Bespoke carbon taxes on food

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The government has been flying a signalling kite: that it might extend carbon taxes to a selected number of "sinning" activities. It let it be known that meat and dairy are in its sights (and gas heating). Signalling has two political merits: it lets the climate change campaigners know that the government is "on their side"; and it gives time to see how big the lobbyists' backlash is going to be.

In the latest batch of "candidates", there is some merit. The Committee on Climate Change (CCC) makes it clear that the net zero targets are hard to hit without a switch away from meat and dairy, for the very good reason that these both lead to high aggregate emissions. How else, it might be asked, are we going to get people to eat less meat and dairy, except by increasing the prices?

The lobbyists were fast out of the blocks. Step forward the NFU. This is Stuart Roberts, Deputy NFU President: "it is essential that any tax is internationally recognised, otherwise UK farmers will be put at a competitive disadvantage, outpriced by food imports with a higher carbon footprint." He goes on: "First and foremost, we should not penalise businesses committed to net zero." "A carbon tax will not be effective if implemented in the UK alone."

I suspect that the NFU wants its members to be paid to reduce their carbon footprint, an inversion of the usual polluter-pays principle to the altogether more convenient polluted pays. Its "Achieving Net Zero: Farming's 2040 Goal" looks very much like this.

But that aside, let's for a moment take Mr Roberts seriously. What follows? Since there is no international agreement on common carbon prices/taxes (they are the same thing), there is no point to a unilateral UK approach. Only when carbon taxes are "universally recognised" is there merit for the NFU in these proposals. This is indeed a powerful criticism, not just of the government's carbon tax kite flying, but of a unilateral policy towards climate change. If the UK sets unilateral carbon targets, and sticks to them, whilst China, India, Africa and, in the agricultural case, especially Brazil and Argentina, are not on the same piece of paper, unilateral UK policy could actually possibly make things worse, unless there is a border adjustment. That is what I argue in *Net Zero: How We Stop Climate Change*.

The government, however, has a strong reply: it is advised by the CCC that unilateral net zero is not going to lead to higher costs at all. The CCC thinks it is going to be incredibly cheap to get to net zero – at most, 1% of GDP, but possibly net positive. Wind, it is argued, is already "cost-competitive" with fossil fuels. It would follow, if this were true,

that Mr Robert's members have nothing to fear: switching to low-carbon energy on their farms is going to give them a competitive advantage over other countries too stupid to realise that net zero is the cheapest option. The good news gets even better: there will be no need for renewables subsidies and paying farmers to invest in them; they will do it anyway because it is all going to be so profitable without subsidy. For the PM this has a huge political advantage: bills are not going to go up, and he can have his "cake-ism" – decarbonisation, no extra costs and lots of jobs too.

My own view is this is at best naïve. It is a stark example of *optimism bias*: believing a story because it fits with one's prior wishes. Wishing costs to be low or negative does not make them so, and ignoring government failures, intermittency and a host of system costs does not make them go away. It also sits very oddly with the argument for carbon prices and taxes: if it is all costless, no carbon price is needed.

The trouble with the CCC headline (and it was given lots of media promotion and spin) is not only that it is highly unlikely to be true, but also that it is an aggregate number. What is claimed to be true overall (even if it was) hides a host of net gainers and net losers. Many of Mr Robert's members are lined up to be in the latter category, and it is not surprising that such a powerful and effective lobby organisation is pushing back. It has decades of experience of opposing environmental measures, defending the use of damaging chemicals, and advocating ever-greater subsidies for each and every new cost that farmers confront. The pages of *Farmers Weekly* are littered with demands that the government should pay for this or that. That is what lobbyists do, and the NFU has a track record of getting its own way, supported by its MP and House of Lords members, Ministers and Select Committee chairmen over decades, and its formidable media campaigning capabilities. It is very good at its job.

That lobbying would have us believe that the farming sector equals the entire food and drinks business in the UK. It doesn't: the value-added in the £100+ billion food and drinks industry is based on just £9 billion, or thereabouts, of UK agricultural output, around 0.6% of GDP. Of that, roughly £3 billion has been made up of CAP subsidies, and the new England agricultural policy is going to go on paying farmers that amount. That leaves £6 billion, before we subtract the costs to the environment of farmers' activities: the pollution to air, water and the biodiversity, and before we throw into the mix red diesel (yes, diesel is subsidised). Then there are the very large tax concessions that have driven up land values – including exemptions from business rates and inheritance tax and other reliefs. A back of an envelope calculation would struggle to be left with much more than £3 billion, and it could be zero.

