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EDITORIAL

Biofuels and perverse subsidies: fuelling the wrong solutions?

JAN BOERSEMA, ANDREW BLOWERS & ADRIAN MARTIN

Subsidies are an important feature of our economic landscape. Although there is no universally accepted definition of a subsidy, the one probably most widely used is that of the OECD (2005): 'A subsidy is a result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs'. All over the world it is common policy to subsidize to lower the cost of commodities or stimulate developments or breakthroughs that otherwise would not take off. From a purely economic viewpoint, all subsidies are potentially distortive, but in some cases they may be given for sound economic reasons, e.g. to create a level playing field or to compensate for unwanted external effects. If they result in unfair competition and a disadvantage for competitors they may be called distortive.

It is well known from a great number of studies that subsidies can have harmful effects on the environment (Whitfield 2006). The OECD (1998) speaks of subsidies that '(unintentionally) discriminate against sound environmental practices'. By using the term 'environmentally damaging subsidies' one is leaving aside the question of whether or not these subsidies really do result in benign effects on the economy. Less widely recognised are 'perverse subsidies' defined as subsidies having adverse effects on both the economy and the environment in the long run (Myers 1998, p. xiii; Myers and Kent 2001). They encourage development in industrial and other sectors, and in particular locations, that is counterproductive to economic and environmental concerns. They may also encourage development and growth in activities that rather should be reduced and/or regulated.

This editorial stresses the importance of being more critical of this kind of subsidy, especially in the energy sector and the emerging new field of biofuels. Biofuels have been championed as an energy source that can reduce vehicle emissions and provide a new income stream for farmers. Both claims have been contested in recent publications, but they remain key arguments for supporting the development of crops for biofuels. Apart from the contested economic arguments, there are concerns about the environmental damage that biofuel production can cause. Do we have a clear case of perverse subsidies here?

Substantial amount of money

Perverse subsidies exist all over the world and it is estimated that they cost taxpayers billions. According to MacNeill et al. (1991, p. 34), they cost North American, European and

Japanese consumers and taxpayers more than \$250 billion dollars per year for agricultural subsidies alone. At the end of the 90s, Myers estimated the total subsidies in five sectors – agriculture, fossil fuels/nuclear energy, road transportation, water and fisheries – to be around \$1 trillion worldwide. He concluded that such a sizeable amount of subsidies could exert a significantly distorting impact on the global economy. Ten years later, in its recently published report, the Institute for European Environmental Policy claims that perverse subsidies of environmentally damaging industries is costing Europe billions of euros: 29 billion for the energy sector, 7.3 for household fuels and a staggering 240 billion for road transport (IEEP 2007). Although the figures vary, we may safely assume Myers was right and is still right in his judgment on the distortive impact on the economy.

The environmental damage of perverse subsidies is not to be underestimated, but is far more difficult to assess due to the less direct nature of the impacts. It may be questioned if it is always necessary to know the full details of damage before calling for reforms. It may be assessed in a comparative way. If we, for instance, consider the energy sector, the relevant question is not how much harm is done to the environment by the subsidy, but whether the energy source it supports causes more or less harm than an alternative energy source (OECD 2005).

Most subsidies have laudable aims when they are instigated. They aim, for example to ensure food and energy security, to reduce pollution or protect disadvantaged social groups. Decreasing price competitiveness, protection of domestic employment and jobs are increasingly seen as less justifiable aims. In many cases, the original rationale no longer fully applies and the continued use of subsidies acts in a way that locks in old technologies while locking-out new and better ones. A telling example is the ongoing subsidies for the German hard coal mining industry. With a declining production and workplace numbers, the 2.7 billion Euros of subsidy spent in 2005 (75,000 Euro per coal job) is still higher per Kwh than the cost of electricity from wind turbines. In 2007, while the world market price averaged about 60 Euros, the extraction costs for a tonne of German coal was about 190 Euros. After years of debate, a court decision in 1994 and a ‘coal compromise’ in 1997, it was agreed in January 2007 to phase out production by 2018. It is hard to get rid of perverse subsidies, even in modern democracies.

