An economic analysis of illegal, unreported and unregulated (IUU) fishing: Key drivers and possible solutions

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Abstract

The fight against illegal, unreported and unregulated (IUU) fishing activities has recently become a high priority in the international fisheries management agenda. While a number of academic contributions have sought to improve the understanding of the problem, most remain limited in scope. To help policy makers obtain a more comprehensive picture of the situation, the OECD Committee for Fisheries recently completed a study addressing the full economic dimensions of IUU fishing in an integrated manner. This paper presents the analytical framework developed by the OECD as well as some of the key results of the study regarding the causes of and the potential solutions to this widespread problem.

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1. Introduction

While the problem of fishing activity regarded as illicit is scarcely new [1], only recently has it become a major international issue. One reason is the recognition by the international community of the extent of the problem, which affects both domestic waters and the high seas, as well as all types of fishing vessels, regardless of their size or gear. The international community has also become increasingly concerned by the contribution of illegal, unreported and unregulated (IUU) fishing to the downward trend in stock status observed since the 1950s. In this context, any behaviour likely to undermine endeavours to manage and rebuild fish stocks, such as IUU fishing, is no longer considered as economically and politically accep-

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comprehensive manner [11]. The rationale for this decision was to make sure that all underlying causes of IUU fishing have been correctly identified in order to select the most appropriate solutions to the problem. This work has been partly based on the outcome of an international workshop hosted in April 2004 by the OECD Committee for Fisheries, which sought to present empirical evidence on the nature and extent of IUU activities. Participation came from governments, IGOs, NGOs, RFMOs and academia [12–16].

The aim of this paper is to present the analytical framework used in the OECD study (see [11]), which elaborates on the model developed by Charles et al. [6]. Drawing on a systematic comparison between fishing operators complying with regulations and IUU fishing operators, the following section describes the major causes for engaging in IUU fishing activities. The final section explores actions that could be taken to modify IUU operators’ incentives structure by reducing revenues from IUU fishing, increasing the operating costs for IUU activities, increasing the capital costs of IUU/FOC vessels, and by increasing the cost of risk of engaging in IUU activities.

2. The causes of IUU fishing

IUU fishing is primarily an economic activity. Recognising that incentives to engage in IUU fishing activities are also economic by nature, the general economics of crime and punishment can be used to model this phenomenon. A key outcome of this theory, the basis of which are the works by Becker [17] and Stiegler [18], is that a risk-neutral individual will commit an offence if and only if his private expected benefit exceeds the expected sanction for doing so. In the context of IUU fishing, this means that incentives to engage in IUU fishing operations will exist (increase) as long as the expected profit of IUU fishing is positive (increases; see [11] for a detailed description of the model).

2.1. Economic causes of IUU fishing

Overcapacity, ineffective management and subsidies are identified as three of the major economic causes of IUU fishing. At the level of the vessel, overcapacity can be caused by a situation of general imbalance between fishing capacities and fishing possibilities in the domestic fleet or inappropriate allocation of fishing rights, both of which result from inappropriate management regimes. The analysis shows that incentives to engage in IUU fishing exist as long as the expected return from using the excess capacity is greater than the regular best alternative, which is a zero profit [11]. In the same vein, IUU fishing activities may take place at the level of Regional Fisheries Management Organisations (RFMOs) because some RFMO members are not granted “sufficient” fishing possibilities in comparison to their—sometimes emerging—fishing capacities. This may be due to the closed nature of some RFMOs or to the lack of fishing history of some members which restricts their claims to a greater share of a Total Allowable Catches (TAC).

The provision of subsidies that contribute to the maintenance, the development or the transfer of fishing capacities are likely to artificially reduce the cost of IUU fishing capacities both locally and internationally. This was recognised by governments in the WSSD Implementation Plan in which they undertook to “eliminate subsidies that contribute to illegal, unreported and unregulated fishing and to over-capacity, while completing the efforts undertaken at WTO to clarify and improve its disciplines on fisheries subsidies...” [5]. There is an emerging consensus in the current WTO negotiations that any support for new vessel construction should be prohibited.