Put this way, the actual damage done to the farming output by a carbon tax would be very small to the economy as a whole. But the next question is whether it would really do much damage at all, and, further, whether some farmers would gain.

Mr Roberts presents the impact as a substitution effect from UK farmers to overseas farmers. We simply buy Argentinian and Brazilian beef rather than British beef. But as

any 101 economics undergraduate knows, prices have both income and substitution effects. The aim is to reduce consumption of meat and cheese, not simply to displace it. What the CCC wants is for us to eat less meet and cheese. Land would therefore switch to cereals and other uses. What the CCC does not want is a switch to imports, with consumption remaining the same.

This is a general point: in order to act unilaterally on climate change – and indeed on all the aspects of policy that sovereignty is supposed to provide – import adjustments are needed. The UK is a small, open-trading country. It cannot have higher environment and social standards, with higher animal welfare, unless it is willing to make sure that all the goods and services in the home economy face the same constraints as imports. This is the difference between political sovereignty and economic sovereignty, and it seems to have passed the government by. BREXIT only really means sovereignty if the borders are controlled, and common standards, tariffs and taxes are applied, relative to the home market.

This is Mr Robert's strong point. As a lobbyist, he treats this as a negative point: it can be used to fight off imposing a carbon price and making his members – the polluters – pay. But what if Mr Roberts actually wanted to get to net zero, and accepted the polluter-pays principle? This is where it gets really interesting, and the NFU is toying with this much more positive approach in its Net Zero 2040 plan.

A credible agricultural net zero plan has several parts. It starts with the polluter-pays principle and applies it to farmers - like any other industry. Initially, this is going to be painful. Out goes the red diesel, and in comes much higher costs for fertilisers and pesticides and for fossil fuels for heavy machinery. Agriculture accounts for 11% of greenhouse gas emissions in official figures (here lumped together as "carbon" but comprising methane and nitrous oxides and different half-lives). But it is actually higher because the carbon loss from soils and peat is not properly measured. Soil has about 4 times the carbon of the atmosphere, and the stripping out of this natural capital has been part of the legacy of modern British farming.

At 11%+ greenhouse gas emissions for 0.6% of GDP, farming is relatively the greatest carbon polluter in the economy, leaving power, heating and transport far behind in its wake. The CCC is right: we cannot hit net zero without radical changes in agricultural practices, and the government is right to put public goods rather than land ownership subsidies at the heart of its new agricultural policy. Farmers are very carbon-polluting, and the NFU's Net Zero 2040 is going to be a really big challenge to farmers, who would (and will) face much higher costs.

It follows that change is going to be radical, and a ditch-by-ditch lobbyists' defence is not going to work, unless it is honest and says we should not go for net zero – or, as Mr Roberts seems to require, we should not unilaterally go for net zero, but only take measures if others do. This is the lowest common denominator approach, and the result will be hot and wet.

What would a net zero agriculture look like?

It is obvious that net zero agriculture is going to be radically different, and to achieve this by 2040 requires immediate and major change.

There are two parts to net zero agriculture: reducing emissions at scale, and sequestrating carbon at scale. The former requires a transformation from high-polluting artificial fertilisers and pesticides, and protection from further carbon losses from the soil and from peat.

Let's start with the emissions. The first step is to measure them properly. This means direct and indirect measures. Direct measures are what comes off the farm – from the animals and the soils and from the operation of machinery. The way to think about the scale of the required change is to work out what the carbon (as shorthand for all the greenhouse gases) price would have to be to reduce the emissions to close to zero – whether or not carbon taxes are actually the preferred instrument.

The indirect emissions are the carbon embedded in the inputs, and especially from the machinery production, fertilisers and pesticides. The way to think about this is the carbon tax that the fertiliser, pesticide and machinery producers would have to pay to reflect the damaging carbon emissions involved in making these products and transporting them to the farm.

Add this lot up, and the current production techniques for many farms simply do not make economic sense. Put another way, the economic competitive advantage once pollution costs are properly incorporated into the markets will shift towards more sustainable farming practices. The restorative approach reduces soil emissions. Organic farming avoids most of the carbon prices (but not all), and arable farming will (if done sustainably) often outclass dairy and beef, where there is scope to do either.

