



FISHERIES MANAGEMENT COSTS

HOW THE EXPENSE OF SCOTTISH
FISHERIES MANAGEMENT CAN BE
SUSTAINABLY FUNDED

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INTRODUCTION

Despite marine fisheries constituting a relatively small economic sector in Scotland (0.2% GVA),^{1,2} the costs of managing Scottish fisheries are substantial. From enforcement to port infrastructure, fisheries science to tax exemptions, the costs of fisheries management are highly diverse and challenging for governments in Holyrood, Westminster, and Brussels.

These management costs are paid for through general taxation but the financial benefits of fisheries management is limited to those within the fishing industry and to a lesser extent ancillary industries and consumers in the UK and abroad. The 'resource rent' generated from the commercial harvest of fish stocks in Scotland is further limited by the fact that commercial licensing in Scottish fisheries is limited. A cap on commercial fishing licenses prevents new entry into the fishing industry and generates economic benefits for those fishers holding licences by limiting access to the fishing industry. Despite acknowledgement that fish stocks are a public resource, this limiting licensing is deemed a crucial protection for the sustainability of the resource.

Both these aspects of fisheries management – significant public costs and limited private benefits – have led to calls for 'cost recovery' in fisheries management. Iceland, the Faroe Islands, Australia, New Zealand and regions of the US have all responded to this call by implementing auctions, levies, and other mechanisms to raise revenue from the fishing industry to pay for management costs. While these mechanisms for cost recovery are relatively new in fisheries management, they have a long, established history in other natural resource industries where private users derive economic benefits from a public resource. This approach includes natural resource sectors operating in Scotland such as oil and gas extraction, aggregate extraction, and water abstraction. The 'public money public goods' principle that has come to define the discussion over future agricultural subsidies is simply the inverse of this approach for private benefits.

There is growing appreciation in the fishing industry that high quality fisheries management can yield economic benefits and that high quality has a price tag attached. One clear example of the benefits of funding management would be a greater number of – and more detailed – stock assessments that may indicate a greater biomass of fish populations and thus larger allowable fish catches in the Scottish fishing industry. Under these conditions, sharing the costs of fisheries management could be in the economic interest of the fishing industry as well as society.

Furthermore, whereas for decades the Scottish fishing industry suffered from low profitability, it is now the case that profit margins in the industry are extremely healthy

(30% gross, 25% net) and much higher than in fish processing, retail, or indeed most other sectors of the economy. This profitability is not uniform across fishing fleets, however cost recovery can be differentiated to reflect these differences.

Improved economic performance in Scottish fisheries stems from both the sustainable recovery of fish stocks (which increases fishing opportunities and improves catch per unit effort) and vessel decommissioning (where a downsizing of the industry translates into a larger share of the resource and higher profits for the smaller number of vessels that remain active). In other industries, the existence of profits would induce new entry, but for the fishing industry limited licensing sustains these profits for the current fishing fleet.

Brexit, despite delays in implementation, remains on the horizon and is likely to increase fisheries management costs for the Scottish Government if fisheries management functions formerly taking place at the EU level are devolved to Scotland (the exact functions are still being decided). Total fisheries management costs may also increase as control and enforcement, exporting requirements, and other aspects of fisheries management are likely to increase in scale and complexity. Post-Brexit fisheries management will also bring new fisheries legislation in the UK and devolved administrations. The challenge of increased management costs for Marine Scotland is therefore accompanied by the necessity for new legislation on cost recovery.

Whether looking to other countries, other industries, or changes with Scottish fisheries management itself, the unavoidable conclusion is that cost recovery for Scottish fisheries management is an idea whose time has come. With several different cost recovery mechanisms available and an even greater number of design features, it is now time to work with fisheries stakeholders to determine the best way forward to implement a cost recovery programme.

The following sections of this briefing will expand on the theoretical and practical justifications for cost recovery in Scottish fisheries management, outline several potential cost recovery mechanisms, and, based on this research, conclude with a recommendation for a levy on landed value differentiated by fishing type and port nationality and an empowerment of local management to recover management costs for local operations.

1. RECOVERY OF MANAGEMENT COSTS

There is a strong case for raising revenues from fisheries through taxes, auctions, permits, or other means. First, fisheries management comes at a cost, and a substantial cost in proportion to the size of the industry, that is paid by the public to manage a private industry. It is reasonable that the main commercial beneficiaries of fisheries management should be the main contributors to the financing of that management. Second, commercial fisheries generate rent from what is ultimately a public resource. In fact, much of the resource rent that is generated is the direct result of public policy limiting entry to the industry. Third, commercial fisheries generate negative externalities – costs borne by others. These externalities, from overfishing to bycatch to seabed impact, are at the expense of the public and future generations.

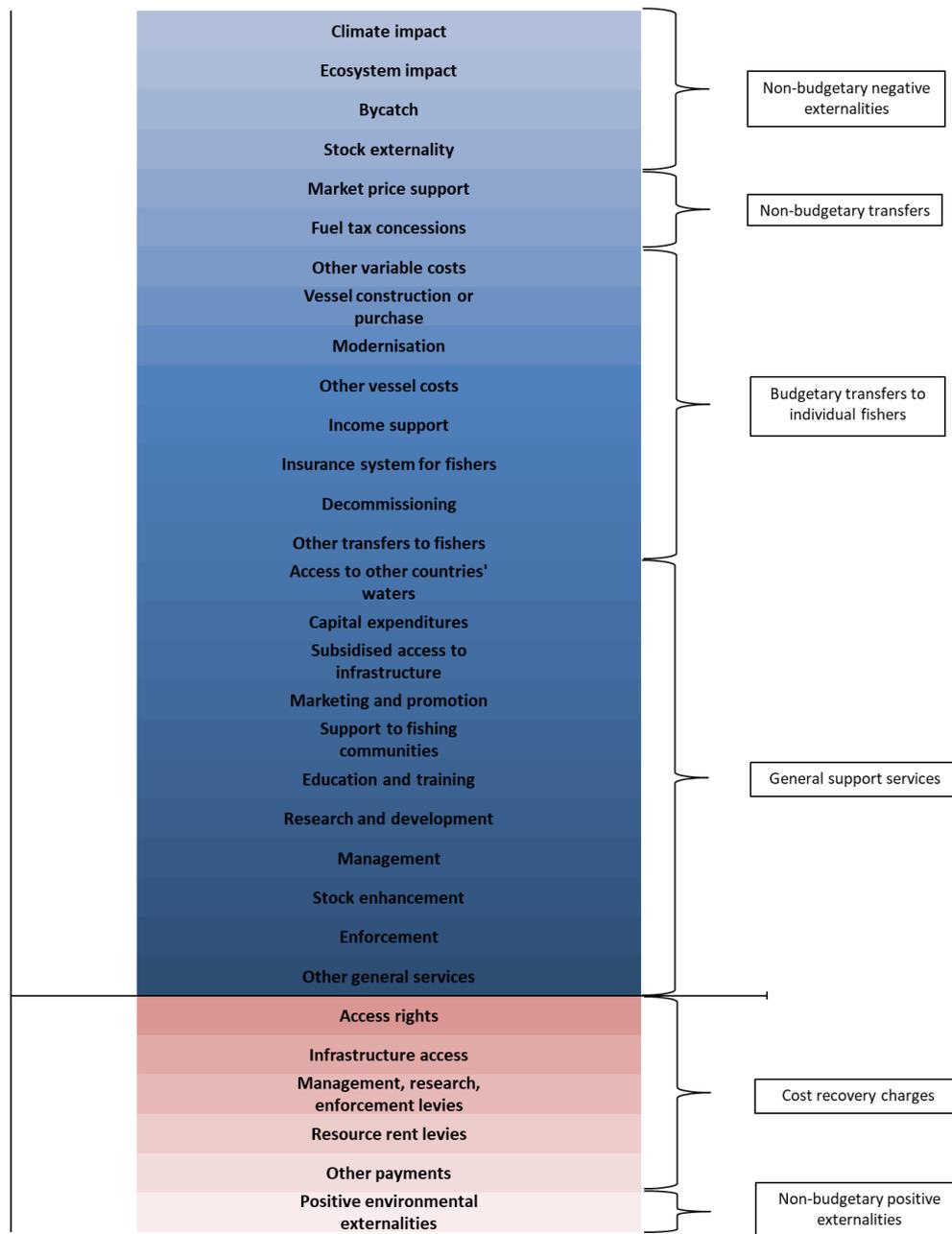
This briefing will focus on cost recovery as the natural starting point and the most pressing concern given the large changes on the horizon to fisheries management responsibilities for the Scottish Government. Section 3 will expand on resource rent and externalities as additional reasons for raising revenue from the fishing industry.

