (2011; cf. Caney, 2010) have offered a taxonomy of arguments against emission trading. Following their systematic treatment, one can

distinguish between the claims that (i) emission permits should not be owned in principle; (ii) responsibility for an emission reduction is personal and should be discharged by the responsibility-bearer only; (iii) emission trading harms the vulnerable; (iv) putting a price on the environment is wrong as such, and that (v) emission trading wrongly converts a fine for pollution into a fee for use. With regard to emissions trading between companies or states Caney and Hepburn find that none of the arguments to back up these claims provide decisive reasons against trading, as long as the system is implemented properly.

For the more specific issue of voluntary emission offsetting, the permissibility of delegating the duty to reduce emissions is crucial. If such delegation is impermissible, all carbon offsetting practices are morally wrong. In discussing this claim, some authors propose an analogy with military conscription (Caney and Hepburn, 2011, p. 215; Anonymous, 2010, pp. 2080-1). If paying someone else to serve in the army is wrong, then, the argument goes, it is also wrong to pay someone to reduce emissions on one's behalf. However, the analogy is shaky. In particular, paying someone else to serve implies remunerating someone to take a significant risk of injury and death. By contrast, paying someone for VER certificates typically imposes no particular risk and often comes with positive side effects for the seller.

Philosophical literature focused specifically on voluntary emission offsets is almost non-existent, with the exceptions of a chapter in John Broome's *Climate Matters* (Broome, 2012, ch. 5) and a research note in the *Harvard Law Review* (Anonymous, 2010). Broome is in favour of individual offsetting. Like me, he observes that current offsetting prices are low due to the non-compliance of others, but, unlike me, he does not see this as a problem. The *Harvard Law Review* note is mainly based on virtue-ethical considerations, a line of

argument that will only play a peripheral role in what follows.

Before tackling the normative analysis, some practical problems that arise with regard to emission offsetting should be mentioned (cf. Environmental Audit Committee, 2007):

- **Lack of additionality**. It is often difficult to prove that the investment is pivotal in bringing about the emission reductions promised because it is hard to assess counter-factual claims about the baseline scenario and indirect effects. Projects may also fail to produce the reductions promised, or the reductions may not be permanent.
- **Lack of standards for emission calculations**. 'Carbon calculators' to determine the level of GHG emissions from activities like air travel vary widely in their results. (Schiermeier, 2006.)
- **Unintended side effects**. Emission reduction projects can have unintended negative side effects, for instance, secondary environmental problems (cf. Kollmuss, Zink and Polycarp, 2008).

To keep the argument simple, I bracket off all the practical problems that could arise. I therefore assume – optimistically – that there are genuine offsetting projects, and that investing into these leads to the additional emission reductions they promise without any negative side effects. The point of this paper is to *investigate the normative questions that arise even if voluntary carbon offsetting works perfectly well from the implementation perspective*. To pursue this line of inquiry, I use a set of background assumptions about climate justice and the moral obligations arising from climate change.

First, I assume that there is a maximum level of global GHG emissions that is permissible per year.[2] One attempt to determine the maximum yearly permissible level is to conduct a large scale cost-benefit analysis of GHG emissions and determine the optimal level of emissions, an approach pursued by the Stern review (2007).

Second, with a global maximum permissible level in place, one can distribute the responsibility to stay below this level among individuals. The simplest form of distributing individual emission rights is to grant an equal share of emission rights to every individual. However, there may be good reasons for more sophisticated, needs-based approaches. Again, these complications are put aside. No matter how the distribution of emission rights is conducted, let there be a maximum annual level of permissible emissions L_i for each individual *i*.

Third, in this paper I only discuss the individual emission limit L_i imposed on individuals. I thereby bracket off the claim that people who benefit from living in countries with a history of high emissions have to compensate people living in countries with a history of low emissions. I also put to the side the (reasonable) claim that individuals have an immediate obligation to help those who suffer from climate change, even if everyone met the required emission limits.

Fourth, I do not address any wider questions of global justice. Instead, I operate under the idealizing assumption that the offsetting scheme operates against a backdrop of equal wealth distribution. This allows me to focus on the question whether carbon offsetting can be defended *in principle*. In the less egalitarian, non-ideal reality it is likely that the practice of carbon offsetting unduly benefits the advantaged. However, I will not pursue this objection to carbon offsetting here.

Finally, I rely on two important *ceteris paribus* assumptions. First, I focus only on the harm done from climate change and the moral obligations arising from it. Therefore I do not discuss any trade-offs between different moral obligations. This is a strong assumption because higher GHG emissions may be permissible if they are necessary to pursue other important goals. Nevertheless, the assumption is useful to single out the problems arising from offsetting. Second, throughout the paper I assume that the decision to purchase flights (or consume other goods with GHG emissions) is a purely individual, optional but non-frivolous decision. All issues arising from social obligations to make certain journeys or buy certain goods are screened off.

