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Eliminating Competition in Fisheries Management: The Mediterranean Case

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Abstract

In this paper, we introduce a simple regulation scheme that might counteract the inefficiencies caused by competition between vessels in fisheries. Each fishing firm is induced to solve the same problem as a social planner. With a constant price for fish, a monopoly firm having all fishing rights might select the Maximum Economic Yield (MEY) outcome in steady state while competition between many vessels will create a competitive game where the solution is a Nash equilibrium comparable to the open access solution. With few vessels the outcome has similarities to the classic Cournot-Nash equilibrium of oligopolistic competition.

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1. INTRODUCTION

In recent decades, incentive adjusting approaches such as individual catch quotas have become the preferred way of managing fisheries rather than incentive block approaches, including effort controls. This is because such instruments may achieve outcomes that are socially efficient. A large number of fisheries are today managed by tradeable quotas (Bjørndal & Munro, 2012). Nevertheless, many fisheries worldwide are still managed by input controls. Instruments may include control of the number of vessels (limited entry), days per vessels, technical characteristics and more. There are several reasons for that. One is because individual quotas may not function well in multispecies fisheries, e.g. in the tropics, where a very large number of species may be harvested at the same time and where there may be grand uncertainty about stock estimates (Squires *et al.*, 2017)[1]. Another reason may be the difficulty of monitoring harvests while one or more aspects of inputs may be controlled much more easily. Examples include industrial fisheries such as those of the Falkland Islands but also many small-scale fisheries. The case study we will consider in this article, multi-species demersal fisheries in the Mediterranean, are an example of the latter.

Assuming a fixed price in a static setting, a monopoly firm with all fishing rights would select the Maximum Economic Yield (MEY) outcome, the solution which is preferred by the social planner. Fisheries with full competition will result in an outcome that corresponds to open access (Bjørndal & Munro, 2012). Between these extremes, we can find an outcome based on an assumption akin to the one used in traditional Cournot analysis (e.g. Tirole, 1997). Here, in a one-product market, each oligopoly firm maximises its profit given that it knows the quantity produced by other firms. In this situation, more firms will increase social welfare. In the open fishery case with few vessels, a similar assumption is that each vessel maximises profits by selecting its effort given that it knows the effort undertaken by all other vessels in the fishery. In this case, more vessels make competition greater, which might significantly decrease social welfare. The reason, of course, is that the competition implies higher total fishing effort and therefore the fish stock diminishes because of overfishing. Whether this happens depends on the ability of the fisheries manager to eliminate the competition element.

In this paper, we fill a gap in the theory of fishery regulation by assuming a payment function where fishers' profits are independent of other participants in the fishery. In that case, when we use a simple static Gordon-Shaefer model as an example, every vessel will choose an efficient effort level. This payment function depends on an effort share parameter assigned to

[1] There are, however, many multispecies fisheries where individual quotas have been found to function very well. One example is given by the British Columbia groundfish fishery (Bjørndal & Munro, 2012).

vessel i and the effort it chooses. The mechanism might be interpreted as an individual tax being levied on each vessel that only depends on an individual effort share parameter and of its own aggregated effort during the regulation period. This model will then be applied to the demersal fisheries of the Western Mediterranean, a multi-species fishery regulated with input controls.

This article is organised as follows: The bioeconomic model is developed in section 2 while section 3 presents the case study. The results, and their potential implications, are discussed in the final section.