1.1 MANAGEMENT COSTS

Fisheries management is expensive. From fisheries science to tax exemptions, control and enforcement to funding for port infrastructure, these costs are borne on governments and taxpayers either directly or indirectly.

Figure 1 illustrates the costs of – and potential revenue from – fisheries management. The direct cost of fisheries management in the form of budget expenses are the most obvious but by no means the most significant. There are differing opinions as to what constitutes a management cost. This section on management costs separates fiscal cost (tax and spend) with environment costs (externalities) and economic costs (rent and utility). This separation is made for clarity rather than as an attempt to take a position in a larger debate about cost and subsidy classifications.

Figure 1: Classification of fisheries management costs (and revenue)



Source: Adapted from OECD (2017) Support to fisheries

1.2 COST AVOIDANCE AND THE CASE FOR ENDING FUEL SUBSIDIES

One option for cost recovery by a different name is to reduce or remove costs in the first instance – cost avoidance. While most management costs (see Figure 1) are required to deliver particular management objectives, it could be that some programme costs are not set at the right level and some costs may actually do more harm than good. Some studies have even found that when taken as whole, there are financial benefits to the

fisheries sector from management costs but a net negative welfare effect for society as a whole.³

In the OECD's assessment of support for fisheries (their term for subsidies and other management costs), they consider both the damages of induced effort as well as the benefits to fisher's incomes of different support measures. The OECD notes that for support measures:

*"... governments should consider not only whether they are susceptible to provoking overcapacity and overfishing, but also their transfer efficiency and the scale of support required to achieve their objectives."*⁴

Furthermore, there is no direct connection between support measures and livelihoods expected to do a poor job of increasing the income of fishers, because a large share of the value of the transfer generated goes to non-fishers from input suppliers to vessel owners.⁵

This framework of balancing overcapacity and supporting livelihoods is applied by the OECD to five support types: variable inputs, fixed inputs, output, income, and general services. The OECD ranks support for variable inputs (which includes fuel tax exemptions) first for inducing effort (based on its high supply elasticity) but last for increasing incomes.

One variable input, the fuel tax exemption, is particularly problematic as it induces fishing effort, disperses the benefits outside of the fishing sector to fuel suppliers, and has harmful side effects.

The fuel tax exemption in the UK is set at 0.1114 £/litre,⁶ totaling £14 million for the Scottish fishing fleet in 2016.⁷ This is a significant financial loss from fisheries management and contributes to the buildup of fishing effort and overfishing pressures.

Beyond the level of fishing effort there are two incentive-based environmental effects of the fuel tax exemption that should be recognised. The first is that by lowering the price of fuel there is an increase in fuel usage, and thus carbon emissions, compared to a situation in which the full cost of fuel were paid. This is a basic feature of the pricing system and is evident in the surge in gear innovation when fuel prices rise. Going further, the full cost of fuel or the 'true cost' is even higher than the market price given the environmental externalities that are not being accounted for. As a consequence, the current pricing system of fuel results in too much fuel being used (i.e. economically suboptimal) and fuel subsidies shift the price in the exact opposite direction to what is required (further from the economically optimal level).

The second incentive-based environmental effect of the fuel tax exemption is that reducing the price of fuel influences the type of fishing, not just the amount. Table 1 lists fuel use and the tax exemption for each UK fleet segment (data not available for Scotland separately). This data reveals that types of fishing using heavy gear that impacts with the seabed are given a competitive advantage over other fishing types. For example, whereas the fuel tax exemption equates to 30% of fishing income for large scallop dredgers, it only reaches 0.3% for longliners. To the extent that seafood products compete in consumer markets (either with each other or with other food products) this provides some fishing types with a competitive advantage (e.g. 100 times between large scallop dredgers and longliners).

By impacting the seabed, mobile gears tend to have larger ecosystem impacts in addition to consuming more fuel. For Scotland's fishing fleet this is reflected in the gear-based sustainability assessments of Seafish's Risk Assessment for Sourcing Seafood programme⁸ and the ratings of the Marine Conservation Society's Good Fish Guide.⁹

Data on UK fleet segments reveals that fuel use varies by size of vessel as well as by fishing type, with evidence of diseconomies of scale. Table 1 indicates that even within fishing types larger size categories have a larger proportional benefit from the fuel exemption. Not surprisingly, several studies on fuel tax exemptions in fisheries have found that fuel subsidies lead to disproportionate gains for larger vessels over smaller vessels.^{10,11} These compositional effects may come into conflict with socio-economic objectives of the Scottish Government to protect employment in small-scale fishing communities.¹²

Removing the fuel tax exemption would provide an incentive for innovation in fishing behavior, developing new gear technology, and/or switching between fishing types. Note, however, that despite large percentage reductions in profits for some fishing fleets should the fuel tax exemption be removed (and assuming no dynamic change), no fishing fleet is estimated to change from profitable to unprofitable under such a proposal (see Table 1).

Not only is the fuel tax exemption one of the largest expenses in fisheries management, totaling £14 million in Scotland,^{13,14} it also has harmful effects by inducing effort, overusing fuel, and incentivising more ecologically damaging fishing types. In the context of cost recovery, avoiding costs in the first instance, especially those in direct contradiction with management objectives, is a clear first step of action.

Table 1: Fuel use and fuel tax exemption by UK fleet segment

UK fleet segment	Total fishing income (£m)	Operating profit (£m)	Profit margin	Fuel tax exemption (£m)	Fuel tax exemption as share of income	Profit - fuel tax exemption (£m)	Change in profits	Profit margin - fuel tax
Area VIIA demersal trawl	2.7	0.6	22.0%	0.1	4.5%	0.5	-20.5%	17.5%
Area VIIA nephrops over 250kW	8.8	2.6	29.4%	0.4	4.5%	2.2	-15.3%	24.9%
Area VIIA nephrops under 250kW	6.8	1.0	14.3%	0.2	3.2%	0.8	-22.2%	11.2%
Area VIIBCDEFGHK 24-40m	19.9	1.1	5.5%	0.8	4.1%	0.3	-74.8%	1.4%
Area VIIBCDEFGHK trawlers 10-24m	15.8	3.0	18.7%	0.5	3.4%	2.4	-18.2%	15.3%
North Sea beam trawl over 300kW	24.2	-0.4	-1.8%	1.6	6.6%	-2.0	N/a	-8.4%
North Sea beam trawl under 300kW	2.4	-0.2	-7.0%	0.2	9.6%	-0.4	N/a	-16.6%
North Sea nephrops over 300kW	28.8	4.2	14.5%	1.7	6.0%	2.4	-41.4%	8.5%
North Sea nephrops under 300kW	11.7	1.2	10.3%	0.7	6.0%	0.5	-57.9%	4.4%
NSWOS demersal over 24m	83.6	13.2	15.7%	3.9	4.7%	9.3	-29.6%	11.1%
NSWOS demersal pair trawl seine	43.9	5.8	13.2%	0.9	2.0%	4.9	-14.8%	11.3%
NSWOS demersal seiners	17.9	4.5	25.2%	0.4	2.2%	4.1	-8.9%	22.9%
NSWOS demersal under 24m over 300kW	35.0	6.3	18.1%	1.4	4.0%	4.9	-22.0%	14.1%
NSWOS demersal under 24m under 300kW	3.9	0.9	23.8%	0.1	3.0%	0.8	-12.8%	20.7%
South West beamers over 250kW	19.0	1.7	8.7%	1.4	7.3%	0.3	-84.0%	1.4%
South West beamers under 250kW	14.9	0.9	5.7%	0.7	4.5%	0.2	-78.9%	1.2%
WOS nephrops over 250kW	47.7	9.2	19.3%	1.5	3.1%	7.7	-16.0%	16.2%
WOS nephrops under 250kW	27.7	18.6	67.2%	1.3	4.6%	17.4	-6.8%	62.6%
UK scallop dredge over 15m	13.7	20.2	147.2%	4.1	30.1%	16.1	-20.4%	117.1%
UK scallop dredge under 15m	9.1	9.5	103.9%	1.5	16.1%	8.0	-15.5%	87.8%
Under 10m demersal trawl/seine	66.7	14.9	22.4%	0.2	0.3%	14.7	-1.4%	22.1%
Under 10m drift and/or fixed nets	6.3	1.8	29.0%	0.2	2.6%	1.7	-9.0%	26.4%
Under 10m pots and traps	20.6	0.7	3.3%	0.1	0.5%	0.6	-14.2%	2.9%
Under 10m using hooks	15.5	1.1	7.1%	0.1	0.4%	1.0	-5.4%	6.7%
Gill netters	11.7	3.5	30.1%	0.2	1.7%	3.3	-5.6%	28.5%
Longliners	25.8	-2.3	-8.8%	0.1	0.3%	-2.3	N/a	-9.1%
Pots and traps 10-12m	24.4	8.8	36.3%	0.5	1.9%	8.4	-5.2%	34.4%
Pots and traps over 12m	40.5	10.0	24.7%	1.2	3.0%	8.8	-12.0%	21.8%

Source: Seafish – Quay Issues: 2016 Economics of the UK Fishing Fleet, excise duty of 0.1114 £/l applied.¹⁵

1.3 WHO SHOULD PROVIDE FISHERIES MANAGEMENT?

Given the public goods characteristics of fisheries management, these costs will inevitably be a public expense. Almost by definition, fisheries management services cannot be excluded from certain individuals (or at least individuals within the ‘club’). Nor does one individual’s use of fisheries management services reduce their availability to others. So the enforcement of laws and regulations, scientific research and policy formulation are textbook examples of pure public goods that the private sector would be ill-suited to provide.¹⁶

Yet the public purse is not infinite and there are pressures between uses. Every pound spent on fisheries is one that is not going towards the justice system, transport, or any number of alternative uses.