The way domestic management regimes are designed and the effectiveness with which they are enforced is an important determinant of the income of individual fishers. In principle, the higher the income generated by domestic fisheries, the lower the incentive for fishers in those fisheries to engage in IUU activities. Hence, countries with weak and poorly enforced management regimes may be a likely source of vessels for IUU operations. The importance of introducing capacity restrictions in national fleets is also significant in this regard, although caution is required in managing the transition towards more economically viable fleet structures to ensure that capacity does not shift to IUU operations.

2.2. Institutional factors

Gaps in the current international legal framework for the sea (in particular as provided by the UNCLOS) allows for some fishing activities to be in practice beyond the reach of national and international regulations [11]. Unregulated fishing activities are defined as those activities conducted by vessels without nationality or flying the flag of States not parties of relevant fisheries organisations [3] and who do not therefore consider themselves bound by their rules. Of particular interest are those IUU operations conducted by citizens of a given State who register and flag their vessels in a foreign State with the explicit objective to circumvent domestic and international regulations. These foreign States are often referred to as Flag of Convenience (FOC) [19, 20] or, in the OECD study, Flag of Non-Compliance (FONC) States. In the high seas, whether or not under an RFMO’s jurisdiction, IUU/FOC vessels are not forbidden to fish under current maritime law. Thus, even where they undermine existing fisheries management arrangements, IUU/FOC vessels can hardly be punished for doing so, dramatically reducing the potential effectiveness of sanctions.

Other institutional problems can exacerbate the IUU problem, with direct consequences for the economic returns of IUU operators. First, it is well recognised that there is generally an insufficient level of Monitoring, Control and Surveillance (MCS) both domestically and in
RFMOs [4]. This leads to a low probability of being apprehended (even within national EEZ’s) and reduces the expected cost of IUU fishing. Second, an insufficient level of sanction (fine and non-monetary sanction) is frequently observed. One case study [15] submitted to the OECD IUU Workshop suggests that maximum penalties should be increased considerably (by as much as 24 times) compared to current levels if they are to have a deterrent effect. A review of national information on penalty levels suggests that while OECD countries apply a very wide range of penalties and fines [11], very few countries seem to have levels of fines that are effective deterrents to IUU activities.

A third factor which can reinforce the reduced risk and expected costs faced by IUU operators is the prevalence of tax havens. Vessel operators have the possibility of using the confidentiality or secrecy of banking institutions established in such places to hide their true identity, and thus avoid paying fines when their vessel is caught. In this context, it should be noted that a number of the countries which have been known to act inconsistently with regional and international conservation rules by relevant RFMOs (e.g. ICCAT), or have been involved in ITLOS cases (such as Belize, Panama, St. Vincent and the Grenadines, Seychelles, etc.) were also listed in 2000 by the OECD as tax havens [21]. Among the 28 countries declared FOCs by the ITF, 12 (i.e. 43%) were also listed in 2000 by OECD as tax havens.3

2.3. Social factors

Some factors behind IUU fishing are of a social nature. The prevalence of poor economic conditions and prospects in some developing countries create a ready and cheap labour pool for IUU/FOC vessels (for example, many IUU crew observed are Indonesian, Chinese or Filipino [14]). The opportunity cost of labour being close to zero in most developing countries, excessive supply of labour pushes salaries to very low levels, whatever the conditions and associated risks [11]. For instance, the poaching of trochus in Australian waters in the early 1990s was mostly driven by the extreme poverty of Indonesian fishermen, who undertook the activity despite the potential of facing heavy penalties and imprisonment [22]. In the same vein, poor domestic economic prospects may force crews to accept working on FOC vessels that may be neither operating under standard health and safety conditions required by ILO and IMO regulations, nor respecting workers’ rights. The costs associated with maintaining appropriate safety and working standards can be then close to zero for those vessel owners that decide to neglect the state of the vessel. The prevalence of a ready and cheap labour pool also reduces in some circumstances the real cost of risk for the vessel owner, as crew members arrested are often abandoned by their employers as they can be replaced at a very low cost (with the notable exception of fishing masters and other specialised crew members).

2.4. Organised IUU fishing operations

The emergence of organised IUU fishing operations has facilitated and accelerated the development of IUU fishing by reducing the monetary and transaction costs of engaging in IUU fishing (mainly the cost of risk and avoidance, fraud, registration operations). This feature is of importance because it goes further than the traditional assumption that an individual’s compliance decision is not supposed to be influenced by the behaviour of other individuals. However, coordination can play an important role in the decision on whether or not to engage in illegal operations [8], and the recent engagement of organised IUU fleets of vessels with common ownership is of particular concern. Agnew and Barnes [14], for instance, report that two major companies based in the Far East manage an organised IUU fleet, although one of the companies officially denies it. In the same vein, the Coalition of Legal Toothfish Operators (COLTO) published in 2003 information related to a group of deep sea fishing vessels reported to have common interests (the so-called “Galician Syndicate”) [10,14].