2. THE BIOECONOMICS MODEL

Unregulated competition in the fisheries

In the analysis, we will solve the bioeconomic model for steady state. We will disregard discounting as this will simplify the analysis without having an impact on the results we want to derive. We base the analysis on the static Gordon-Schaefer bioeconomic model (Bjørndal & Munro, 2012). Moreover, steady state means that there is no change in stock size x, i.e.

$$\frac{\partial x}{\partial t} = F(x) - h(e, x) = 0 \tag{1}$$

where $F(x)$ is the growth function, and $h(e, x)$ is catches given as a function of stock size and of total effort (e). Solving this equation with regard to x, and eliminating the $x = 0$ solution, gives the stock function $x(e)$, where $x'(e) < 0$ as stock declines in effort. With the Schaefer harvest function (Schaefer, 1957), we have

$$h\big(e, x(e)\big) = h(e) = q\ e\ x(e) \tag{2}$$

where q is a constant, known as the catchability parameter. Further, assuming constant price p and variable costs c for each unit of effort, we have profits π as:

$$\pi = \max_{e}[p\ q\ e\ x(e) - c\ e] \tag{3}$$

This formulation also describes the profit of a sole owner fishery where all fishing rights are held by one firm. The concavity ensures an inner solution to (3). The optimal solution is called the maximum economic yield (MEY) level. As the social planner optimises the same objective function, the outcome of (3) is efficient.

To find an analytical expression, we use the logistic natural growth equation,

$$F(x) = r\ x\ (1 - x/K) \tag{4}$$

where r is the intrinsic growth rate and K the carrying capacity of the environment. Assuming steady state (eq. 1), for $x(e) > 0$, the stock-effort relationship becomes

$$x(e) = K - \frac{q\ K}{r} e \tag{5}$$

When (5) is inserted in (3), we find the sole owner problem as

$$\pi = \max_e [p\,q\,e\,x(e) - c\,e] = \max_e \left[p\,q\,K\,e - \frac{p\,K\,q^2}{r} e^2 - c\,e\right] \tag{6}$$

The first order condition becomes

$$p\,q\,x(e) \;+\; p\,q\,x'(e)\,e - c \;= p\,q\,K - \frac{2\,p\,K\,q^2}{r} e - c = 0 \tag{7}$$

which gives

$$e_{so} = \frac{(p\,K\,q - c)\,r}{2\,p\,K\,q^2} \tag{8}$$

where e_{so} denotes the effort of the sole owner.

Next, consider the case with $n \geq 2$ independent and equal vessels in the fishing industry. Each vessel i simultaneously and independently chooses effort in the one-stage game by maximising its profit given that the vessel has knowledge about the sum of effort chosen by other firms. Vessel i's profit becomes

$$\pi_i = \max_{e_i} \left[p\,q\,e_i\,x\left(e_i + e_j(n-1)\right) - c\,e_i\right]$$

$$= \max_{e_i} \left[p\,q\,K\,e_i - e_i \frac{p\,K\,q^2}{r}\left(e_i + e_j(n-1)\right) - c\,e_i\right] \tag{9}$$

where e_j is one of the other equal vessel's effort multiplied with the number of other firms, $(n-1)$. The first order condition is

$$\frac{\partial \pi_i}{\partial e_i} = q\,x\left(e_i + e_j(n-1)\right) + q\,e_i\,x'\left(e_i + e_j(n-1)\right) - c = 0 \tag{10}$$

Using (5), the solution is the reaction function

$$e_i = \frac{1}{2}\left(e_j(1-n) + \frac{r}{q^2}\left(q - \frac{c}{pK}\right)\right) \tag{11}$$

As firms are equal, we can replace e_j in (11) with e_i and solve the resulting equation with respect to e_i, i.e.,

$$e_i = \frac{(p\,K\,q - c)\,r}{(n+1)p\,K\,q^2} \tag{12}$$

If $n \to \infty$, total effort is

$$e = \sum_{i=1}^{\infty} e_i = \lim_{n\to\infty} \frac{n(p\,K\,q - c)\,r}{(n+1)p\,K\,q^2} = \frac{(p\,K\,q - c)\,r}{p\,K\,q^2} \tag{13}$$

which corresponds to the open access solution.