1.4 WHO SHOULD PAY FOR FISHERIES MANAGEMENT?

On both equity and efficiency grounds there are good reasons why the fishing industry itself, rather than the public as is currently the case, should pay for fisheries management. These include:

The polluter pays principle

On equity grounds, there is the principle that those responsible for the costs should bear the costs. This is often expressed as the ‘polluter pays principle’ but does not require those responsible for the costs to be ‘polluters’ in a pejorative sense.

The beneficiary pays principle

Another principle could be termed the ‘beneficiary pays principle’, where those who benefit from management, especially in a direct financial sense, should bear the costs of that management. The fishing industry itself will sometimes note that it is the ‘true’ stakeholder in fisheries management as an argument for greater rights in securing decision-making powers. By extension, this should also imply a responsibility to pay for that management. While both principles refer to the fishing industry as the instigator of management as well as the beneficiary of management, these roles do not always overlap. Cleaning up a waterway from agricultural run-off would have different agents for the polluters (farmers) and the beneficiaries (other downstream users). For environmental externalities in fisheries (addressed in a later section) these roles similarly diverge.

The principal-agent problem

There are also reasons why it can be economically efficient for the fishing industry to pay for fisheries management. Currently in fisheries management (true in other government departments more widely) there is no real link between the value of the services provided and the cost of providing them. Termed the ‘principal-agent problem’ in economics, this can be overcome, or at least improved, by establishing a closer link between those paying the costs (here the public) and those benefitting from them (the fishing industry). If the fishing industry were to pay the costs of management a link would be established, and incentives naturally provided to assess what services are working and are worthwhile.¹⁷ This arrangement would also greatly increase industry buy-in to fisheries management – although perhaps with the more discerning eye of the procurer of a service. There is some evidence that such increased buy-in can result from cost recovery, as was the case in the Scottish Solway cockle fishery – at a certain price level.¹⁸

2. RESOURCE RENT AND EXTERNALITIES

The need for fisheries charges and the lack of existing mechanisms means that cost recovery is sometimes confused with resource rent and externality. These two concepts are two further independent reasons for fisheries charges (although there is some overlap between the three) and could look similar in the charges applied and therefore reinforce cost recovery. The following section explores resource rent and externalities in turn.

2.1 RESOURCE RENT

Resource rent is defined as the excess lifetime value arising from the exploitation of a resource over the sum of all costs of exploitation including the compensation to all factors of production (including a risk-free, long-term minimum return on capital).¹⁹ With respect to fisheries, resource rent is the profit derived from the exploitation of commercial fish stocks. While taxing the income that is earned from the commercial harvest of fish stocks captures some of the rent that is generated, there are three main justifications for specific schemes for the public to capture resource rent over and above the levies implicit in general income taxes.

Natural resources belong to the public

The first reason for the public capture of resource rents is that natural resources belong to the public at large and as such the rents represent the bounty that nature has bestowed on society rather than a reward for individual effort. There is near universal recognition in Scottish fisheries, including the fishing industry itself,²⁰ that fish stocks are a public resource.²¹

This recognition, and the apparent exception for fisheries, goes beyond Scotland. Brent Gentner, a former fisheries manager in the US (where some cost recovery varies significantly between regions) explained in a 2017 op-ed that:

“Unlike the auction system that governs just about every other public resource - oil and gas, timber, airwaves - all of the resource "rents," or profits, that should belong to the American public from our shared marine fisheries and should be generating wealth for years to come get stripped out by a small number of people who forever lock those values up in private bank accounts.”²²

Echoing this idea, a former fisheries management advisor in Denmark, Poul Degnbol, explained that: “What’s they’ve done with the fishing industry would equate to giving the oil away and not taxing anything”. A Danish fishing industry representative

responded that “we’re looking constructively at the idea of a tax on profits and would be very willing to talk about it”.²³ Charges in other Scottish resource industries, including oil, are explored in section 6.

Profits may be generated by public policy rather than economic effort

The second related reason for collecting resource rent through fisheries charges is that the profits generated by private actors may be generated by public policy rather than economic effort. In Scottish fisheries this is most evident from limited licensing that means despite large profits in the catching sector (£174 million gross, £146 million net in 2016) there is no increase in the number of fishing businesses. The government’s approach to licensing means that sustained, supernormal profits accrue to the license holders, but not due to their own actions.

The efficiency of raising revenue from resource rent

Whereas the first two reasons for capturing resource rent relate to equity concerns between public and private actors, a third reason relates to the economic efficiency of raising revenue through the capture of resource rent. As resource rents are pure economic rent, any tax or levy will not distort the use of capital or other production factors since factors of production are applied at the margin until the marginal return on the last unit employed is equal to its economic costs. Capturing resource rents is therefore neutral in the sense of neither encouraging nor discouraging investment in production. This feature makes resource rents an ideal tax base to maximise economic efficiency as other forms of taxation typically have distorting effects.

2.2 EXTERNALITIES

Externalities are the consequences of one activity that affects other parties. They can be considered as management costs, especially where they prompt compensatory actions. But, for this briefing, a narrower definition of management costs is used that refers to existing line items in government budgets related to fisheries management. In practice, environmental levies, taxes and other instruments tend to focus on covering management costs or correcting for/disincentivising externalities - but rarely both.

For fisheries, there are externalities from direct impacts on the target fishery itself (e.g. the stock externality of overfishing, discards of undersized fish), other species (e.g. bycatch of fish, birds, mammals, ghostfishing, foodweb effects), the marine environment (e.g. damages from gear impact), and climate-related impacts from fuel use. Some of these costs will be borne directly by the public in the form of compensatory government

expenditure, but most of the cost will manifest as forgone welfare, be that in the form of fishing opportunities for recreational fishers or wildlife for coastal tourism.

3. IMPACTS OF CHARGES

3.1 ECONOMIC IMPACTS

To measure the economic impact of fisheries charges it is intuitive to apply a standard accounting framework and increase total costs and reduce profits by an amount equal to the size of the proposed charge. This would be a mistake. There are always dynamic aspects relating to behavioral change that should be considered. In fact, while it may be counterintuitive, the unique bio-economic dynamics of fisheries means that profits could increase, not decrease, for some fisheries under a new charge for cost recovery.

Economic actors alter their behaviour based on the environment they find themselves in. In response to a new fisheries charge, fishers could simply raise the sale price of their product (passing the cost down the supply chain) or use more complex behaviours such as reducing fishing effort on the least profitable species or fishing trips.

Bio-economic dynamics in quota and non-quota fisheries

The bio-economic nature of fisheries makes it a particularly interesting case of dynamic behaviour. In fisheries where there is more effort than the economic optimum, a reduction in fishing effort in response to a new fishing charge could actually raise revenues. This is most clear in non-quota fisheries suffering from overcapacity (Figure 1a). A non-quota fishery with a very low level of effort (Figure 1b) would see profitability reduced as there is no effort change. Note that these are long-term effects once a new equilibrium has been reached.

However even in quota managed fisheries, fishing effort may remain at high levels after the imposition of new charges as a result of quota being set too high either because scientific advice is not followed, or because the scientific advice is for maximum sustainable yield rather than maximum economic yield (which corresponds to a lower level of fishing effort). There can also be illegal and unreported fishing activity taking place, meaning that an additional cost in quota managed fisheries could lead to lower effort and higher profitability. All of these caveats will offset some of the profit loss indicated in Figure 1c.