Consider the frequent flier F again. Assume that F is required to stay below his personal emission limit L_F. Suppose F meets this requirement, except for his excessive air travel, which he pursues to visit friends and relatives. His flying causes some pleasure to him and his peers, but these are not decisive reasons for F to fly, compared to the potential harm caused by excess emissions. However, F 'offsets' the emissions from flying by buying VER. These offsets are quite cheap due to partial compliance, since most people violate their individual emission limit and do not buy VER to offset their excess emissions. As a result, the market price for VER is low, and F can easily fly as much as he likes, while complying with his emission limit, provided that we accept his offsets as a genuine compensation. How should we evaluate F's behavior?

II The Market for Voluntary Emission Reductions

A well-implemented market for voluntary emission reductions helps to realize efficiency gains. Buyers and sellers have different emission reduction costs. For the buyer

of the offset, reducing emissions is expensive because the opportunity costs (for instance: not flying, disappointing friends, etc.) are high. For the seller, the reduction of emissions is cheap because she has a project at hand that yields high emission reductions at a low price.

The supply on the VER market is determined by the set of available offsetting projects. Suppose that the offsetting projects are all genuine offsets that meet the conditions explained above. Let the schedule of abatement be an ordering of all available offsetting projects from the lowest to the highest marginal abatement cost (MAC). It determines the MAC supply curve as shown in figure 1. The x-axis shows the total amount of offsetting, the y-axis the marginal price. If the total demand for offsetting is low, the MAC is low, that means it is cheap to offset an additional unit of GHG. However, as the quantity of offsetting increases and the 'low-hanging fruits' are taken, offsetting projects with higher MAC have to be used. Therefore the MAC curve has a positive slope.[3]

*** Figure 1 about here ***

Consumers buy emission certificates on the VER market. Currently, the volume of this market is very small, compared to the overall volume of emissions. In 2010, the equivalent of an estimated 131 Mt of CO_2 emissions was offset worldwide, compared to overall CO_2 emissions of around 30 Gt of CO_2 in 2010 (not counting other GHG like methane). The lion's share of carbon offsets is bought by businesses, not by individual consumers (Peters-Stanley et al., 2011, pp. iv, 46). In the UK, for example, it is estimated that only 1-2 percent of consumers use offsetting schemes (Environmental Audit Committee, 2007, p. Ev181). Within a certain price bracket, the market based on voluntary demand is probably quite price inelastic. People who offset are likely to do so because they are convinced that it is a good idea, and would do so for any relatively low price –

offsetting is clearly not the result of payoff maximization.[4] However, it is also likely that the voluntary demand for offsets would drop quickly if offsetting was significantly more expensive. Therefore a plausible demand curve for voluntary offsets D_{vol} has a 'kinked' shape, indicating that there is inelastic demand for a certain low price range, and highly elastic demand for higher prices. The demand curve intersects with the supply curve MAC at q_{vol} and p_{vol}, the market equilibrium.

Now imagine that strict emission limits are imposed on all individuals. If one wants to cause excess emissions, one is therefore only allowed to do so if one offsets these emissions. This leads to a much higher demand for offsets, and D_{full} is the kind of demand curve that results. The full compliance market has a much higher volume of trade (q_{full}) and a much higher price (p_{full}) in equilibrium. The scenario sketched in Figure 1 suggests that the price p_{full} under full compliance is so high that it would trigger no demand in the voluntary market, as the maximum of D_{vol} is smaller than p_{full}. Thus, no one would offset voluntarily for the prices that would obtain in a full compliance market. Consequently, full compliance would have to be enforced.

III Utilitarian Optimizing and the Compliance Condition

One possible reaction to the behavior of F the frequent flier is this:

> 'What is wrong with the current practice of voluntary offsetting is that people do not offset enough. After all, if there is such a cheap way to abate GHG emissions, and if the current level of emissions is too high, then people ought to buy more offsets.'

This position refers to the 'optimizing principle' prominent in many versions of

utilitarianism (cf. Unger, 1996; Singer, 1972). In this section I contrast an application of the optimizing principle to GHG offsetting with Liam Murphy's 'compliance condition' (1993; 2000). In the next section, I will reject these two principles in favour of a principle based on individual emission limits. This leads to three competing principles for assigning responsibility regarding voluntary emission offsetting:

- **The Optimizing Principle**. Agents should buy additional GHG offsets or mitigate their own emissions as long as the overall utility is increased.
- **The Compliance Condition Principle**. Agents should make a sacrifice in their GHG offsets or mitigation efforts equal to what they would have to sacrifice under full compliance.
- **The Individual Limit Principle**. Agents should offset or mitigate their emissions to the extent that they ensure compliance with their own morally permissible emission allowance.