Eliminating competition in fisheries

There are n fishery firms, each assumed to control one vessel, which can be regulated via a mechanism suggested by Berglann (2012)[2]. Berglann (2012) considers regulation in a static model with negative externalities caused by pollution. We do the same by treating a dynamic fishery model in steady state. The outcome is a mechanism where revenues become regulated on an individual basis. The revenue increases until effort is over a certain point (the maximum economic yield, MEY), thereafter it decreases as individual effort increases through the regulation period.

The following equation differs slightly from (9), because we want to indicate that information might be asymmetrically distributed. We restate (9) as

$$\overline{R_\iota}(e_i, e_j) = p\, q\, e_i\, \bar{x}\left(e_i + e_j(n-1)\right) \tag{14}$$

where n, p and q are commonly known, and e_i and e_j are choice variables. The (dash above) marking indicates, as assumed in Berglann (2021), that the information about the stock size function $\bar{x}(\cdot)$, and hence also the revenue $\overline{R_\iota}$, is not known by the planner but only known or experienced by the vessels. The latter because vessels see the relationship between effort and harvest as they fish and they observe the sum of effort of opponents.

Now, let us assume that the planner applies available historical data to estimate model parameters, including the stock-effort relationship $x(e)$ in equation (5). Regulation then take place as follows: Before fishing starts, parameters of the modelled stock function are disclosed and becomes common knowledge. The planner promises that parameter values will not be updated during the regulation period, and thereafter, each vessel i in the industry is informed that its revenue for landed fish will be

$$R_i(e_i, s_i) = p\, q\, e_i\, x(e_i/s_i) \tag{15}$$

where e_i is the amount of effort chosen by the vessel. The parameter s_i can be interpreted as firm i's holding of share permits, or its allocated share of the total expected effort chosen by the industry, where the total is $\sum s_i \coloneqq 1$. Note that the latter interpretation of s_i might be a little misleading. It is only a parameter in the individual revenue function (15) rather than a unit of permissible effort. This will map into the firm's share of total effort only if all firms behave optimal. But, in no way the s_i parameter restricts the vessel owner from choosing more or less effort than the given share of the total.

[2] Originally proposed by Loeb and Magat (1979) in the context of regulating the output of a monopoly.

If the planner were in the possession of adequate information to perfectly foresee the relation between the ex post optimal efforts of vessels, he/she would be able to portion out optimal s_i holdings. That will be situation in the "n equal vessels" case, which yields $s_i = 1/n$ for all i. The result of applying the revenue schedule (15) to each firm would be a series of optimal choices within the industry.

The first order condition of (15) minus costs, $R_i(e_i, s_i) - c\, e_i$, using (5) is

$$\frac{p\,K\,q}{r\,s_i}(r\,s_i - 2\,e_i\,q) - c = 0 \tag{16}$$

which solves to the effort of the sole owner (8) times s_i

$$e_i(\,s_i) = \frac{(p\,K\,q - c)\,r\,s_i}{2\,p\,K\,q^2} = e_{so}\,s_i \tag{17}$$

This may give the optimal total effort promoted by a social planner that may also be distributed between vessels in an optimal way. We see this by summing up shares $\sum s_i \coloneqq 1$, where we get $\sum e_i(\,s_i) = e_{so}$ in (8), i.e. the effort chosen by the sole owner. Individual profit under optimal effort becomes

$$\pi_i(e_i, s_i) = (p\,q\,e_i\,x(e_i/s_i) - ce_i) = \frac{(K\,p\,q - c)^2\,r\,s_i}{4\,K\,p\,q^2} \tag{18}$$