Figure 1a: Fisheries changes in a fully exploited non-quota fishery

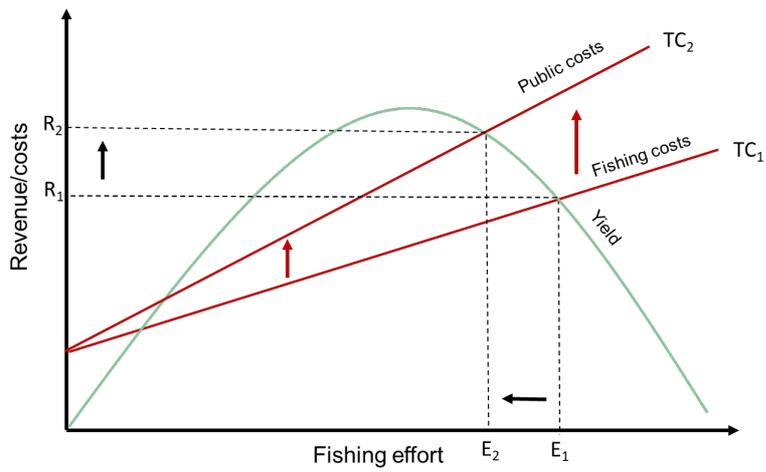


Figure 1b: Fisheries charges in an underexploited non-quota fishery

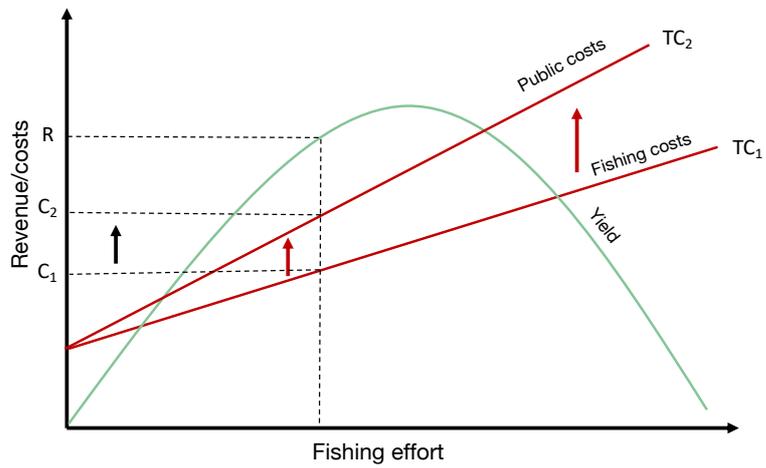


Figure 1c: Fisheries charges in a quota fishery

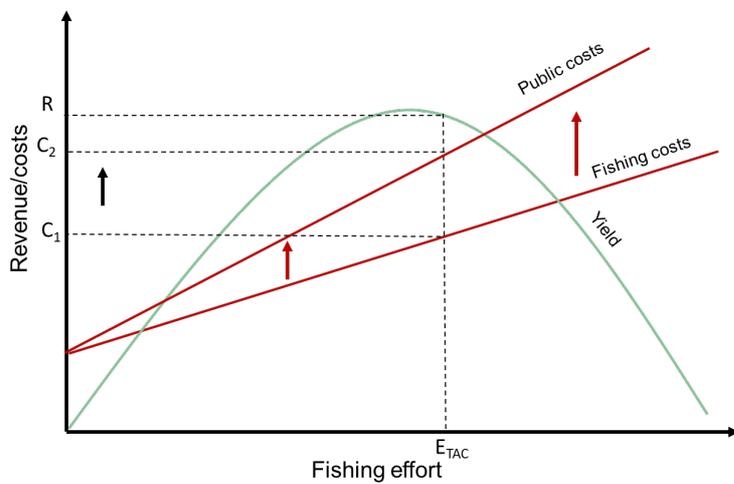


Table 2: Summary of changes to effort, costs, revenue, and profits from fisheries charges

Fishery	Effort	Costs	Revenue	Profits
Fully exploited non-quota fishery	Decrease	Increase	Increase	Unchanged
Underexploited non-quota fishery	Unchanged	Increase	Unchanged	Decrease
Quota fishery	Unchanged	Increase	Unchanged	Decrease

This dynamic between fisheries charges, effort change, and improved economic performance is not only rooted in bio-economic theory but can be observed in cases where fisheries support has been removed – the equivalent effect to an increase in fisheries cost. As the OECD concluded in their report *Financial support to the fisheries sector*:

“It is evident from the experiences of a number of countries, such as Norway, New Zealand, Iceland and Australia, that the reduction of financial support does not necessarily spell doom and gloom for the industry and have generally resulted in increased profitability and reduced dependence on government assistance over the medium to longer term from reducing financial support.”²⁴

Improvements in fisheries management

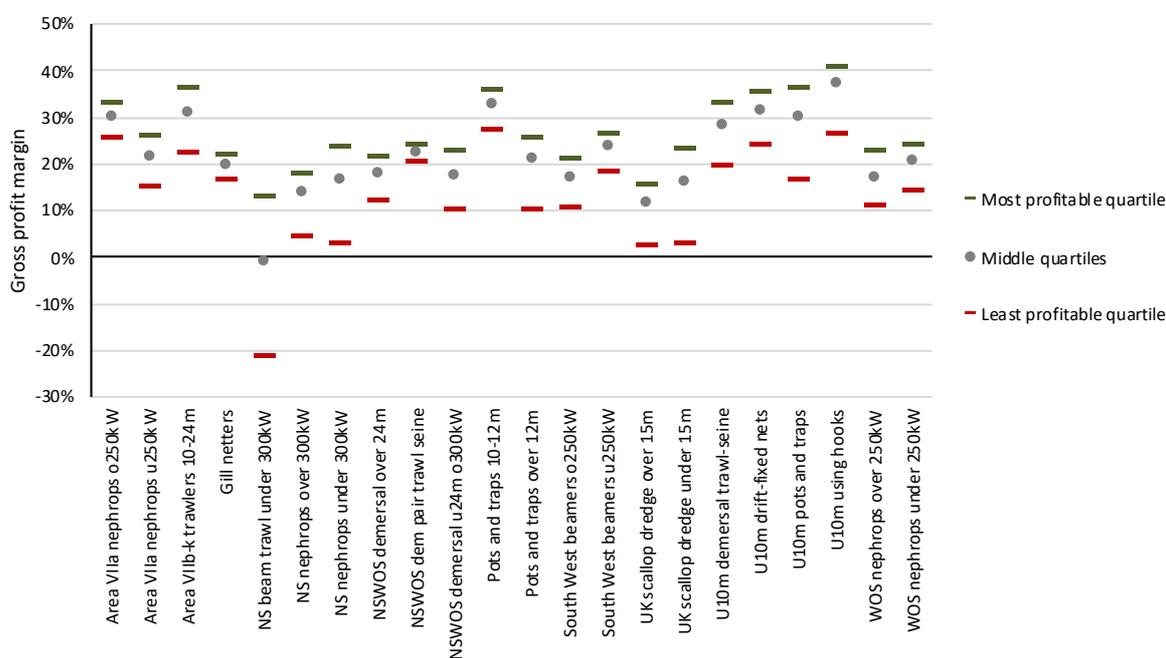
Beyond the bio-economic dynamic described above, there is also a more practical feedback loop between funding fisheries management and improved economic performance. If fisheries management can increase the abundance of fish stocks or otherwise improve the conditions of fisheries, then *additional* funding of such management could improve profitability. There are many mechanisms that would be expected to generate a positive feedback loop between increased revenues for management, management improving fishing conditions, better fishing conditions improving economic performance, a larger tax base for fisheries charges, and thus a repeating and expanding cycle. In fact, there may be support from the fishing industry to pay for fisheries charges if it would result in more frequent and more detailed stock assessments. By increasing the certainty and timeliness of stock assessments it is hoped that there will be evidence of healthy fish stocks and therefore greater fishing opportunities for the commercial fishing industry.

Maintaining financial viability

Finally, even setting aside these expected dynamic changes, a simple accounting framework reveals a smaller negative economic shock than may be expected in the short-term. The fishing industry in Scotland, having gone through the hard transition of lowering fishing mortality to sustainable levels, is now increasing income and profitability year-on-year. The Scottish fishing industry is now recording profit margins (30% gross, 25% net in 2016) that are much higher than other sectors of the economy. It is reasonable to expect that other natural resource industries will begin to question why profits in the fishing industry are allowed to accrue to owners of fishing rights that were freely gifted.

Fleet segment level data (UK as a whole) reveals that the vast majority of fleet segments could bear such a fisheries charge even under the worst case scenario where the charge is fully internalised by the fishing fleet and no cost is passed on. This is even true for the quartiles of the fishing industry, as shown by the quartile profit margins in figure 2. A charge that amounts to 5% of landed value, for example, is well within the limits of what is economically viable.

Figure 2: Gross profit margins by UK fleet segment and quartile



Source: Seafish – Quay Issues: 2016 Economics of the UK Fishing Fleet

Just because the fisheries charges are levied on fishers (statutory incidence) does not mean that they will be the ones bearing the cost of the charges (economic incidence). Determining who pays the charges requires an economic analysis of product elasticities.