The *Optimizing Principle* is derived from the act-utilitarian view that an agent should always choose an action that maximizes overall utility. Applied to the GHG offsetting case, assume (unrealistically) that the only way to do good with one's wealth is to offset GHG emissions. Then the *Optimizing Principle* demands that one buys GHG offsets until the utility loss for oneself is at least as great as the utility gain caused by the offsets. Because the utility gain from mitigating climate change is likely to be high, one would have to invest virtually all of one's wealth in emission reduction projects. Also, the *Optimizing Principle* implies that complying agents have to compensate for the slack left from those agents who do not comply.

Liam Murphy criticizes the *Optimizing Principle* because it distributes responsibility under partial compliance in an unfair way.[5] His discussion is geared towards the duties of beneficence, not carbon offsetting, but exploring the analogies will be useful. Murphy argues that the problem of beneficence is different from other problems of justice because its demands are purely agent-neutral: 'We could say, somewhat tendentiously, that a principle of beneficence is directed to agents as a group, whereas other moral principles are directed to agents individually.' (Murphy, 2000, p. 75). On first sight, the obligation to reduce GHG emissions is agent-neutral in the same sense: to stabilize emissions on a sustainable level, it does not matter who emits, it only matters that the emission total is limited. The demand to reduce emissions seems to be addressed to all people *as a group*. This group-directed obligation poses two questions: how should the responsibility for meeting this obligation be distributed?; and how are individual obligations affected under partial compliance?

Murphy's answer to these questions is stated in his compliance condition:

> 'Agent-neutral principles should not under partial compliance require sacrifice of an agent where the total compliance effect on her, taking that sacrifice into account, would be worse than it would be (all other aspects of the situation remaining the same) under full compliance from now.' (Murphy, 2000, p. 80)

According to Murphy, demands are unfair if they exceed the demands that would be made on individuals under full compliance. This is the negative part of his answer. In addition, in his 'principle of collective beneficence,' he also advances the positive claim that individuals should optimize their actions within the limits of the compliance condition, that

is they should ‘do as much good as possible’ (Murphy, 2000, p. 117) up to the level of sacrifice under full compliance.

Would an analogous *Compliance Condition Principle* for offsetting be convincing? According to this principle, people should make a sacrifice for offsetting (or perform own reductions in emissions) equal to what they would have to sacrifice under full compliance. Here we see that the *Compliance Condition Principle* can be demanding: the price for offsets in the VER market under full compliance would be much higher than the current price. Hence, in today’s situation, where only very few people offset their excess emissions, agents would either have to invest as much money into offsets as they would have to pay for offsetting their excess emissions under full compliance, or they would have to reduce their emissions to a permissible level. Therefore, under partial compliance people would have to do more than just buy cheap offsets for their own emissions.

It is remarkable that Murphy’s original compliance condition focuses only on the point that we should not unduly be *burdened* by other people’s non-compliance. However, his principle cuts both ways: if we take Murphy’s theory at face value, we should also not unduly *benefit* from non-compliance. This means that our effort to reduce emissions should be on the level we would have to make under full compliance. With a market as discussed in section II, this effort is likely to be higher than the effort required under partial compliance.

IV A Defense of the Individual Limit Principle

The upshot from the previous section is that the *Optimizing* and *Compliance Condition Principles* demand more than the mere offsetting of one’s own excess emissions.

But is it fair to demand that people do more than neutralize the excess emissions they have caused *themselves*? Consider instead the *Individual Limit Principle*. That principle simply demands that one should keep one's emissions below the personal permissible limit L_i. It neither requires increased efforts to compensate for the non-compliance of others, nor any other considerations regarding the sacrifices that would have to be made under full compliance. Instead, the *Individual Limit Principle* takes causal responsibility as the relevant criterion for determining obligations, similar to the "polluter-pays principle" (e.g. Caney, 2005), but, unlike the latter, does not use money as the measure of obligation. In that sense it is closer to Shue's demand that polluters should "clean up their own mess" (1999, p. 533), and the justification for such claims is often traced back to Mill's harm principle (Brooks, 2012). In what follows I argue against the *Optimizing* and *Compliance Condition Principle* and for the *Individual Limit Principle* with regard to offsets.