3. THE MEDITERRANEAN CASE

Mediterranean fisheries are a case in point when it comes to effort or input management. These fisheries are managed by controlling input through effort limitations and technical restrictions, contrary to other EU fisheries that are regulated by catch quotas (output controls) (Lleonart & Maynou, 2003). This fisheries management model was enshrined in the EU Common Fisheries Policy (CFP) as the “Mediterranean specificity” (EU 2006) and has contributed to determine the non-adaptive character of fisheries management in the region (Penas Lado, 2016), that is, fishing effort is not annually revised to meet some specified optimality criterion. The lack of annual revision of fishing effort to match existing fishing opportunities has led to an excessive harvest, overcapacity and economic inefficiencies (Vielmini *et al.*, 2017; Gómez & Maynou, 2020). To redress these problems, the EU has established subregional Multi-Annual Plans (MAP) to align fishing effort with fishing mortality at maximum sustainable yield (MSY) for the main fish stocks within a specified time frame, as envisaged in the 2013 reform of the CFP (EU 2013). For instance, in the Western Mediterranean, a MAP for demersal resources aims at reducing effort with 40% by the end of 2024 compared to actual days for 2016-18 by setting the number of fishing days per fleet segment (COM/2018/0115 final – 2018/050 (COD)).

Thus, the problem of effort shares is very pertinent, particularly in the Mediterranean multi-annual plan where the total effort available (days/year) is now being allocated by individual vessel, according to some historical values as "effort shares", s_i. In retrospect, the total effort may have been set too high.

The objective of the Western Mediterranean Multi-Annual Management Plan (WM MAP) is to achieve (Fmsy) by 1st January, 2025 for the main five target species European hake (*Merluccius merluccius*), red mullet (*Mullus barbatus*), Norway lobster (*Nephrops norvegicus*), deep-water rose shrimp (*Parapenaeus longirostris*) and red shrimp (*Aristeus antennatus*).

Our case study models demersal fisheries in the NW Mediterranean, focusing on geographical subarea GSA06 (the Mediterranean coast of Spain[3]). Demersal fisheries are exploited mainly by otter bottom trawl (about 80% of demersal landings) with fishing vessels of 14 - 28 m length overall based on the 40 fishing harbours (578 vessels were active in 2019). Fishing vessels have little or no selectivity with regard to harvesting.

The five main stocks that define the policy objective make up 48% of the landings of the demersal fishery, the remainder comes from dozens of other secondary species (see Akbari *et al*., 2021). For this reason and for model simplicity, we are treating the stock as aggregate here.

The model was parameterised from data for the bottom trawl demersal fishery in GSA 06, available for the period 2008-2016 in STECF (2020) and complemented with our own data for 2017-2019 obtained by interviews of vessel skippers (Gómez & Maynou, 2020). The parameters of the biological submodel were estimated with ASPIC 7 (Prager *et al.*, 1996) and are given in Table 1. The combined carrying capacity of the stocks harvested by this fleet is 19,900 tonnes with the instrinsic growth rate estimated at 2.5. This implies that the stock level giving rise to maximum sustainable yield $x_{MSY} = K/2 =$ is 9,950 tonnes with MSY equal to $h_{MSY} = rK/4 =$ 12,473.5 tonnes.

In 2019, the fishing fleet consisted of 578 vessels, each operating between 120 and 190 days, on average 155 days. Thus, total effort in days was 89,590. Total catches were 10,640 tonnes. Table 1 shows also price, costs and production estimated for 2019.

[3] For fishing areas, see http://www.fao.org/gfcm/data/maps/gsas/en/.

Table 1: Parameters for the NW Mediterranean demersal fishery exploited by otter bottom trawl.

Fleet size (2019)	578	vessels
Individual effort level (number of fishing days)	120 -190	days / year
Mean individual effort (number of fishing days)	155	days / year
Harvest	10,640	tonnes
Biological production function (Schaefer model)		
K	19,900	tonnes
R	2.5	
q = 0.00397 (tonne/year)/155 =	$2.56\ 10^{-5}$	tonne/day
Economic parameters		
Price of fish	9,472,5	€/tonne
Costs per unit effort:		
Fuel	240	€/day
Labour costs	438,7	€/day
Other variable costs	319	€/day
Total variable costs	997.7	€/day
Fixed costs	69.0	€/day
Total costs per unit effort	1066.7	€/day

In Figure 1 we illustrate total revenue and total costs, both as functions of total effort, for the demersal fishery under consideration, based on the parameters given in Table 1 for the estimated aggregate Gordon-Schaefer model. We find that e_{MSY} =48,804 days, e_{MEY}=38,021 days and e_{OA}= 76,042 days. e_{MEY}, which gives maximum profits, and e_{MSY} compare to an actual effort of almost 89,590 in 2019. Actual effort is even larger than e_{OA}, This clearly illustrates the need for a reduction in effort.