In general, the food industry is considered to be a highly competitive industry where producers are forced into the role of price takers. Retailers have low profit margins and therefore have less ability to internalise the charges. An exception to this rule is where the UK fishery is selling a fresh product and where the UK holds a large market share (limiting the amount of substitute foreign products). The sale of live Nephrops and other shellfish, an important Scottish fishery, would therefore be expected to pass on some of the cost of any fishery charge.

3.2 SOCIAL IMPACTS

Industry Buy-in

One important social impact relates to industry buy-in. It is difficult to predict whether fisheries charges would lead to more or less industry buy-in as there are influences in two opposing directions. On the one hand, fishers may feel slighted, especially in the short-term, from a new charge when there are also expectations to abide by great numbers of regulations. On the other hand, fishers might be more involved in management as the procurer of the service. It has been suggested that this has taken place in Iceland where there have been fisheries charges for several years.

Public Buy-in

There is another dimension of policy acceptability – that of the wider public. While fisheries management has largely escaped public scrutiny, the fishing industry has received more public attention as a result of Brexit discussions. Soon questions may arise about why only some individuals have the right to commercially harvest a resource, a right that was freely gifted, while the public as a whole pays for the cost of management. These management costs are increasing, as are the profits within the fishing industry. When these issues arose in Iceland during the formation of their individual transferable quota management system (where fisheries has more political salience), the use of a resource tax is credited with making management of commercial fisheries and the limited set of financial beneficiaries more politically palatable.²⁵

3.3 ENVIRONMENTAL IMPACTS

Fisheries charges will reduce fishing effort and fleet capacity as fishers change their behaviour to better align the marginal costs and benefits of fishing (see section 4 on economic impacts). By reducing fishing effort and the number of fishing trips, fisheries charges could therefore reduce overfishing.

Some authors have hypothesised that the presence of management restrictions will limit this effect as fisheries charges will not lower the economic equilibrium below the management restriction (e.g. quota limit).²⁶ However, control and enforcement is never perfect, and it is likely that there will be some effect at the margin from an additional cost.²⁷ Regardless, the reduction in effort and thus overfishing is expected to be greater for non-quota fisheries.

It has also been hypothesised that a resource tax could have negative environmental impacts as a reduction in the value of fishing rights reduces the economic potential of the resource to fishers²⁸ and that paying for the management of a resource fosters an attitude to extract as much as possible. Conversely, there is also an expectation that with fisheries charges there is incentive for fishers to keep environmental impacts low and thus management costs low.²⁹ Industry buy-in could also increase familiarity with, and improvement of, management measures.

Besides reducing effort and overfishing, especially in non-quota fisheries, and improving the knowledge base and robustness of fisheries, further environment effects could arise from the design of the fishery charge. The following section will focus on design elements of a fisheries charge in Scotland.

4. POLICY OPTIONS FOR COST RECOVERY IN SCOTTISH FISHERIES MANAGEMENT

Policy options for cost recovery at the national level typically involve either auctioning fishing opportunities or charging a tax/levy. Cost recovery at the local level typically involves the use of permitting. Internationally there are examples of both auctions and taxes in fisheries management that can serve as models for cost recovery in Scotland. While fisheries charges are not currently used in Scotland or across most of the EU, this is not the case further afield. In Iceland, New Zealand and Australia, cost recovery amounts to 65%, 39% and 36% of management costs, respectively.³⁰ These systems provide helpful examples of the available policy options.

4.1 QUOTA AUCTION

Under a quota auction, fishing opportunities raise funds through their sale to the highest bidder. A review of quota systems with individual allocations found that while only 3% of quota systems exclusively use auctions to allocate quota, up to 30% of these systems used auctions to allocate some fraction of the quota to individuals.³¹ In Europe, there are historical examples of the use of auctions to allocate fishing rights, for example oyster bed leases in the Dutch province of Zeeland were allocated through auction from 1870 until shortly after the outbreak of the First World War.³² In Estonia, 90% of rights were allocated according to historical track record until 2005, with 10% of fishing rights distributed at auction each year.³³ Chile and New Zealand have also used auctions for part of their quota allocation systems.³⁴

The only current example of quota auctions in Europe is the recent decision of the Faroe Islands in their fisheries reform process to implement quota auctions for a portion of their pelagic quota (15% of the mackerel and herring quota, 25% of the blue whiting quota) and their demersal quota in non-Faroese waters (15%).³⁵ Demersal fisheries in Faroese waters are only auctioned if the tonnage of quota exceeds certain thresholds above current levels. The auctioned quotas in the Faroes are valid for eight years and revert back to the government if unused. There is also a resource fee on profits from the Faroese fishing fleet.³⁶

Based on the examples of where auctions have been used in other fisheries, an auction for fishing opportunities in Scotland could be used for a portion of the available fishing opportunities, once allocations have been made on the basis of other criteria and

priorities. This would enable other priorities to be addressed first through preferential allocation to certain sectors (e.g. under-10m vessels) or vessels based on criteria to be determined (e.g. historical track record, beauty contest criteria), with any remaining fishing opportunities, or a portion of any new fishing opportunities (e.g. if additional quota can be brought in to Scottish fisheries) being allocated through auction.

Depending on objectives, the auction could be open to any participant (which would help maximise the potential revenue from the auction), or participation could be restricted on the basis of criteria set by the Scottish Government (e.g. established track record in the fishing industry, local economic link to Scotland, commitment to land catches to Scottish ports etc.), although this would likely reduce the overall revenue potential of the auctions.

4.2 AUCTION DESIGN

Important design features to consider, which affect who can participate in the auction and the degree of concentration among shareholders include:³⁷

- the type of auction used (e.g. English, sealed-bid);
- the size of the shares sold at the auction;
- consolidation limits; and
- whether bids are paid up front or when fish are landed.

The quota of fishing opportunities to be auctioned may be set by the Scottish Government in some cases (i.e. those stocks for which Scottish Government has management responsibility), or may be the portion of the UK quota that is allocated to Scotland as a Devolved Administration. The auction could be run by the Scottish Government, or by a separate independent body (at some cost) established for this purpose.

4.3 TAXATION

Another type of revenue raising from fisheries is in the form of taxation or levies. This usually takes the form of a tax on income from landing or on net income (income minus expenses). The charge can be differentiated by fishing type or applied as a uniform rate. In the UK, the Seafish Industry Authority – a government quango to support the fishing industry – is currently funded through a levy on landed value (as well as a levy on the processing sector).

The Icelandic model

One of the longest running fisheries levies is the Icelandic resource tax, beginning in 2004. It was introduced, in part, to address concerns that the quota system in Iceland grants fishing rights in perpetuity and thus privatises a public resource. Through a resource tax the public purse is able to derive an annual flow of benefits from fish stocks.

The Icelandic fishing levy is applied to fishing rights for the entire Icelandic fleet. The fee is calculated in a manner so as to account for both the amount of quota held by the fishing firm as well as its economic performance. First, a rate of 9.5% (increased from 6% in 2009) is applied to net fishing income (total landed value with fuel, wages and other operating costs deducted) for the previous tax year. This tax bill is then divided by the landings in cod-equivalent (a fixed value-based conversion factor to represent all species as cod) kilos to provide a fee per cod-equivalent landed for the current tax year.³⁸ With this approach to taxation, the levy takes account of fluctuations in the profitability of the industry while also charging for the amount of fish landed to account for fluctuations in quota.³⁹

In 2012 an additional resource tax was introduced. This tax was targeted specifically at fishing industry profits in the context of the deep economic recession in Iceland and a resilient fishing industry.⁴⁰ The tax was set at 50% but increased to its full rate of 65% in 5 percentage point increments. It is differentiated by pelagic and demersal species and there are exemptions for the first 30 cod-equivalent tonnes, which are tax free, and the next 70 tonnes, which are half the standard rate.⁴¹

The Alaskan model

Alaska has a different approach to taxation, consisting of dozens of separate fees and taxes. The first set of taxes, the largest in revenue, are in response to specific economic practices in Alaskan fisheries: there is a Fishery Business Tax levied on exporters, a Fisheries Resource Landing Tax levied on resources processed outside their 3-mile limit and landed in Alaska. Many localities also charge a raw fish tax. There are also fees for cost recovery. Some of these are for specific purposes such as the Federal Observer Program and the Salmon Hatchery Cost Recovery. Finally there are fees for industry self-assessment and promotion. The Seafood Marketing Assessment is levied at 0.5% of landed value in Alaska and three additional taxes (Salmon Enhancement Tax, Regional Seafood Development Tax, Dive Fishery Management Assessment) are levied on specific fisheries and charged as small percentage of the price paid.⁴²

Based on the examples detailed in Iceland and Alaska, resource taxation could be applied in Scotland in much the same manner. Industry financial reporting is the same as in Iceland if the Icelandic model is pursued and a levy is already applied to landed value is to fund Seafish levy and could be added to if the Alaskan model is pursued.