The development of highly complex company ownership structures has several effects which alter the economic balance sheet for these vessels. First, mixing IUU catch along with regularly obtained catch will allow the price of IUU fish to be higher than would otherwise be the case. Second, it is not sufficient to simply examine the economics of a single vessel when a company runs a series of IUU vessels because single vessels can be quite easily sacrificed to the overall benefit of the fishery. For example, there are allegations that the two vessels arrested by the Royal Australian Navy in February 2002 (the Volga and the Lena) were the oldest and most dispensable in the IUU fleet fishing around Heard Island [14]. Thus, the actual disincentive of arrest may be much less (for the company) than would be assumed for a single vessel.5 Third, a large company will have the ability to disguise fleet movements through rapid re-flagging,6 name changing, modification of vessels, and early warning systems.7

1International Tribunal for the Law of the Sea (http://www.itlos.org/).
2The International Transport Workers’ Federation (ITF) is a federation of 621 transport trade unions in 137 countries, representing around 5 million workers (http://www.itf.org.uk).
3Antigua and Barbuda, Bahamas, Barbados, Belize, Gibraltar, Liberia, Marshall Islands, Netherlands Antilles, Panama, St. Vincent and the Grenadines, Tonga and Vanuatu.
4For further details, see http://www.colto.org.
5After the arrest of the most inefficient vessels which are used as decoys, the efficient fleet is often assured of a period of fishing, uninterrupted by a patrol vessel.
6In practice, the cost of registration/re-flagging in a FOC country which has established open registers is minimal (around USD 1000–5000, mainly legal costs), relatively simple and fast, and can often be done at sea.
7Some of these factors may be worsened when IUU fishing companies are also involved in other illegal trade, such as drug and weapons [1,20].
3. Possible actions against IUU fishing activities

Under current conditions, IUU fishing is clearly a profitable undertaking. The OECD study concluded that the first major step in combating such activities is to identify measures that render them unprofitable. This can be done by adopting actions aimed at reducing revenues from IUU fishing (3.1), increasing operating costs of IUU activities (3.2), increasing capital costs of IUU vessels (3.3), and increasing the cost of risk of engaging in IUU activities (3.4). While some of the following measures can affect specific factors, others are more of a “cross-cutting” nature and are likely to affect several aspects at the same time [11].

3.1. Possible ways to reduce total revenues

3.1.1. Improving the effectiveness of the current legal framework for the sea

To reduce unregulated catches on the high seas, a first set of actions could be taken to address the incompleteness of the current international legal framework. These include: the ratification of all international conventions (including UNCLOS) by all flag states in order to provide a comprehensive legally binding framework; the establishment of RFMOs wherever fishing takes place; and the adhesion to all RFMOs by involved flag States. Such improvements in the comprehensiveness of the system could, in particular, reduce the possibility for a vessel being registered in a FOC State. Appropriate incentives should be found to convince FOC countries to join RFMOs or become a contracting party (including through the provision of financial supports [11]).

Second, actions can be taken to improve the effectiveness of the current international legal framework in place. This includes the development of minimum and enforceable standards for parties to international agreements (e.g. an enforceable definition and application of the principle of “genuine link”) and the improvement of compliance from all contracting parties to international agreements, (e.g. through the use of legal procedures).9 Greater effectiveness of the current legal framework for the sea could also be obtained through the improvement of MCS capacities. To avoid increasing the financial burden on legal operators, this could take place through a greater collaboration between committed States, including the sharing of platform costs and information. A recent 2003 treaty between Australia and France establishing co-operative surveillance in the Southern Ocean is significant in this regard. The establishment of the International Network for the Co-operation and Co-ordination of Fisheries-Related Monitoring Control and Surveillance Network (the MCS Network),9 where nations are joining their resources to increase their effectiveness, is likely to offer some important cost savings.

