The effects of fuel prices, subsidies and taxes on fisheries production and management

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Abstract
Fuel costs are one of the main cost items fishing fleets have to face, even when fuel prices for the fishing sector are often lower than public prices, as in many other production sectors. Fuel prices paid by the fishing sector are often exempted of certain taxes. Fuel subsidies, such as tax exemptions, have received significant attention, while taxes themselves may have not received the deserved attention lately. However, both, taxes and subsidies, can distort production and markets. In fact, low taxation levels behave similar to subsidies, and can be considered as such. This happens when fuel consumption is charged with a tax lower than the externalities they generate (e.g. related to pollution, health risks and global warming). In this paper we investigate the effects of fuel taxes and subsidies (using the tax exemption and low taxation level approaches) on the economic performance and overcapacity of the EU fleet operating in the Northeast Atlantic.

Keywords: fuel consumption, fuel price, tax, subsidy, excise, MSY, EU fishing fleets.

Introduction
Fisheries is a (high) fuel consumption food production activity. Economic performance of fishing fleets is very dependent on fuel prices. Fuel costs are a main cost for fishing fleets. Fuel costs average 27% of the total operating costs in the EU fishing (STECF, 2015), being one of the main cost items of EU fishing fleets. Hence, low fuel prices supported by subsidies or low tax levels lead to reduced production costs and, consequently, higher levels of production (i.e. higher fishing effort and capacity, often termed overcapacity) that would be in competitive equilibrium. Hence, in most fisheries, low fuel prices, apart from the increase in pollution and greenhouse gas emission, lead to higher fishing effort and capacity, a lower long-term level of fish production and an overall decrease in welfare.

Fisheries fuel prices are often lower than public prices (e.g. tax exemptions). Energy subsidies, often in the form of tax exemptions for the industry, are widely used in order to prevent competitiveness losses of national industries facing higher energy prices because of taxes (Ekins & Speck, 1999). This is at the same time justified because of the often large differences in taxation levels for energy and fossil fuels between countries. However, tax exemptions are often considered a subsidy.

FAO & World Bank did some first estimates of global fisheries subsidies (FAO, 1992; Milazzo, 1998). Fuel subsidies are the most common and largest fisheries subsidies (Willman et al., 2009). The OECD (Martini, 2012) estimated fisheries fuel subsidies for OECD members based on submitted data to be about $2 billion for 9.3 billion litres in 2008[1]. Borrello et al. (2013) estimated

[1] As Martini (2012) points out, the total value of fuel tax-concessions (subsidies) is underestimated as not all countries reported the relevant data; there are sub-national tax concessions that have not been reported, and some missing fuel consumption data.

fuel subsidies (or foregone revenues as they name it) for the EU fishing fleet to be around €1.05 billion on average per year over the period 2002-2011[2]. More recent studies, estimate global fisheries subsidies to be about $35 billion (Sumaila et al., 2016), of which fuel fisheries subsidies were estimated, using the tax exemption approach, to be about $7.7 billion in 2009 (Sumaila et al. 2016).

Methodology

The tax exemption approach to estimate subsidies is not fully satisfactory, because of the large differences in taxation levels (& approaches) between countries. For example, there could be a country (A) that incentivize fuel consumption and both the public and the industry pay 0.1$ per liter, while another country (B) more aware of the environment could decide that the public pays 9$ per liter and the industry pays 10$ per liter. Following the tax exemption approach, country A would not subsidize the fisheries fuel, while country B would subsidize it with 1 per liter.