Taxation design

Important design features to consider with fisheries taxation:

- the level of charge and whether it is phased-in or increases with time;
- if it is levied on landed value, income, net income, or an estimation of resource rent;
- any deductions or exemptions;
- whether there is differentiation by fish type or fleet type;
- other equity issues;
- transparency;
- political feasibility; and
- statutory incidence versus economic incidence.

There are additional features for consideration regardless of whether an auction or taxation is used, such as:

- what level of government receives the revenues;
- whether revenues raised are earmarked for specific purposes, or are unspecified,
- Whether the taxation or auction proceeds are revenue neutral.
- These issues are explored in detail in section 7. The following section explores charges in other Scottish resource industries, many of which employ specific resource taxes.

5. CHARGES IN OTHER SCOTTISH RESOURCE INDUSTRIES

5.1 COST RECOVERY IN OTHER RESOURCE INDUSTRIES

In Scotland, as is the case across much of the world, charges are levied on most natural resource industries. Fisheries are very much the exception to rule. In fact in some natural resource industries, described below, artificially low resource access charges have been successfully challenged at the WTO.⁴³

There is no direct comparison of fisheries to another natural resource. There is a wide range of resource characteristics, whether that is the renewable or non-renewable nature of the resource, the public or private ownership, or the excludability of the resource.

The charges that have been levied on these resources, not necessarily related to the characteristics of these resources, also vary in their objectives. Charges on oil and gas are primarily designed to raise resource rent. Charges on aggregate extraction are designed to account for some of the additional environmental externalities in production. Charges on water abstraction are designed to recover the costs of management as well as the indirect costs associated with externalities. These three charges are explained in the following sections.

5.2 OIL AND GAS – TAX BASED ON RESOURCE RENT

In 1975 the UK Government imposed the petroleum revenue tax (PRT), a supplementary tax targeting the high profits of companies involved in the production of oil and gas in the UK and on the UK continental shelf in the wake of the first OPEC oil price shock. In 2016 the PRT was reduced from 35% to 0% but it has not been abolished so losses can be carried back against past payments.

Currently the main charge is the 'ring fence' corporation tax (RFCT), similar to standard corporation tax, with the exception that profits from oil and gas are taxed separately to prevent taxable profits from oil and gas extraction being reduced by losses in other activities. The current RFCT rate is 30%.

A further supplementary charge (SC) was introduced in 2002, first at 10%, rising and falling several times in response to changes in oil prices before falling back to 10% in 2016. The SC is an additional charge on ring fenced profits (but with no deduction for finance costs).

Oil and gas taxes raise approximately £1 billion annually, representing 0.1% of all tax receipts.⁴⁴

5.3 AGGREGATE EXTRACTION – LEVY BASED ON EXTERNALITIES

The aggregates levy was introduced by the UK in 2002. It is levied at a rate of £2 per tonne of sand, gravel or rock at the point at which it is commercially exploited. The levy also covers imported materials.⁴⁵ The levy was introduced with the dual aims of reducing the negative environmental impacts of quarrying and increasing the recycling rate of construction materials by disincentivising new extraction.⁴⁶

The levy is uniform across quarries despite many different and varying environmental externalities at the extraction stage (e.g. noise, dust, visual intrusion, loss of amenity and damage to biodiversity), although a differential rate for ‘green quarries’ was discussed during the bill’s drafting.⁴⁷

There are exemptions for certain industries and practices, although a number of exemptions have recently been the subject of State Aid investigations from the European Commission. The shale aggregate exemption was determined to be unlawful in 2015 and was subsequently amended.⁴⁸

While the rate originally increased with inflation (from 1.60 to 2.00) the planned rate changes were cancelled in 2010 and as such the rate has remained at £2 since 2009. Initially the revenue offset a minor tax shift of a 0.1 percentage point reduction in employers’ National Insurance contributions, although this was not explicitly linked. In the past, a portion of the revenues have been ring-fenced in the Aggregate Levy Sustainability Fund to support projects to mitigate the environmental impacts of quarrying but was abolished in 2011 due to budget constraints.⁴⁹ In total, the aggregates levy brings in around £350 million annually in revenues.

Powers over aggregate extraction are due to be passed to the Scottish Government, which has commissioned a review of options for a Scotland-specific aggregate levy.⁵⁰

5.4 WATER ABSTRACTION – LEVY BASED ON COST RECOVERY AND EXTERNALITIES

In Scotland, water abstraction is governed by the Scottish Environment Protection Agency (SEPA) through the Environmental Regulation (Scotland) Charging Scheme. Charges for water abstraction were overhauled in 2016 with some adjustments to rates made for 2018.^{51,52} The new scheme combined the existing charging scheme for water

abstraction with other charging schemes for waste, pollution prevention and control, holding of radioactive substances, water discharges.

The principles of the annual charges are to recover on-going management costs for direct work (e.g. site inspections) and indirect work (environmental monitoring and reporting). An explicit attempt is made in the charging scheme to link charges to environmental damages.

The Environmental Regulation (Scotland) Charging Scheme has three components:

- Activity component: Used to recover direct regulatory costs and some indirect costs. Determined by economic sector and activity types(s) in the authorization.
- Environmental component: Used to recover the remainder of indirect costs. Determined by economic sector and activity type(s) in the authorization. Accounts for the environmental significance of these activities but only applies to larger activities.
- Compliance factor: Based on compliance records, charging more for poor compliance records. Will not come into effect until the 2021-22 financial year at the earliest.

5.5 INDUSTRIES BEYOND RESOURCE EXTRACTION: WASTE DISPOSAL AND MOBILE AIRWAVES

While oil and gas, aggregates, and water may have the most similarities to marine fisheries as they involve the private extraction/abstraction of a resource, there are also lessons to be learnt from other sectors that deal with environmental externalities and/or public assets. The landfill levy is an example of the former while mobile airwaves are an example of the latter. Both cases can also be considered natural resource industries in the sense that the resource in question (airwaves and land) is naturally produced and rivalrous.

Beginning in 1996, the UK Landfill tax is recognised as “the first tax in the UK to have an explicit environmental purpose”.⁵³ The aims of the landfill tax, as stated in the 1995 White Paper on Waste were threefold:

- to ensure that landfill costs reflect environmental harm;
- to recover value from more of the waste that is produced;
- to dispose of less waste in landfill sites.⁵⁴

In 2015 the Scottish Landfill Tax replaced the use of the UK Landfill Tax but the rate and all the characteristics of the levy remain in place. The Scottish Landfill Tax is

administered by Revenue Scotland with support from the Scottish Environment Protection Agency.⁵⁵

The tax was intended to be revenue-neutral by offsetting a reduction in national insurance contributions, although this is difficult to demonstrate. Most of the revenue raised simply goes to the general budget. The rate is differentiated by a standard rate for general waste and a lower rate for inactive waste (e.g. naturally occurring rocks and soils, ceramic or cemented materials, mineral materials).⁵⁶

The rate has been raised several times since the tax's introduction but now sits at a standard rate of £88.95 per tonne and a lower rate of £2.80 per tonne. Both rates are rising in line with inflation for 2015 to 2020. Landfill sites can offset just under 6% of their annual tax by contributing to environmental bodies through the Landfill Communities Fund. The tax raises just under £1 billion annually.⁵⁷

Outside of natural resources, the licensing of mobile airwaves to telecoms provides another interesting example as a great deal of thinking has been put into auction design and a great deal of revenue raised. In fact the 3G auction in 2000 that raised £37 billion has been described as “the biggest auction ever”.⁵⁸ The windfall equated to 2.5% of the UK GDP.⁵⁹

This auction, designed in consultation with economists specializing in risk evaluation and game theory, chose an auction model where there were multiple rounds of simultaneous bids. To remain in the auction a bidder had to either hold the top bid for a licence or raising the bid by at least the minimum bid increase, termed a “simultaneous ascending auction”.⁶⁰ The licensing auction eventually went through 150 rounds of bidding, raising more than four times the expected amount and seven times more than the likely outcome of a conventional auction. Several additional auctions have been used since 2000 for new frequencies. A recent auction of 5G licences raised £1.35 billion.

5.6 QUESTIONS RAISED

From the extraction of aggregates to the selling of the airwaves, the management of very different industries has grappled with issues relating to revenue generation. Despite these differences in industry structure and function, the questions raised are similar: Who should pay for management? How should the fee be set? Should it be equal for everyone? Should funds be earmarked? The following section will address these issues and many others in the context of Scottish fisheries.