This broad set of implications of course needs to take account of the wider economic considerations, and the wider environment impacts. Fertilisers and pesticides go into rivers and we pay to have our water cleaned up and our rivers protected. Some of these costs fall away for us water customers, whilst they go up for the polluters. There are also environmental benefits from mixed farming and from farm animals to take into account too. Carbon emissions are one part of the environment challenges, but they are not the only ones: biodiversity, soil management and the supporting infrastructure of hedges and meadows need to be taken on board too. A simplistic "anti-meat" approach is just that – simplistic.

Farming methods in a net zero agriculture will have to change not only in the direction of better soil and land management. Technology will make a big difference. So far, indoor vertical farms are in their infancy, as is the application of genetics to food production. Indoor farms can be net zero, by using renewable energy to generate the electricity for the lights, water systems can be closed, and there is no obvious need for pesticides in a closed system. Fertilisers can be precisely applied. In the process, more

land can be freed up for wider environmental purposes. It will be part of the mix, raising productivity and reducing emissions.

The second part of net zero is sequestration. The carbon concentration in the atmosphere is the consequence of emissions increasing it, and sequestration taking it back out again. This balance is what has regulated and determined our climate, long before humans and the Industrial Revolution came along. Any serious focus on net zero has to look at sequestration, and natural sequestration in particular. Crops and trees all sequestrate carbon. The problems come when the crops are eaten (by humans and animals) and the trees are burnt. Biomass for electricity generation more than negates the sequestration, and its only serious claim to have a net zero role is that it is not as bad as coal, and sometimes not as bad as gas.

The land can do much more sequestration. This is a win-win environmentally. The soils are not only a store of carbon, but also of the bulk of our biodiversity. Putting the carbon back in the soils is a massive opportunity on the wider route to net zero for the economy as a whole. Farmers, managing 70% of the land, have a clear and obvious role and responsibility in this regard.

However, there is a snag here. Those farmers who have done the most to denude the soil of its carbon are also often those best placed to put it back. Farmers following organic and restorative practices are often already at the carbon saturation point. It is worse: the perverse incentive for farmers is to trash the soil further, in order to be paid to put the carbon back again, just as some farmers had a perverse incentive to get rid of hedges and plough up land in SSSIs before they were protected, and can now deliver the public goods of restoring the SSSIs and replanting hedges.

This perverse incentive problem and the rewarding of those who have done most carbon damage lies at the heart of the design of the new ELMS system of subsidies. The answer is to combine payments for the public goods of the stored carbon in sustainable farming practices, and a parallel market in carbon offsets. Whether or not farmers have stripped out the carbon, it is the carbon-poor areas that have the most scope for sequestration, and it is sequestration that is needed to meet net zero. Remember, too, that intensive farming is still carbon-emitting, and the carbon price will bite hard on the more polluting farm practices.

This is just a bit of a short sketch of what a net zero agriculture will look like. I will elaborate further in subsequent papers. The point to make here is that it is radically different from what we have now, and the NFU's 2040 target is under 20 years away. For many farmers that is already in the planning horizon, and, for each, comparing what exists now with a net zero outcome on their farms, and working out how to get from here to there in a few rotations of crops and livestock generations indicates that a lot has to happen right now. There is little evidence that this sense of urgency is gripping many farmers yet.

Tariffs, standards and a border adjustment mechanism

The beef and dairy carbon tax proposal is one element of an efficient way to make this transformation. But, as noted, if other countries do not take measures, then it, too, will have too unintended consequences: it will make some farming practices uneconomic; and it may increase carbon emissions globally (and lower carbon sequestration globally), as importers get an additional policy-induced competitive advantage. It is right to cry foul.

The interesting question is how to deal with these consequences, and the answer is that the beef and dairy carbon tax must apply to *all* beef and dairy, wherever they are produced. It must apply to domestic production by British farmers and to imports. Without a border adjustment, we could be switching British beef for Brazilian beef reared on the cleared Amazon.

How to do this? Contrary to the arguments of importers, this does not have to be complicated (except for one issue, tackled below). The aim is to be roughly right, not precisely wrong. Agriculture has always been riddled with tariffs. Indeed, there is very little tariff-free agriculture trade. The EU (or the EEC as it was) was set up as a customs union to keep out cheap imports. The CAP was designed around deliberate tariff barriers, and that is why the CAP produces expensive food (and not the cheap food that its supporters claim).

If we take beef, there could be a standard tariff for imports based upon notional carbon (greenhouse gas) content by weight for those countries who do not have their own domestic carbon taxes. Notice, immediately, two issues: first, this applies only to those countries that do not have carbon taxes; and, second, a general carbon border tax makes no allowance for the very different ways beef is produced, from intensive grain-fed lots to open prairie and pastures.