To show that the *Optimizing* and *Compliance Condition Principle* put unfair burdens on the complying agents in the offsetting case, I present a stylized example. Suppose you and your neighbours live around a lake. Each of you catch a certain quantity of fish from that lake. The level of fish caught is unsustainable in the long term, and (everything else equal) will lead to a collapse of the fish population in 100 years' time. Such a collapse would bring great harm to those future generations who earn their livelihood by fishing and have no reasonable alternative to do so. There are two ways to prevent the collapse and the resulting harm. Either the overall fish consumption is reduced, or the lake dwellers take costly measures to improve the habitat and thus the reproduction of the fish. Further, let's suppose that these measures to improve fecundity, such as creating spawning areas by planting reeds, introducing protective fences, and so on (I will call these "breeding

measures" from now on), do not have any negative side effects. Given the harm of unmitigated fish consumption affecting future generations, it is uncontested that all lake dwellers should either catch less fish or should bring in the described breeding measures at their stretch of the shore. All this information is public knowledge.[6]

Unfortunately, you live at a low compliance lake. Your neighbours keep consuming fish at the unsustainable rate without taking any compensatory breeding measures. You, by contrast, do implement breeding measures at your part of the shore to offset for your catch of fish. Overall, your interaction with the lake in terms of fish consumption and breeding promotion is therefore sustainable, that is, your net effect on the fish population is neutral or positive. On the one hand, you catch fish, on the other you increase fish reproduction.

Note that proponents of the *Optimizing Principle* must maintain that your obligations do not stop there. Since grave harms will affect future generations unless the overall net fish consumption becomes more sustainable, the *Optimizing Principle* demands measures from you to compensate for your neighbours' slack. Perhaps optimizing obliges you to perform *all* possible breeding measures, not only on your stretch of the shore but in all communal areas as well; perhaps you should do this *and* refrain from eating fish, and so on. Overall, as an optimizer you should contribute to increasing the fish stocks as long as this increases utility.

While there may be cases for which such optimizing is in order, the situation here has four features rendering optimizing less plausible: (i) the harm is caused by intentional individual actions based on relevant knowledge, (ii) it is clear who should do what to prevent the harm; (iii) the causal effect of the current actions can be reversed by future actions, and (iv) the current non-compliers are still able to prevent their causal contribution

to the harm (for the last two points cf. Miller, 2011, p. 237). Put in terms of our example: your neighbours know what they are doing and they freely choose to do so; it is possible for them to compensate for current and past overconsumption by consuming less or taking more extensive fish breeding measures; and the neighbours who are currently non-compliant can still become compliant and neutralise their past overuse. A case like this very much differs from emergency situations where there is often no clear causal responsibility, the precise remedial obligations are uncertain, immediate action is required to avert harm, and other individuals who should act are unavailable.[7]

Let us now turn to the *Compliance Condition Principle*. To show that it may put unfair burdens on compliant agents, we need to introduce another assumption: the costs of the fish breeding measures increase with compliance. For the plausibility of this assumption we can imagine that the only supplier of such products and services (planting reeds, setting up protective barriers, etc.) responds to higher demand with higher prices. To keep things simple, suppose there are just four people (including you) living around the lake. Here is the price schedule for buying fish breeding tools and services:

Demand (units):	1	2	3	4
Unit price/year:	£100	£200	£300	£400

If everyone invests in the breeding measures, each buyer has to pay £400 per year. But since you live at a low compliance lake, no one else requires these services, and you end up paying just £100 a year due to the low demand. This means you can put your consumption on a sustainable footing for less money than you would have had to pay for

the same measures under full compliance. If we take the *Compliance Condition Principle* seriously, you ought to make a sacrifice equal to your sacrifice under full compliance. This means you have to spend *two* units of breeding measures and pay 2 x £200 for them, which equals the price of £400 for one unit under full compliance. But this is implausible: there is no reason to ask for a higher investment from the only individual who is compliant just because the prices are low due to the non-compliance of others.

If your net effect on the fish population is not negative, you have complied with your obligations. Why? Taking your fish consumption and your breeding measures together, your net effect on the fish population is zero or positive, and you do not contribute to the harm affecting future generations of fishers. Your causal effect on the harm is equal to the one that would obtain if you were non-existent – removed from the lake without replacement. In the circumstances described by features (i) to (iv), this discharges one's obligations fully, because your neighbours are equally responsible and are in a position to do their fair share in the future, as well as compensate for their past slack.

Note that the market for fish breeding measures has the same structure as the market for VER certificates: under partial compliance the prices are lower than under full compliance. Therefore, if we agree that the *Compliance Condition Principle* does not make sense for the lake example, it does not make sense for the VER market either. It is unjustified to demand higher sacrifices from those who do buy offsets and thereby stick to their emission limits just because their compliance is cheaper than it would be under full compliance. The upshot is that under the conditions outlined above, the *Individual Limit Principle* is the right principle to determine offsetting obligations.