6. DISCUSSION

6.1 COMPARISON BETWEEN AUCTIONS AND TAXES

Auctions can present problems in fisheries because:

- The variability in the resource means that the revenue stream is uncertain;
- The success of the most profitable fishers, or those with the greater access to capital, at auctions does not guarantee the most desirable quota allocation.
- there are many non-quota fisheries (mostly under effort limits and technical regulations) that incur management costs, create negative externalities and generate resource rent - just as quota fisheries do. In Scotland approximately one-third of the landed value comes from non-quota fisheries.

Quota auctions could also have merits, particularly in Scottish fisheries where quota is the dominant allocation tool. In particular, quota auctions could:

- address the legal grey area around quota ownership, by being designed so that the quota is time limited (e.g. for ten-years or set indefinitely);
- be used to allocate limits on effort (i.e. days at sea, number of pots).

In the context of Brexit, quota auctions could also be used for any new quota that is gained, indeed there are indications that this will be proposed in the forthcoming White Paper on the UK Fisheries Bill.

6.2 CHARGES ON FISHING ALLOWANCES OR ON ACTUAL USAGE?

A debate over the charges on water abstraction licences in Scotland has highlighted an important question, which is also relevant to charges for fisheries: whether charges should focus on allowances or actual usage (i.e. how to deal with unused allocation). Holders of water abstraction licenses in the UK have argued that they should only be charged on usage as there is no damage from licenses that are unused. However, this overlooks the fact that there are management costs associated with administering the licenses.. The dual objectives of charging for water abstraction licenses (cost recovery and environmental externalities) applies to fisheries as well.

In fisheries, most environmental externalities, resource rent, and most management costs are linked to activity and thus there is an argument to only levy a charge on used quota. However, the charges with respect to resource rent are not only because rents are being generated but also to reflect the fact that entry into the industry is limited. The

payment being made is therefore to recognize the fact that other members of society do not have the right to commercially fish and in that sense it is not important whether the license is being used to its full capacity. Taken one step further, unused quota represents an additional resource management issue as society is not benefitting as consumers of fish, it is simply a lost economic opportunity. Only charging used quota could create a perverse incentive to fish much less and at a suboptimal level. This incentive would need to be finely balanced.

If charges are applied as a levy on landings or on resource profits this distinction between used and unused is not present.

6.3 SHOULD REVENUES BE EARMARKED?

In the face of high levels of public mistrust towards new taxation, it is popular to call for any new taxes to be earmarked for specific purposes – hypothecation, in the jargon. This is an appealing option for policymakers. In the UK, the hypothecation of water abstraction revenues for water resource-related purposes is credited with building support for that change. However hypothecation is extremely misleading and can even backfire.

The problems of hypothecation

Since there is no feasible way to trace where £1 of tax revenue ends up, revenues raised and cost spent must exactly balance for hypothecation to be meaningful. Talk of ‘softer’ forms of hypothecation where a new tax contributes towards a larger expense is simply marketing as the other sources of revenue could rise or fall in response. For example, new revenues earmarked to fisheries management could simply displace existing revenues originally destined for this expenditure to somewhere else – say road repair. Under this scenario, the marginal effect of the hypothecated revenue from fisheries would be an increase in spending in a different, unadvertised area. As the costs for fisheries management already exist, as opposed to a new programme, either additional expenditure must be equated and agreed by successive governments or displacement is inevitable.

Nevertheless there are examples of soft hypothecated taxes within fisheries management. The Icelandic fisheries tax is hypothecated for separate functions – owing to its double function (as described in the Taxation paragraph in section 5) . The revenues from the original tax, focusing on management costs, are hypothecated for expenses such as monitoring, surveillance, and decommissioning vessels.⁶¹ The revenues from the new tax are hypothecated for the reduction of the national deficit.⁶²

Mandating that revenue and expenditure to balance in a certain period is even more problematic due to the extreme uncertainty it generates for spending plans. This was observed, for example, in the cost recovery scheme for the **Scottish Solway cockle fishery**. It could even backfire as the greater the intended incentive effect of the tax, the less revenue is raised for another worthwhile objective. It is simply poor policy design to put policy objectives at odds through perverse incentives.

A very soft form of hypothecation would be to simply set a revenue target for fisheries charges as a percentage of management costs (e.g. 50%). As the remaining amount would be covered by public costs there is no fear if the amounts do not exactly balance and there is also no need to formally earmark funds if the only objective is a revenue target.

Even the argument for hypothecated taxes on the grounds of their public acceptability rests on shaky grounds. As the Financial Times argued in an editorial against the rise in proposals for hypothecated taxes, both the revenue raising element and the expenditure element must be finely balanced and agreed by successive governments – an unlikely proposition.⁶³ This is exactly what happened in the 1970s when national insurance contributions could no longer keep pace with contributors' state pensions and other employment-related benefits and the link between the two was broken.⁶⁴ When, almost inevitably, a promise of hypothecation breaks down, there may be even more resentment and distrust than if general taxation was used.

Ultimately whether hypothecation is required is a complicated question of political acceptability, but it should be recognised that it is a sacrifice in policy effectiveness or else a misleading sales pitch. Furthermore, with Brexit likely to drastically change public finances and fisheries management in Scotland, there is an opportunity to design the optimal funding mechanism from a blank canvas rather than 'selling' one specific policy feature.

6.4 SHOULD THE POLICY BE "REVENUE NEUTRAL"?

An extension of hypothecation is the issue of revenue neutrality. Whereas a hypothecated tax uses revenue for a specific government expense, a revenue neutral tax would use revenues raised to decrease taxes elsewhere. Revenue neutrality is often used to show that a new tax is not a "money grab" for public coffers. Certainly if other taxes are too high it is worthwhile to decrease them, but there is no need to specifically link policies in this way or to create a situation where lower revenues from the fishing industry would automatically result in a rise in income taxes, for example. More broadly, revenue neutral taxation creates a nearly impossible counterfactual to prove that the tax

reduction is permanent. It must be justified that if and when income taxes rises in the future that it would have also risen and by the same amount if revenue had not been raised from the fishing industry (or, even more difficult, that if income taxes remain stable they would have fallen in the counterfactual). As it is impossible to demonstrate the permanence of a tax change through counterfactuals, revenue neutrality is simply another form of hypothecation that is misleading at best.

6.5 SHOULD CHARGES BE DIFFERENTIATED BY SOCIAL, ENVIRONMENTAL AND/OR ECONOMIC CRITERIA?

Under an ideal cost recovery scenario, a fisheries levy would be set at a rate equal to the marginal cost of management. However, it may be the case that different fishing types incur different levels of management costs. Just as there is a strong argument for the use of social, environmental, and economic criteria in the allocation of fishing opportunities, this also applies to allocating the costs of fisheries and not just in allocating the means of benefit.

In fact, one of the common criticisms of other resource charges in Scotland is that they aim to address a heterogenous expense (management costs or environmental damages) but apply a very crude one-(or two)-size-fits-all solution to all users or all units of production or disposal. The aggregate levy is set at one amount despite a wide range of environmental externalities generated from site to site⁶⁵ and the landfill tax only has two rates: active and inactive materials.⁶⁶

If management costs, particularly general support services like research and enforcement, are assumed to be roughly proportional to the level of fishing activity, then a uniform charge across fishers, for example on landed value, makes some sense. It is when environmental externalities are brought into consideration that costs can be expected to vary much more between fishing types as some fishing types are more fuel intensive, less selective, and/or impact more with the marine ecosystem.

One proposal that was been put forth for UK fisheries management is for a differentiated landings tax based on whether the landings take place in the UK, thus generating economic activity (and tax revenues) in related industries, or whether landings are made abroad.⁶⁷ If this model were applied to Scotland it would provide an economic incentive to land in Scotland for each trip rather than a crude threshold (as currently exists in the economic link) and has been proposed in a form of a new Scottish economic link.⁶⁸

A potential drawback of a differentiated approach to fisheries charges using social, environmental and economic criteria is that such an approach could conflict with the aim to raise revenues for fisheries management. For this reason, auctions for resource permits and allocating permits based on performance criteria are often characterized as strict alternatives. The importance for policy design then is to seek, where possible, alignment between the Scottish Government's multiple objectives for fisheries management.

6.6 SHOULD CHARGES PROGRESSIVELY INCREASE BASED ON SCALE OF OPERATION?

A variation on the social, environmental and economic criteria used above is to differentiate a fisheries charge in a progressive manner. One example could be to have an escalating charge with respect to vessel size. Despite management objectives in Icelandic fisheries giving a relatively small importance to social considerations, their fisheries tax (detailed above) has a progressive element as it is not levied on the first 30 cod-equivalent tonnes and the next 70 tonnes are subject to half the standard rate. As cod-equivalent tonnes approximate a measure of income, this policy is closer to common usage of 'progressive' as relating to income. By taxing profits, Iceland's resource rent charge (and other countries) is also progressive in an economic sense.