Biofuels

The drive for green energy all over the world is in danger of creating the same perverse effects. While the use of biofuels are supposed to reduce CO₂ emissions, the benefits may vary significantly, depending on the resource used and the process applied. The clear and present danger is that we are fuelling the wrong solutions; wrong because of the poor overall performance of many biofuels in environmental terms. According to a recent paper, it may be asked if the most common ways of producing biofuels offer a cure that is worse than the disease they seek to heal (OECD 2007). According to the US Department of Energy and the US Environmental Protection Agency, the statistics are as follows. For corn ethanol, the most widely produced biofuel in the USA, 4.9 billion gallons in 2006, the energy balance (input of fossil fuel energy used compared with the energy in the output) is 1:1.3, leading to an overall reduction in greenhouse gasses of 22%. To get the energy equivalent of a gallon of gasoline costs 25% more (retail prices 2007). These figures are far from impressive. Cane ethanol is more profitable in terms of price and productivity. It yields twice as much as corn and can be produced 20% cheaper than gasoline. Brazil is the world leader: in 2005 it produced approximately 4 billion gallons. Compared to corn ethanol the energy balance is far better, 1:8, and the reduction in greenhouse gas emissions is about 56%. Another way of producing

biofuels is by chemically altering plant oils into biodiesel. It takes less energy than distilling corn into alcohol, but the yields are low and the costs high. The energy balance is 1:2.5 and the greenhouse gas emissions can be reduced by 68%. Germany is the world's leading producer with 0.5 billion gallons in 2005. It comes from rapeseed, canola, and soybeans.

Whatever the way of producing biofuels is or was, it has never happened without being subsidised in one way or another. The federal government in the USA started supporting ethanol use in the late 1970s through a reduction in the excise tax for gasohol (a fuel composed of 90% gasoline and 10% ethanol). From that time on, according to an article in *Foreign Affairs*, the push for ethanol and other biofuels has spawned a worldwide industry that depends on billions of dollars of taxpayer subsidies (Runge et al. 2007, p. 41). Recently, the USA congress gave the ethanol industry another boost, extending the tax credits and tariffs while requiring that 7.5 billion gallons of the nation's fuel come from ethanol or biodiesel by 2012. President George W. Bush went even further, calling on the country to produce 35 billion gallons of renewable fuel by the year 2017, nearly five times the level currently mandated. In the EU, financial support to biofuels production and use includes a fuel duty, enhanced capital allowances (an extra tax incentive to companies for investing in biofuel processing plants) and a 'bio-credit' (IEEP 2007, p. 125). The leading OECD countries producing ethanol apply import tariffs that add at least 25% to the cost of imports. As a result, current trade is only about 10% of the world's biofuel consumption. From an economic viewpoint, this is an inefficient outcome, as biofuels produced in tropical regions from sugarcane and vegetable oils have a considerable cost advantage over those derived from agricultural crops in temperate zones.

Social impacts

Looking at the environmental impact, the record of biofuels is not as good as its promoters would have us believe. In some cases, it is not good at all. For instance, the Indonesian government is planning the conversion of some 20 million hectares to oil palm plantations, largely to serve the European biofuel market. This is likely to destroy most of the remaining peatlands and rainforests and lead to the emission of as much as 50 billion tonnes of carbon (IEEP 2007, p. 130). But there is more at stake. One of the most obvious drawbacks is that every biofuel also consumes crops/land that could feed hungry people. The *Foreign Affairs* article asks with appropriate rhetoric: 'will it starve the poor?' (Runge et al. 2007). This is especially true in the case of corn, but it holds for almost all biofuels currently available. Alcohol from sugarcane may be a relatively clean fuel, but the process of making it is very dirty, especially the burning of cane. Labour conditions are harsh, and they equal the situation of coal miners in China. The exploitation of cane workers is said to be a shame to every civilised nation.

Solutions

There are no easy solutions to the problems created by environmentally damaging or perverse (energy) subsidies. This is even more the case with of subsidies that create some benefit to the environment but at unacceptable social costs or for subsidies that could yield far more benefit economically, environmentally and socially if spent elsewhere. It requires taking measures on several levels. For the EU, the authors of the IEEP report give sensible and detailed recommendations. Others like Koplow (2007) and Myers (1998) have done their part for countries like the USA and Brasil. They are all pointing in the same direction. The worst thing to do is to throw away the baby with the bath water. Subsidies make sense if they meet

conditions already mentioned. Subsidies could and should be part of a carefully drafted and widely discussed energy policy plan. They should be given to promising technologies only after thorough assessment. But how do we evaluate? The big issue for interdisciplinary science is to develop methods to make such an assessment feasible and sensible at the same time.

Phasing out quickly the most harmful subsidies is required in any case. Taking energy conservation seriously is still the best advice to be given to oil-addicted countries. It is by far the cheapest way to go for developed countries, certainly in the long run. For countries with an expanding economy like China and India, applying the best technology and technology transfer is probably the best way to mitigate their emissions. As to biofuels, probably the best thing to do is to take food out of the picture. Far better to turn to the (further) development of a cellulose based production of ethanol. The raw material might come from perennial prairie grasses or from by-products that are normally dumped, burned or ploughed back under. The energy balance of cellulosic ethanol could rise above 30 while the reduction of greenhouse gasses amounts to 91%. Far from being perverse, subsidies directed towards such a form of development would bring both economic and environmental benefits.

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