A possible objection to my argument is given by Hohl and Roser (2011), who analyse the obligations of *states* to reduce GHG emissions in non-compliance situations. They

claim that "it is not clear why we should take full compliance as the condition under which our *responsibility or duty all things considered* is to be determined" and if other states do not comply, "there is an unacceptably large potential of human rights violations." (Hohl and Roser, 2011, p. 481). In their view, there is at least a *pro tanto* argument for taking up the slack of other states. In response to Hohl and Roser, I want to emphasize a relevant difference between my analysis on the level of *individuals*, and their analysis on the level of *states*. Since states have long implementation lags and take decisions over much larger emission volumes, they need to plan emission control policies well in advance and for long time horizons. In those settings, conditions (iii) and (iv) stated above may not be met: given the time lag, a state possibly cannot wait for the non-compliers to change their ways if one wants to prevent harm. In those circumstances a compliant state may be obliged to take up the slack from a non-compliant state to prevent disaster, which would entitle the compliant state to receive future compensation from the non-compliers for the additional sacrifices.[8] But such a setup differs significantly from the choice of individuals regarding VER, where the time lag between plan and implementation is minimal and volumes are small.[9]

In addition, as long as there is no urgent action required to avert disaster, a more promising route may be supporting political processes to ensure that everyone complies with the emission limits. Absorbing the slack from others can be politically counter-productive and entrenches an unjust distribution of efforts. The upshot is that the applicability of the *Individual Limit Principle* depends on the context, but in the case of offsetting it is the most plausible principle.

We have seen that Murphy calls the duties of beneficence agent-neutral because they are directed at a group, not at specific agents. To discharge these duties it is irrelevant who

performs the right actions, as long as they are performed. On first sight the duties of emission reduction are similarly agent-neutral because it does not matter who emits and who mitigates emissions, as long as the total emissions are below a certain level. But in one crucial way emission reduction differs from beneficence: in the case of beneficence, it is usually unknown who has caused the suffering that needs to be alleviated. And in many cases, the suffering is not caused by an intentional agent at all but by natural disasters. For emissions, by contrast, we know who has caused the emissions. This *causal* responsibility makes a difference. It supports the case for the *Individual Limit Principle* against the *Compliance Condition Principle*. If we know who is causing harm, we require (at least in the first line) that the harming person prevents the harm or, failing that, performs remedial actions (cf. Miller, 2007, pp. 81-109). Asking other people who have not caused the harm to work towards a compensation of *this* harm is unjust if it is possible to hold the harming agents to account.

The discussion so far has revealed serious problems with the *Optimizing Principle* and the *Compliance Condition Principle*. The *Individual Limit Principle* now looks like the most plausible principle to distribute responsibility for controlling emissions. But the attention on the distribution of responsibility is only one important aspect for assessing the practice of voluntary carbon offsetting. What has gone amiss in that approach is the question of motivation, specifically the question of motivational robustness. We know that offsets are currently cheap due to a very limited participation in these schemes. We also suspect that many people are unlikely to buy offsets if VER certificates were more expensive. Thus, the current practice of offsetting is motivationally unstable. This lack of motivational robustness matters for policy reasons, and perhaps even for the question of

the moral permissibility of offsets, as I am going to argue now.

V A Test for Motivational Robustness

To explore whether individuals' motivations are robust against changes in the level of compliance, we need to predict how individuals would behave once compliance levels rise. This prediction must draw on the individuals' underlying personal policies for action. I will call such personal policies *maxims* (with a nod to the methodology of Kantian ethics, but without any commitment to its substance, or indeed to any moral theory that aims to offer a test for the permissibility of maxims). The general form of a maxim is: 'I perform action A under conditions C in order to achieve goal G'.

To test whether individuals are robustly motivated to perform a certain action (such as offsetting their emissions), we consider how their maxim would fare if levels of compliance were increased.[10] Conducting this thought experiment, two problems can arise:

(1) **Impossible Set of Actions.** A level of compliance obtains for which the maxim prescribes performing action A, but it is impossible that the compliance-willing agents can all perform A.

(2) **Unstable Motivation.** A level of compliance obtains such that performing action A is not prescribed by the maxim, because conditions C are not met at this compliance level.