For 2019, it is seen that the difference between revenues (dot, red) and costs (dot, blue) is just over € 5.2 million. Actual stock level in 2019 is estimated at 4,378 tonnes. This is, however, a disequilibrium situation. Inspection of Figure 1 will, however, show that in equilibrium, there will be substantial losses at this effort level (vertical dotted line). In equilibrium, harvest is 3,751 tonnes, stock size 1,635 tonnes and there is a negative profit of € 60 million. A situation like this can only be supported by substantial subsidies.

The various alternatives, in terms of number of vessels, total effort, harvest, stock size and profit are illustrated in Table 2. Scenario 1 is the 2019 situation but as noted, this is a disequilibrium. For the 2019 harvest of 10,640 tonnes to be in steady state, effort per vessel would have to be reduced from 155 to[4] $e_i = 116.6$. In other words, reducing effort with 25%

[4]Solving $h = q\, x(n\, e_i) n\, e_i$ with respect to e_i yields $e_i = \frac{Kr \pm \sqrt{Kr(-4h+Kr)}}{2Knq}$ with solutions $e_i = 52.3$ and $e_i = 116.6$.

(scenario 2) would be sufficient to obtain the same landings and with a profit of 28.8 million € which is more than five times larger than at the present because of less use of costly effort. Equilibrium stock size in this case is 6,160 tonnes.

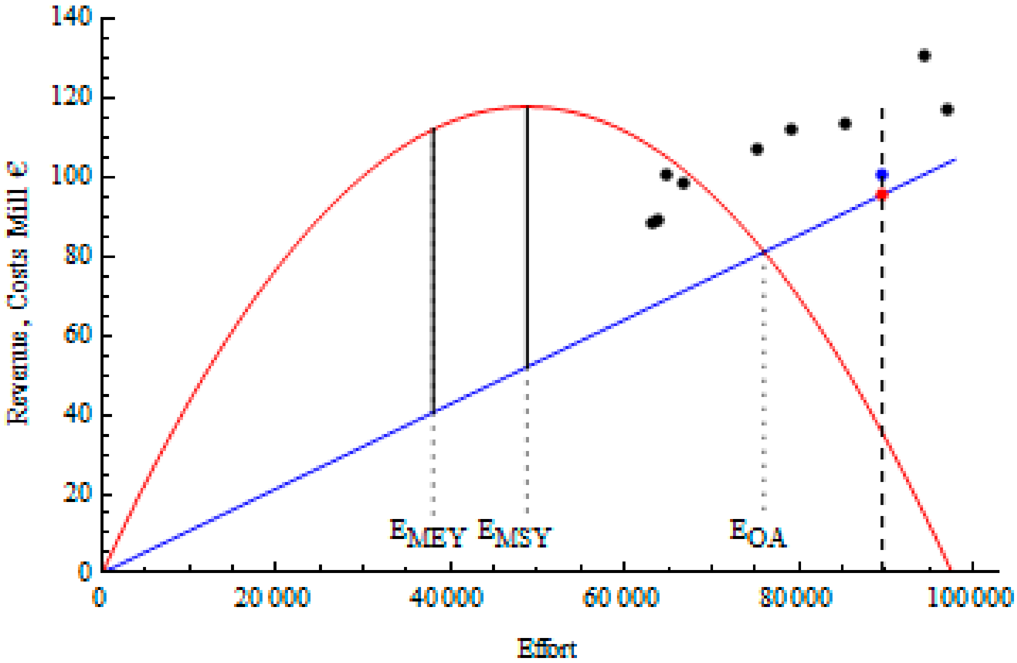

Figure 1: Total costs (blue curve) and revenues (red curve) as a function of total effort in the single species Gordon-Schaefer model of the NW Mediterranean demersal fishery. The blue and red coloured dots are respectively revenues and costs in 2019. The black dots are observed revenues at observed effort levels from 2008 to 2018.