The first is actually a great advantage. For instead of paying the UK Treasury the border adjustment, exporters to the UK could pay the tax to their own government back home. There is a massive incentive for others to follow the UK lead. These countries would then present an exemption certificate at the border. Instead of the jaw-jaw of global conferences and global agreements based upon the lowest common denominator, the border adjustment creates a bottom-up incentive to pluralise the taxes globally.

The second is much trickier, and it applies as much to home production as to imports. There is a great difference in emissions from beef produced from grass than from grain. There is also a considerable difference between short journeys to consumption, and global shipping and transport. It would be absurd to try to provide a complex and detailed precise estimation of the carbon from beef on each farm. They are all different. But the perfect should not be the enemy of the good: there could, for example, be two rates of taxation at the border and domestically, according to a fairly crude distinction. Indeed, the distinction may encourage farmers both overseas and at home to shift

towards the more sustainable ways of dairy and beef framing, and thereby incur the lower costs of a lower pollution charge.

Supply chain implications

We noted above the NFU's repeated attempts to associate itself with the value of the whole supply chain, rather than the more meagre 0.6% of GDP. The distinction between the supply chain (what happens once the farmers have done their producing) and the farms is actually very important to the carbon tax issues.

Take a look at the sheer complexity, globalisation and transport issues that the modern food industry presents us with. A simple jar of chocolate spread might involve tens of countries and multiple producers and, as BREXIT has revealed, one product may travel repeatedly between different production and distribution parts of the modern supply chain before reaching its final customers.

There are two challenges for this food supply chain. The first is the global bit and its sheer carbon intensity. The second is the "food" that comes out the end. There is little evidence that the complex processing of our food has necessarily been overall a huge net benefit. Fast food, highly processed food, intensively marketed food – these are all not completely innocent of the obesity and health crises that developed countries are afflicted by, not least the health consequences in the UK and the correlation with the highest death rates in the world from the coronavirus pandemic. (A sugar tax might also reduce obesity.)

If the cost of the carbon in the full food supply chain were properly taken into account, then it is reasonable to speculate that there would be quite a lot less globalisation, quite a lot less highly processed food, and hence the apparent competitive advantage that imports have over home production might be less than it appears. A proper carbon tax applied through the full supply change would result, other things being equal, in a lot more local food and a competitive boost to home production. When farmers complain about supermarkets and the prices they offer for the farmers' produce, they touch only the tip of the problem.

A final consideration is the separate issue of live animal imports and exports. If proper carbon taxes tilt the balance back to the local, this will apply to live as well as dead animals. That should improve animal welfare – a particular concern in the BREXIT discussions and trade more generally. There would then also be more scope for local abattoirs and the gradual return of local food infrastructure.

Where will the food come from and what about security of supply?

The NFU is quick to bang the "security of supply" drum, and this is raised in the case of carbon taxes too. It has two versions. The first is ridiculous: it is the argument that we must produce a high percentage of all food consumed in the UK for "security" reasons.

In the background is the whole edifice of the post-Second World War agricultural policy, with its subsidies per unit of output.

It is true that in the Second World War we really did have to dig for victory, for there was a genuine fear of being starved into surrender by German U-boats as they sunk the food convoys from the USA. I doubt anyone thinks that we would have time to be starved in a modern war. The electricity and fibre grids would be taken out in a matter of minutes and, at most, days, and a carbon tax is not going to make any difference.

Yet question this and the NFU President is brought in to shoot you down as if you have committed sacrilege. It is nonsense, and so we have to see if there is some other justification for maximising the amount of food produced in the UK as against imports. This is where the carbon tax comes in: key reasons for producing more food domestically are environmental and animal welfare. If the polluter pays, then more food should and would be domestically produced, provided there is a border adjustment.

The other dimension of the security of supply lobbying which is more interesting and highly relevant to net zero is to take a close look at what farmland is actually used for. The remarkable thing about British agriculture is how much of it is *not* about producing the sorts of food that would meet the NFU's security of supply criterion. British farmers make money from a host of activities that do not produce much food. Two obvious examples are game shooting and biomass. Between 50 and 80 million pheasants are released into the countryside annually (in non-pandemic years). Typically, they are intensively reared, eat copious amounts of grain, and the shooting involves lots of travel. The biomass crops are something the NFU is keen to see more of, and more subsidies. Take a look, for example, at the practices of anaerobic digestors and the growing of maize crops for this purpose, with all the implications for soil and carbon losses from the soil.