Problem (1) arises if the individuals find that full compliance is impossible due to the circumstances. It may be that full compliance is economically, physically, or perhaps even logically impossible. Problem (2) arises if the maxim's conditions are sensitive to the level of compliance. In the case of *unstable motivation*, it would be *possible* for everyone to perform action A, but the maxim ceases to prescribe that action once a certain threshold of compliance is crossed. The individuals' motivations are therefore not robust against changes in the compliance level.[11]

Applying this analytical framework to carbon offsetting, suppose, for a start, that people offset based on this maxim:

> **Maxim 1:** I buy carbon offsets no matter how expensive in order to neutralize my excess emissions.

This maxim can lead to an *impossible set of actions* under full compliance, because one of these two situations can arise:

1. There are not enough offsetting opportunities for all excess emissions, and we find that universal compliance with maxim 1 is impossible.
2. The price for carbon offsets increases so much that some or all individuals cannot afford to buy offsets, and we find that universal compliance with maxim 1 is impossible.

If one of these two problems occurs, maxim 1 will fail to work under full compliance. This suggests that even if people comply with maxim 1 given low compliance,

it would turn out that they cannot comply given high compliance.

Perhaps maxim 1 was formulated in an overly restrictive way in the first place because it suggests that the level of excess emissions is fixed. Less restrictive is a maxim that leaves a choice between reducing emissions and offsetting them:

> **Maxim1*:** In order to comply with my emission limit, I only cause excess emissions if I can offset them, or, if that is impossible, I stay within my limit of individually permissible emissions.

This conditional maxim does not lead to an *impossible set of actions*. Rather, maxim 1* captures what a functional full compliance VER market should bring about: either people emit and pay the full compliance market price to offset their excess emissions, or they avoid creating the emissions in the first place. Everyone can perform one or the other course of action, independent from the level of compliance. The way maxim 1* is formulated, it is also clear that the problem of *unstable motivation* is ruled out. An individual truly committed to maxim 1* will either offset excess emissions, or avoid excess emissions.

However, is it likely that maxim 1* captures the true motivation when individuals buy VER certificates under conditions of partial compliance? As we have learned from the scenario represented in figure 1, the price in an enforced full compliance market may well lead to zero demand in the voluntary market. Individuals who would stop buying VER once the price increases follow a different maxim:

Maxim 2: In order to neutralize my excess emissions, I buy voluntary carbon offsets, but only as long as these offsets are cheap.

This maxim defines a much less demanding personal policy. Full compliance with that maxim would certainly be possible but likely lead to excess emissions without offsetting as soon as the VER market price rises to a certain level. Maxim 2 shows an *unstable motivation* to offset, a motivation that is not robust to increasing levels of compliance. People offset now, but since this motivation is contingent on the market price for offsets, it is fickle. The rather cumbersome formulation of maxim 2 could be replaced with a more pungent phrase:

Maxim 2*: I offset excess emissions, but only as long as the sacrifice is small, in order to have a clear conscience regarding my excess emissions.

Again, this maxim exhibits *unstable motivation* because increasing compliance with maxim 2* will lead to very few people performing the relevant action, that is, buy offsets for excess emissions. Maxims 2 and 2* show a lack of motivational robustness, as offsetting now depends on the level of compliance and the market price it induces.

What can we conclude if a maxim runs into either (1) the problem of *impossible sets of actions*, or (2) into problems with *unstable motivation*? Take (1) first. Perhaps people are truly motivated by a maxim akin to 1 when they buy offsets. In that case, their motivation

is robust, but the maxim prescribes actions that are impossible to perform by all individuals under full compliance. The individuals follow a maxim that fails to provide useful guidance for conditions of high or full compliance. This does not *necessarily* suggest that following such a maxim is wrong. There are many perfectly defensible maxims that cannot be complied with by everyone at the same time. For instance, 'I go grocery shopping on Tuesday night to avoid the crowds' is a perfectly acceptable maxim, even though it cannot be followed by everyone, as it would (at the very least) defeat the purpose, and perhaps even make it impossible for all of us to physically get into the supermarket. But in the case of carbon offsets, the very idea is to create a workable system that can be used by everyone. Once we realize that this system fails to work if everyone uses that system, we have good reasons to be skeptical about the justificatory work such a system is supposed to do. For instance, claims that we can fly as much as we want (as long as we offset) or drive big cars (as long as we offset) are a lot less convincing when it becomes transparent that there are not enough offsetting opportunities to go around for everyone. Even worse, offsetting is often used as a marketing argument for particularly carbon intensive products and services, prodding consumers to emit more GHG. This worry could only be alleviated if we had reasons to believe that individuals would be prepared to reduce emissions themselves once offset opportunities become scarce, as suggested by maxim 1*.