Scenario 3 represents the current effort reduction plan to reduce current effort by 40%. Once equilibrium is reached, this would involve a more than doubling of the stock size to 8,941 tonnes, an annual harvest of 12,310 tonnes and annual profits of € 59.2 million.

The other scenarioes (4-9) of Table 2 shows the outcome with free fishing but when a limited number of firms are allowed to participate in the fishery. Scenario 4 and 5 describes the outcome with a fixed price when all fishing rights are held by one firm, respectively in the case when the firm has MEY and MSY objectives. The MEY is the social planner's preferred solution. Scenario 6 shows the outcome in the duopoly case, i.e. when the fishery is open and two independent firms $i = 1, 2$ are given the fishing rights. The oligopoly scenario 7 and 8 have respectively n=10 (arbitrary chosen) and n=578 (vessels in 2019) number of fishing rights in use. In these scenarios (6-8) fishing firms do include own effort costs in their calculations. Firm i chooses effort determined by equation (12), which is the effort that maximises its equilibrium profit given the sum of effort for all other firms. Scenario 9 shows the full competition or open access case (corresponding to → ∞). Here total effort is given by equation (13). In general, we see, for $n \geq 2$, that the solutions will not be efficient.

Table 2: Outcomes for the NW Mediterranean demersal fishery by the otter bottom trawler fleet in GSA06 when each of n vessels maximise its profit given the sum of effort for all other fishers. In all these cases we calculate with total costs per unit effort = 1066.7 €/day.

	Scenario	Number of fish rights, n	Total effort days	Total harvest tonnes	Stock size tonnes	Total profit mill €
1	Realised (2019)	578	89,590	10,640	1,635	5.20
2	25% effort reduction	<578	67,395	10.633	6,160	28.8
3	40% effort reduction	<578	53,754	12,310	8,941	59.2
4	MEY	1	38,021	11,830	12,148	71.5
5	MSY	1	48,804	12,438	9,950	65.7
6	Duopoly	2	50,695	12,419	9,564	63.6
7	Oligopoly	10	69,129	10,280	5,806	23.6
8	Fleet size (2019)	578	75,911	8,600	4,423	4.9
9	Full competition	→ ∞	76,042	8,563	4,396	0

As we pursue in this article, instead of setting effort quotas for each vessel equal to a specific number of days, an alternative to achieve optimal total effort can be by regulating individual revenues, equation (15). Using equation (17) and parameter values of Table 1, we find that regulation with equilibrium as a goal, vessel i's effort in equilibrium becomes a share of the effort chosen by the sole owner firm (and the planner)

$$e_i(s_i) = e_{so} s_i \tag{19}$$

where e_{so} is the total effort equilibrium goal, e.g. at MEY $e_{so} = 38021$, s_i is the effort share set by the regulator. Since $\sum_{i=1}^{n} s_i = s$, we find that the wanted outcome is achieved when s=1 (with n equal vessels, $s_i = 1/n$ for all i). Figure 2 shows profit as a function of effort for a vessel in this case (red curve). In optimum individual effort is 65.8 days (=38021/578 days) and vessel profit (18) is 0.124 mill €.