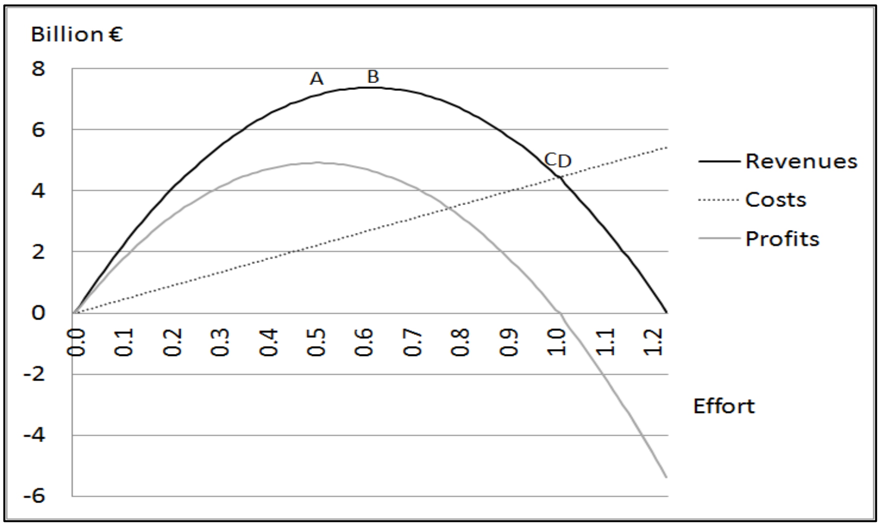
Hence, both taxes and subsidies can distort production and markets. In fact, low taxation levels behave as subsidies. So, there is the need to find a common acceptable and sound reference point to delineate fuel subsidies.

In this study, we have chosen the externality cost as the reference point to delineate fuel subsidies. So that a tax is lower than the externalities fuel consumption generates (e.g. related to pollution, health risks and global warming) behaves as a subsidy. While, a higher taxation level would lead to fuel consumption levels lower than the optimal one. However, in this case, governments would capture resource (fisheries) rent.

Considering the externality cost in the subsidy estimation has been previously done by the International Monetary Fund (Clements et al., 2013) and a FAO (2000) expert consultation.

Following Guillen et al. (2016), we define a Gordon-Schaefer model relating current (2013) EU fleet activity in Northeast Atlantic (FAO Fishing Area 27) including MSY estimates (see Figure 1). The cost and economic performance data were obtained from the 2015 AER (STECF, 2015).

Figure 1: Gordon-Schaefer model of the EU fleet activity in Northeast Atlantic (Guillen et al., 2016)



[2] As Borrello et al. (2013) is partly based on Martini (2012) data, it suffers from some of the underestimation problems highlighted in Martini (2012).

Guillen et al. (2016) conclude that important effort (and capacity) reductions are necessary to achieve MSY, which would lead to relevant improvements in profits MSY (-B€ 4.5). It should be noted that the extent of Guillen et al. (2016) results depend on the assumptions. But about 50% of the economic performance improvement comes from the cost reduction, and so is less uncertain.

We re-estimate Guillen et al. (2016) model assuming different fuel cost prices.

- Fuel prices paid by the fisheries sector (0.63 €/l) (STECF, 2015),
- Fully taxed (i.e. as public pays) gasoil price (1.44 €/l) (European Commission. 2016),
- Fuel price with no taxes (0.52 €/l) (European Commission. 2016),
- Fuel price with taxes accounting for VAT and externalities (1.39 €/l).

The fuel price with taxes accounting for VAT and externalities is determined by adding the externality to the price paid by the fisheries sector (that includes VAT but no excises). The externality cost is estimated as follows. Shindell (2015) estimated the impact of fossil fuel consumption considering a variety of pollutants and impacts on climate change and human health to be $4.80 per gallon of gasoil. While the Clean Air for Europe (CAFE) Programme estimated that emissions occurring at sea impose 50-80% (we assume them to be 80% following a precautionary approach) of the damage of the same emissions occurring on land (AEA Technology Environment, 2005). So:

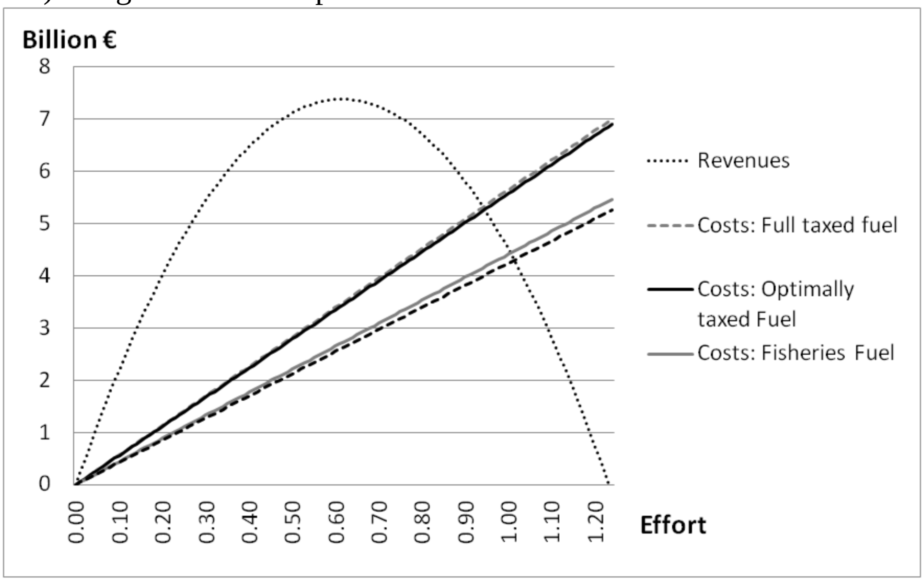
$4.80/gallon * 1gallon/3.785 litre * 1€/1.3281$ * 80% = 0.76 €/l.

Thus, the fuel price with taxes accounting for VAT and externalities (1.39 €/l) is equal to the sum of the fuel prices paid by the fisheries sector (0.63 €/l) and the externality (0.76 €/l).

Results

When re-estimating Guillen et al. (2016) model assuming different fuel cost prices we obtain the following revenues and cost structures represented in Figure 2.

Figure 2: re-estimation of the Guillen et al. (2016) model of the EU fleet activity in Northeast Atlantic (Area 27) using different fuel prices



From these results it can be seen that "low" fuel prices (i.e. subsidized) are not very responsible of the current overcapacity situation. If there was no fuel tax exemption, fisheries fuel price would be €1.44 per litre instead of €0.63 per litre (equal to a 129% fuel price increase). Net profits, considering a fuel price of €1.44 per litre (and status quo), would be -€1.14 billion, while when fuel price was €0.63 per litre they were €0.10 billion. Effort needs to be reduced by 6% (relative effort from 1.00 to 0.94) to obtain the same profits. So, the low (subsidized) fuel prices are just responsible of the 6% of the current overcapacity.

Results from our study also show that the fuel subsidies for the EU fleet operating in the Northeast Atlantic fisheries were €1.16 billion following the externality cost approach, compared to the €1.23 billion using the tax exemption approach, in 2013.

This methodology also allows us to estimate the total fuel subsidies for the EU fleet at about €1.75 billion, considering that it consumed 2.4 billion liters of fuel according to AER, while the tax exemption approach would estimate fuel subsidies for the whole EU fleet to be at €1.87 billion. Following the same approach, global fuel subsidies could be estimated to be between €28.8 billion and 38.4 billion ($38.3-51.1 billion) based on Muir (2015) data, which would lead us to conclude that current global fisheries subsidies estimations (e.g. Sumaila et al., 2016) are underestimated because of the fuel subsidies estimation.

Conclusions

In this study we propose a more comprehensive way to estimate fisheries fuel subsidies considering the externality costs. We are aware that the estimation of the externality cost of burning fuel could be controversial and may need to be improved (which is out of the scope of our work). However, it is clear that current fuel prices are too low to fully cover the externality costs of burning fuel. Our results show that with our methodology the importance (the amount) of global fuel subsidies increases. Considering overcapacity and that we are currently in a period of low fuel prices, it may be a good moment to start implementing changes

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