The more pertinent concern is with (2), the suspected lack of stability in people's motivations. The current practice of offsetting is probably marred not so much by ambitious but impossible maxims, but rather by insufficiently strong motivations, which would fail to trigger the necessary sacrifices once offsetting becomes more expensive. Depending on one's moral background theory, one will derive different normative

implications from this. Broadly speaking, many Kantians and virtue theorists will argue that such a fickle motivation to perform the right action casts doubt on the moral worth of this motive-action pair, and some would argue that the action is therefore impermissible. A careful justification of that claim would require intricate arguments and qualifications beyond the remit of this paper (see, e.g., Parfit, 2011, chs. 40-45 for some of the difficulties). For most consequentialists, by contrast, permissibility is independent from the question of motivation. Nevertheless, motivational robustness has a role to play in a consequentialist analysis because of the *expected consequences of policy measures* implied. After all, if people are not robustly motivated to participate in offsetting schemes, these schemes are prone to fail once participation increases. This suggests that voluntary schemes are not likely to succeed once we get serious about the volumes of emissions that must be offset. Therefore, a consequentialist has no immediate moral concern about a lack of robust motivation, but will be worried about an offsetting practice that would defeat itself under full compliance, because of the bad consequences that such failure will bring about.

All this does not suggest that some offsetting is worse than no offsetting. Any genuine opportunity to reduce net GHG emissions should be welcome, and partial compliance is often better than no compliance.[12] The concern with the offsetting practice is of a different nature. It creates the mistaken impression that offsetting is all we need to solve the problem of GHG emissions, and it sends the misleading signal that the average Western lifestyle does not need to be reformed to mitigate climate change because buying a few cheap offsets is enough.

Ultimately, the question whether the motivation to offset is robust or fickle is an

empirical question. Motivations cannot be observed directly, but there is evidence that price tends to have a negative impact on the demand for green energy and offsets for flights (Kotchen and Moore, 2007, MacKerron et al., 2008), suggesting that motivations to offset are not as robust as one would wish. At the same time, there is evidence that setting economic incentives can both diminish and increase normative motivations – it is possible, though perhaps not likely, that offsetting schemes lead to 'crowding in' and more robust motivations (e.g., Bowles and Polania-Reyes, 2012).[13] We cannot know for sure why individual people offset now and what they would do if prices increased. Nevertheless, the fact that offsetting schemes are used to sell gas-guzzling cars and long-haul flights suggests that a good deal of opportunism may be in play.

VI Conclusion and Outlook

The practice of voluntary GHG emission offsetting is often met with suspicion. This suspicion is well grounded when offsetting is abused as a marketing tool to sell SUVs or airplane tickets. Nevertheless, offsetting should not be rejected in principle. If the offsetting is implemented properly it helps to control emissions in an efficient way. But offsetting raises worries because it is cheap due to partial compliance. Returning to the example from the introduction: is it really permissible that F the frequent flier travels around the world, as long as he buys enough cheap VER to offset the excess emissions? One could claim that F is not doing enough because the low market price due to partial compliance makes offsetting too cheap. However, this response extends F's obligations in an implausible way. Offsetting only one's own emissions is not wrong because of insufficient sacrifice. It would be implausible to hold people accountable for more than

their own emissions. Rather, the problem with offsetting under partial compliance is that the robustness of the motivation to offset is questionable, and this lack of robustness raises doubts about the motives offsetters have. The problem of offsetting under partial compliance is not that offsetters get a 'cheap ride'. The problem is that we are unsure whether offsetters are truly committed to buy offsets if prices reach the level that would obtain in a full compliance equilibrium. This captures the problem with VER nicely: while we meet our obligation to comply with emission limits by buying cheap VER they may hide our lack of motivation to make more substantial sacrifices to mitigate climate change.

The case studied here has wider implications for the normative analysis of partial compliance settings. The importance of such settings will grow as the increasing complexity of human interactions implies that morally relevant outcomes are often brought about (or supposed to be brought about) by many individuals together (cf. Thompson 1980). In such situations partial compliance tends to be a problem. Partial compliance is challenging to analyze from a normative perspective for a variety of reasons. First, even if we keep the level of compliance fixed, there is disagreement about which principles are to determine individual obligations. Candidates range from some forms of utilitarian optimizing to more causally geared obligations to compensate for harm. Second, if we let the level of compliance vary, we find that, depending on the principle we have chosen to determine individual obligations, the level of compliance can influence the costs of meeting one's obligations. This means that the compliance or non-compliance of others can make it harder or easier to comply. In such settings, it is interesting to think not only about the world with the current level of compliance, but to study what would happen under different levels of compliance, and to look at the robustness against such variations. The

case of carbon offsetting is instructive in that regard. It is a system that works well in the current situation of low compliance, but is likely to collapse if compliance levels increase. The lack of robustness in the offsetting system matters: the system fails as an institution because it would be undermined by its own success. Perhaps even worse, it creates incentives and price signals that convey the impression that climate neutrality could be easy to achieve for everyone without sacrifice.