The interpretation of s_i as a share of total effort might not be necessary. In scenario 5, for the fishing industry to choose to attain the MSY target, a value $\sum_{i=1}^{n} s_i = s > 1$ might be requested. In this case, s_i's cannot be interpreted as shares because their sum becomes larger than one, in this case $\sum_{i=1}^{n} s_i = s = 48804/38021 = 1.2836$. The blue curve in Figure 2 shows a vessel's profit in this MSY scenario. For vessels to choose a 48804/578 = 84.44 days effort level, with an individual profit (18) of $\pi_i = 0.1588$ mill €, an extra amount of subsides are required. This subsidy can be regained for example with levying a profit tax making the net profit inverse proportional to s, i.e. that $\pi_i/1{,}2836$ =0.124 mill € which is equal to the MEY profit.

If the total effort goal in equilibrium is a 40% reduction of the 2019 effort level (scenario 3) at 53754. That level may be targeted with a s value equal to $53754/38021 = 1.4138$. The orange curve in Figure 2 shows a vessel's profit in this scenario 3. Optimal vessel effort and gross profit is respectively 93.0 days and 0.175 mill €.

Similarly, scenario 2, showing a 25% reduction leads to $\sum_{i=1}^{n} s_i = s = 67395/38021 = 1.773$. The vessel's profit curve in this case is colored green in Figure 2. To attain that 53754 level an extra amount of subsides are required. Optimal vessel effort and gross profit is respectively 116.6 days and 0.219 mill €.

If vessels are heterogenous, e.g. there are two groups with each 578/2=289 vessels where costs differ by 10% and is thus $c_1 = 960$ in one group and $c_2 = 1173$ in the other group. With the MEY target each group is appointed similar effort shares $s_1,\ s_2 = 0.5$, then $e_1(\ s_1) = 19550$ and $e_2(\ s_2) = 18471$ that adds to $\sum e_i(\ s_i) = 38021$. With a 40% reduction target we set $s_1,\ s_2 = 0.707$, and when costs differs by 10% then $e_1(\ s_1) = 95.63 * 289 = 27639.5$ days and $e_2(\ s_2) = 90.37 * 289 = 26117.5$ days that adds to $\sum e_i(\ s_i) = 53757$.

These latter calculations show by example that flexibility of the regulation in no way restricts the vessel owner from choosing more or less effort than the given share of the total allowable effort (TAE).