I raise these two examples (there are many more) because the obvious question for anyone who trumpets security of supply is that they should be "against" these forms of land use. The most obvious way to increase security of supply is to use more of the land to produce more food for us, and not these other (often subsidised) products. Talking the talk about security of supply would be consistently followed through by walking the walk. A high level of self-sufficiency should lead to a big change in the actual crops grown and the land use. That is, after all, what happened in the "dig for victory". I doubt very much that all the NFU members would take kindly to such policy advocacy.

These considerations and inconsistencies aside, it is hard to argue that the percentage of home versus overseas production really matters much (even if "food" was properly. defined). The real issue is how to have a sustainable net zero agriculture, and the percentage will be an outcome of that system of farming. My guess is that it would be one with more local production and the percentage might actually go up. If, in the process, land was actually used to produce more food, rather than some of these other

profitable and subsidised activities, we might have better, more healthy, food, lower emissions and less animal cruelty.

Back to the beef and cheese tax: not all beef meat and dairy is high carbon

The final consideration is whether there should be bespoke beef and dairy carbon taxes, considered separately from all the other polluting activities in the economy. Why pick on beef and dairy farmers?

This is a very good question, and it tells us a lot about the politics of carbon taxation. The right answer to carbon taxation is a uniform carbon price applied to everything – energy, transport, heating and agriculture. This is the most efficient approach, letting the market sort out the cheapest ways of reducing emissions and increasing sequestration. Of course, a uniform carbon tax would not be sufficient, but it is necessary if the transition to net zero is to be done at a cost that the public and voters might be able to stand.

The government's approach is the opposite: "a pick-and-mix strategy", all the time trying to ameliorate public opinion. What governments fear is that the public will realise that the unilateral transition to net zero is going to cost a lot. The Prime Minister is keen for the public to believe that consumers' bills will not go up. It is all going to be cheap and easy.

This is unlikely to be the case. Food prices will rise because we, the consumers of that food, will have to pay for the pollution we cause. Electricity prices will go up because renewables are not generally fully cost-competitive once the system costs and intermittency and remote locations are taken into account. There will also be big policy mistakes: think of the fiasco of the first Green Deal, the extraordinary costs and inefficiencies of the smart meter roll-out, or all those subsidies paid to biomass.

This is where the carbon tax comes in. The problem with carbon taxes is that they are "in your face". They force us – the polluters, who consume carbon-intensive goods and services, from dairy to using the internet, to going on foreign holidays – to face up to the pollution we cause. So, politicians – and, in particular, this government – try to hide the costs of new zero behind the mass of detailed interventions, regulations and subsidies. The problem is that the costs don't go away – in fact, they are bigger.

So far, the government has chosen the worst post-BREXIT carbon-pricing option – the UK ETS – and rejected a general carbon tax. Instead, it wants to creep forward with carbon taxation in targeted segments of the economy. It wants to go for beef and dairy farmers, and also possibly domestic gas heating. What is interesting is less whom the government is targeting, but whom it is not. The case of a carbon tax on beef and dairy is best made as a case for a *general* carbon tax applied across *all* of agriculture, and, with this, a *general* negative-priced carbon offset sequestration market. Choosing the short-term politically expedient route is not the cheapest option. The costs will out, and be higher than they need to be.

Conclusions

Bespoke carbon taxes on beef and dairy could work, if done properly. The government has floated the idea, putting the kite in the air to see what happens. The response of the main farming lobbyists has been highly predictable.

The question now is what is to be done about it. Carbon taxation makes a lot of sense, and it should be applied at the border, on the same basis to imports as to domestic production. It is a key part of achieving the immensely ambitious Net Zero 2040 target that the NFU has set itself. The result will be to lift the competitiveness of British farming, and to incentivise the shift from carbon-intensive to more sustainable farming practices.

Sustainable farming, where carbon is priced and polluters pay, is likely to be both more technologically advanced and also more local. To pretend that farming can go net zero in 19 years (or at least 29 years), and that food prices will not go up, is something the government should stop doing. Polluters – you and me – are living beyond our environment means. We are not paying all the costs. Paying those costs increases the economic efficiency of farming. An efficient economy incorporates all costs.

The real question is whether the government and the NFU, with its Net Zero 2040, is willing to wish the means as well as the end. Pretending it is all going to happen is not going to make it actually happen.

Net Zero: How we stop causing climate change
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