Figure 1

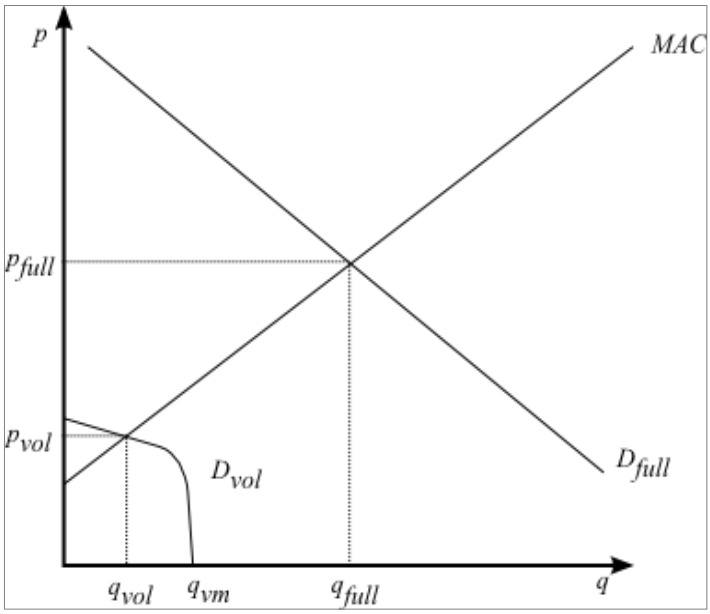

Figure 1: *Demand and supply for voluntary and compulsory carbon offsets.*

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Notes

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[1] Since there are other GHG apart from CO_2, the term ‘carbon neutral’ is misleading. Methane, for example, is another important GHG. For simplicity I assume that ‘carbon neutral’ stands for ‘greenhouse gas neutral’. Greenhouse gas neutrality can be achieved by offsetting the same levels of all relevant GHG, or by calculating equivalent offsets in other gases. The standard unit for comparison are CO_2e (equivalents).

[2] The issue of temporal indexing is a tricky one, but for the purpose of this paper I simply presuppose that an annual emission limit is plausible.

[3] Note that the slope of the MAC curve has a positive slope by definition because the schedule of abatement projects was ordered by MAC. However, this is a static perspective, considering only the currently available offsetting projects. If the supply of offsetting projects increases over time, the

MAC would decrease.

[4] We can interpret the purchase of VER certificates as a voluntary contribution to the provision of a public good that cannot be explained in terms of monetary payoff maximization. By now there exists an expansive literature investigating such phenomena. Among the proposed explanations are "warm glow" theories of altruism, preferences for expressive actions, the desire for social approval and esteem, concerns about moral self-image and/or identity, the desire to comply with social norms, and theories of conditional cooperation. A review of this literature is beyond the scope of this paper.

[5] I am grateful to Laura Valentini for pointing out to me that the duty to offset emissions is not analogous to duties of beneficence. My transfer of Murphy's discussion of the duties of beneficence to the issue of carbon offsets is therefore 'with apologies'.

[6] This example is a response to some very helpful critical comments from an anonymous referee.

[7] Of course, a thoroughgoing orthodox act-utilitarian will be unmoved by these considerations. But if such an act-utilitarianism entails that causal responsibility is *completely* irrelevant for determining obligations, it leads to some rather counter-intuitive results in cases related to promises, intentional and targeted harm, theft, etc.

[8] Note, however, that even though Hohl and Roser discuss a case where the setting is much more tilted towards obligations to take up the slack, they only claim to establish *pro tanto* reasons for doing so.

[9] Broome (2012) proposes a different, controversial line of argument, suggesting that states ought to be concerned primarily with the promotion of goodness, while individuals ought to be concerned primarily with justice. This distinction could justify different answers for individual and state actors.

[10] It is also possible that compliance with the relevant action increases if different agents follow different maxims, but for simplicity such cases are not taken into account here.

[11] This situation can be modelled in different ways. We could assume that the underlying

preferences are stable but conditional on certain facts, or we could assume that the preferences change with context. Both interpretations are consistent with my approach.

[12] Partial compliance is *often* but not *always* desirable because partial compliance may be worthless when tipping points are reached, or when partial compliance creates incentives for non-compliant individuals to emit even more, as Bernward Gesang (2011, p. 175) points out.

[13] Thanks to the anonymous referee who has pointed out this possibility.