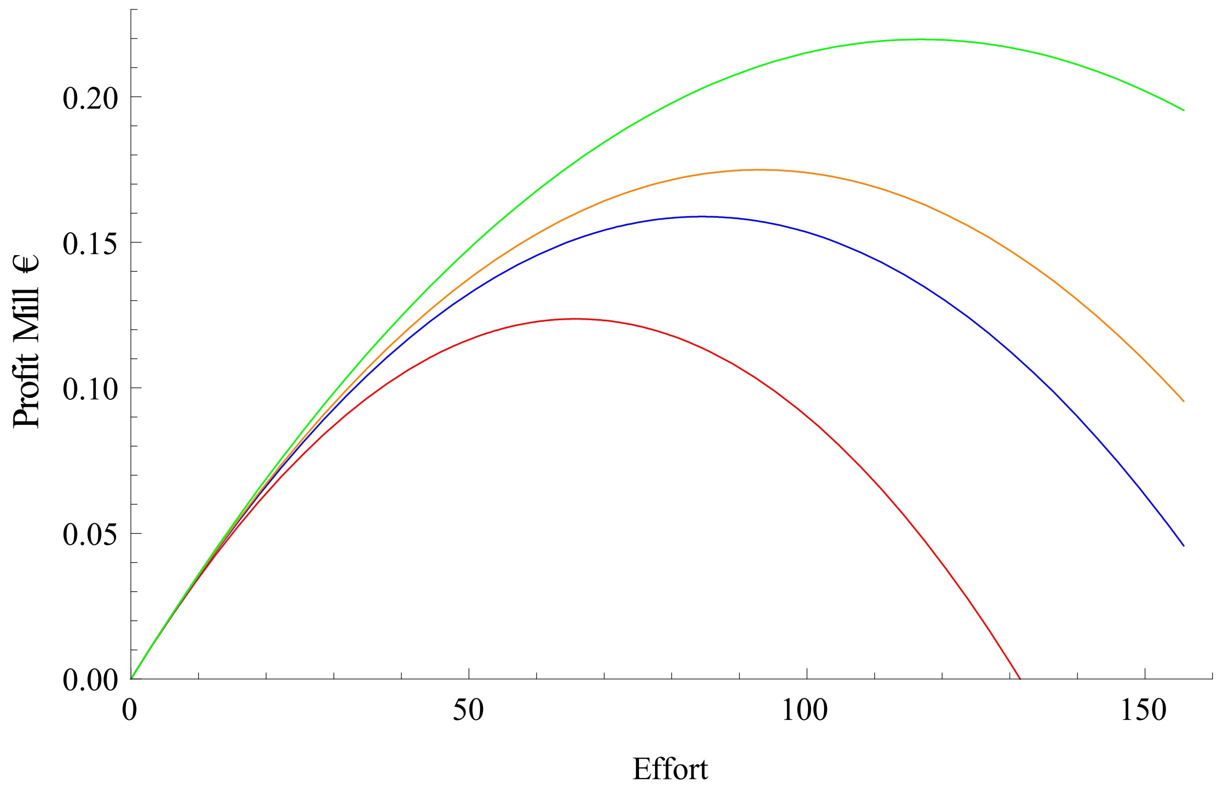

Figure 2. Profit under regulation in the above scenarios, for each of the n=578 vessels. Scenario 2 (25% reduction, green), scenario 3 (40% reduction, orange), scenario 4 (MEY, red) and scenario 5 (MSY, blue).

4. CONCLUDING REMARKS

For many fisheries, catch rights based management is preferred due to desirable properties with regard to economic efficiency. With a given vessel quota, harvesters will have incentives to minimise cost of harvesting. Moreover, each vessel will adjust harvesting so as to maximise output price (Arnason, 1990; Arnason, 2000). On the other hand, weaknesses might be that vessel quotas increase the risk of discarding and misreporting of catches.

A fundamental problem with effort-based management is that it gives incentives to maximise harvest given effort, e.g. the number of fishing days. There is also an incentive to "effort creep" and to substitute unregulated inputs for regulated ones. As a consequence, continual adjustment in the effort control is required so as to counter "effort creep" (Squires *et al.*, 2017).

On the other hand, effort rights-based management might be more effective at managing fishing mortality where uncertainty in biomass and TAC estimates is more fundamentally important than uncertainty in the estimates of the catchability coefficient (FAO, 2012). Moreover, in a multi-species fishery, where there is very little selectivity in harvesting, and where it is very difficult to monitor harvests, effort control might be the preferred management option. This might be the case for the NW Mediterranean case presented here, but may also be the case in other fisheries around the world of which many may be poorly assessed or being in danger of overfishing (Walsh *et al.*, 2018).

The practical advantage of our proposal, compared to traditional effort control, is that the greater flexibility may make it easier for fishing vessels to comply with the regulation. This might, among other things, increase the legitimacy of the regulation. The increased flexibility also ensures that more efficient vessels will choose more fishing days than the less efficient participants. This may increase social welfare compared to a traditional effort scheme because authorities will typically have less information about the vessels' efficiencies than the fishers themselves. Hence, authorities will not be able to distribute effort quotas better than the realised choices of fishing days that occurs with the flexibility scheme devised.

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In this paper, we introduce a simple regulation scheme that might counteract the inefficiencies caused by competition between vessels in fisheries. Each fishing firm is induced to solve the same problem as a social planner. With a constant price for fish, a monopoly firm having all fishing rights might select the Maximum Economic Yield (MEY) outcome in steady state while competition between many vessels will create a competitive game where the solution is a Nash equilibrium comparable to the open access solution. With few vessels the outcome has similarities to the classic Cournot-Nash equilibrium of oligopolistic competition.

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