While the gap in economic performance between different fleet segments in Scotland (typically large-scale versus small-scale) would be narrowed by progressive policies recognising this differentiation, it is not clear that cost recovery is the best mechanism for doing so compared to, say, the allocation of fishing opportunities. Vessel size is an indirect measure of income when a simple and clear system already exists if this is the concern to address.

If cost recovery is differentiated based on environmental externalities (as explained in the previous subsection), it is likely that this would be progressive with respect to scale as smaller vessels tend to use passive gears and larger vessels tend to use active gears. In this scenario, the progressive element would be a related consequence rather than an explicit policy design feature.

6.7 HOW MUCH IS ENOUGH?

The lack of systematised data on management costs, despite efforts from the OECD, means that the sum total of fisheries management costs is unknown. It cannot be determined what level of revenue raising would be required to fully or partially cover management costs. However, it is possible to determine how much revenue could be

raised. A levy set at 2% of landed value, for example, would raise £11 million in Scotland (based on current landings).⁶⁹

By way of comparison, this amount of revenue would fail to cover some of the larger individual management expenses like the £15 million annual share for Scotland of the European Maritime and Fisheries Fund⁷⁰ and the £14 million fuel tax exemption.⁷¹ With just these costs in consideration, it seems likely that for the near future it is society that will continue to pay a large share of fisheries management costs.

6.8 WHAT LEVEL OF GOVERNMENT

Most of the literature on cost recovery focuses on the national management of fisheries, but local fisheries management is increasing in scale and importance. In England, the Inshore Fisheries and Conservation Authorities (IFCAs) are empowered to pursue cost recovery to fund their operations through the use of byelaws. In their guidance to IFCAs, the Department of Food, Environmental, and Rural Affairs specifies that “IFCAs will be able to recover the costs of administering and enforcing a permit scheme, attach conditions to permits and limit the number of permits they issue under a particular scheme.”⁷²

There are now a multitude of cost recovery byelaws used in the IFCAs. The Eastern IFCA, for example, is scaling up its fees to reach 50% cost recovery in the coming years.^{73,74} EIFCA and other IFCAs have cost recovery programmes that use a combination of licences, permits for specific fisheries, and pot tagging schemes to aid limiting static fishing gear per vessel spatially, although most of their funding continues to come from Defra and local authorities (Councils and Unitary Authorities). The equivalent inshore bodies in Scotland, the Regional Inshore Fisheries Groups (RIFGs) do not have the same legislative powers as the IFCAs and cannot raise funds themselves.

As inshore management bodies are currently largely directed towards just one section of fisheries (shellfish), the evolution of cost recovery will almost inevitably lead to two independent charges to reflect the structure of the fisheries management system, which is undertaken by two levels of government: national and local.

6.9 DOMESTIC OR INTERNATIONAL VESSELS, DOMESTIC OR INTERNATIONAL LANDINGS

It is standard practice for foreign vessels to fish in Scottish waters and land in Scottish ports and vice versa, with Scottish vessels often making trips outside of Scottish waters. Leaving aside any drastic post-Brexit changes to fisheries management, this practice is likely to continue, leaving open the question whether international and domestic vessels

should be charged at equivalent rates, and whether international and domestic landings should be charged at equivalent rates.

There is an argument that international landings from Scottish vessels could be subject to a differentiated charge as an alternative to the existing economic link, as noted in the previous discussion of differentiating charges by social, environmental, and/or economic criteria. Regarding international vessels catching and/or landings in UK ports, this could be set as a levy on landings, but would be more closely aligned with management costs if it were set as a combination of access fee and quantity (e.g. a fee charged on catches from Scottish waters). A quota auction, under an assumption that they are only available for national vessels, would only raise funds from British-flagged vessels.

7. CONCLUSIONS AND PROPOSALS

Scottish fisheries have been under constant pressure to improve their environmental sustainability. Much progress has been made, but new demands emerge as environmental awareness increases – marine pollution being the latest example. There has been much less focus on financial sustainability, regarding both public and private costs. If progress is to be made here it will require a detailed consideration of a cost recovery programme for Scottish fisheries management.

7.1 RESEARCH CONCLUSIONS

Based on the research conducted for this briefing, we conclude that:

- Fisheries management is a significant public expense and the private beneficiaries should be contributing much more to management costs. Relating to this fact:
 - Raising revenue from the fishing industry is justified on grounds of cost recovery (polluter/beneficiary pays principle), resource rent (profits are being made from a public resource), and environmental externalities (damage paid by the public and future generations);
 - Resources users, who are the beneficiaries of management, should pay for management costs in proportion to their use;
 - Resource charges should provide incentives for users that align with management objectives.
- A Scottish cost recovery programme should be consulted on and phased in at the closest possible date, learning from examples used elsewhere. It should be noted that:
 - Although uncommon in the EU, fisheries charges are used in Iceland, Australia, New Zealand and the US;
 - Raising revenue is common practice in other resource industries in Scotland and lessons can be learnt from the experience of oil and gas extraction, water abstraction, aggregate extraction, as well as related industries like waste, and mobile airwaves;
 - The fuel tax exemption for fishing vessels is one of the largest management costs and is working in direct opposition to the Scottish Government's strategic objectives for the environment and the global discourse on removing harmful subsidies;
 - Cost recovery may not harm the economic performance of Scottish fisheries if effort is reduced in overexploited fisheries and, especially if management is improved, may even improve economic performance.
- A cost recovery programme for Scottish fisheries management could contribute to the financial and ecological sustainability of Scottish fisheries, all while ensuring that users contribute their fair share to management costs. To meet

these objectives the cost recovery programme should take the following design features into account:

- A landings tax is preferable to a quota auction due to the significant non-quota fisheries in Scotland and relative ease of implementation due to the existing Seafish levy;
- Earmarking revenues raised from fisheries for fisheries management (hypothecation) or compensating revenues raised with tax reductions elsewhere (revenue neutrality) may be useful tools for policy salesmanship but are fundamentally misleading and could undermine the financial stability of management programmes. A softer approach using a revenue target (i.e. half the cost of fisheries management) without an attempt to earmark specific funds, would be preferable;
- Differentiating a charge based on fishing type could reflect existing environmental externalities (indirect management costs). This policy would likely be progressive with respect to scale (as smaller vessels tend to use lower-impact fishing gear) and would deliver social benefits from increased local landings (as low-impact fishing vessels tend to operate closer to Scottish fishing ports);
- Differentiating a charge based on domestic versus international landings would provide an incentive to land fishing catches in the UK. It could also avoid the strict thresholds and administrative burden of the current 'economic link' requirements.

7.2 POLICY PROPOSALS

From these conclusions we recommend the following policy proposals as a model of sustainable cost recovery for Scottish fisheries management:

1. The fuel tax exemption for fishing vessels should be phased out.
2. A landings tax should be phased in at a low but increasing rate across all fisheries. Reaching a level of 2% (as an average for the fleet) would, as an example, raise £11 million in cost recovery for Scotland.
3. If a landings tax is employed:
 - a. It should have a differentiated rate based on fishing type and based on their estimated contribution to environmental externalities. How fishing types are defined should be subject to consultation.
 - b. It should have a differentiated rate based on foreign and domestic landings, which can serve as an alternative to the existing economic link policy.
4. In the longer term, an additional charge for resource rent should be added to supplement cost recovery – following the lead of Iceland.
5. If a quota auction is employed:
 - a. The auctioned quota should be a time-limited (e.g. a 10 year lease) rather than a single sell-off. This would require periodic auctions.
 - b. Revenues should be raised on the sale of quota itself rather than quota usage so as not to discourage quota utilisation.
 - c. This approach would be most applicable to any new pelagic quota gained post-Brexit.

6. If, as seems likely, environmental externalities are not accounted for in the cost recovery plan (i.e. if not 3a), then much more progress is needed to internalize these damages in other areas of policy (e.g. internalising climate damages through a carbon tax).
7. If, as seems likely, foreign vessels continue to access Scottish waters post-Brexit there should be a fisheries charge on catches from Scottish waters equivalent to charges on Scottish vessels for the same activity.
8. Inshore fisheries management bodies in Scotland should be empowered to generate their own parallel cost recovery programmes following the model of the inshore management bodies in England.

If implemented, these proposals would not only lead to a more sustainably financed fisheries management system in Scotland, but they would also lead to a more environmentally sustainable system. Whether it's removing the fuel tax exemption, damping fishing effort through new fisheries charges, or differentiating these charges by fishing impact, good financial management and good environmental management go hand-in-hand. Ultimately that is what is needed for Scottish fisheries and the management that shapes it to have a long and bright future ahead.

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