3.1.2. Reducing the value of IUU catches

Measures can be taken to reduce the possibility of the catches being “converted” into revenues. Such measures, because they aim to prevent IUU catches from entering regular markets, are of a trade nature and can take the form of embargo or other forms of import restriction for fisheries products.10 For instance, since 1996 ICCAT has requested that Contracting Parties introduce commercial measures aimed at banning imports of IUU catches.11 In the same vein, the Convention for the CCAMLR adopted in 1999 a Catch Documentation Scheme designed at preventing IUU toothfish catches from entering markets in CCAMLR member countries.

Some measures also aim at reducing the relative difference in revenues between IUU and regular fishing operators by increasing the price of regular catches. The fundamental logic underlying such a measure is that consumers may be willing to provide complying operators with a price premium in order to reward their responsible behaviour. Such measures would require the use of labelling or certification based on a catch document or any other trade tracing document. There is evidence from the CCAMLR situation that fish that have been certified using a catch document scheme may command higher prices than uncertified fish; for example, the current premium on fish carrying CCAMLR Catch Documents is around 20–30% [14]. Lastly, there is some scope for the use of tariffs to prevent IUU catches entering into final markets. Applying higher tariffs to fish products originating from countries supporting IUU fishing would increase the final price of IUU catches to a level considered as unattractive by consumers. Using such a tool could be particularly appropriate when preferential tariffs are granted to specific countries, as for example under the EU Generalised System of Preferences [24].

3.2. Possible ways to increase operating costs of IUU/FOC vessels

As tax evasion has been often cited as one incentive to engage in IUU/FOC fishing activities [1, 14], a direct way of modifying the incentive structure would be to promote the elimination of tax havens, as well addressing any other tax distortions that may sustain IUU fishing activities. Trade measures could also be taken to restrict the

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8It is worth noting that the subjects of international law are States, not individuals or legal persons, unless there is some provision in the domestic law which makes the rule in question applicable and enforceable as a matter of domestic law [23, p.21].

9See http://imcsnet.org/.

10For a review of the use, effectiveness and challenges of the trade measures used against IUU fishing activities (including their WTO consistency), see Le Gallic [24].

11In 1996, Members of ICCAT recommended Contracting Parties to introduce “appropriate” commercial measures to prohibit imports of bluefin tuna from Belize and Honduras (recommendation 96–11), as well as from Panama (recommendation 96–12).
provision of some goods and services to FOC vessels in order to increase their costs [24]. For instance, preventing FOC vessels from landing their catch in a given port is likely to increase the fuel cost of steaming (e.g. the ban by Canadian ports of Estonian vessels in 2002). Other restrictions may be established either on fishing input goods (e.g. ice; navigation, detection or communication device) or on services.

Due to its relative importance in the total cost of most fishing operations, crew cost is an area where strong incentives to engage in IUU/FOC fishing exist. Three types of actions can be envisaged. First, all flag States should pursue the ratification and implementation of any international convention regarding the working conditions of fishers, and in particular the ILO conventions. It is worth noting that ILO Convention 163 (Seafarers' Welfare Convention) and Convention 180 (Seafarers' Hours of Work and the Manning of Ships Convention) have been ratified by only 12 and 15 countries, respectively. A second set of actions, addressing the problem of unskilled crew originating from developing countries, aims to improve the economic and social situation in these countries in order to increase the opportunity cost of labour. This would result in higher wages and higher maintenance costs. While such actions for development need to be considered in a medium to long-term perspective, they are nevertheless likely to generate a durable deterrent to IUU/FOC fishing operations. A third set of actions specifically concerns skilled crews (such as master and engine chief), and consists of using "extra-territorial" sanctions to influence the wage of IUU/FOC fishers (see Section 3.4 below).

3.3. Possible ways to increase capital costs of IUU/FOC vessels

Increasing the capital cost of IUU/FOC vessels can be achieved either directly (e.g. through the definition and application of enforceable minimum standards, in accordance with existing international regulations) or indirectly (i.e. through improvement of the economic prospects of developing countries). Reducing local and global imbalances between fishing possibilities and fishing capacities (i.e. overcapacity) is also an important avenue to pursue. The use of time-limited scrapping programs could help to reduce global imbalances. It should be noted that such programs in general have a high cost. For instance, EU Member countries granted around EUR 32 million for permanent capacity reduction in 2000 (both national and EC funding), while Korea spent up to KRW 254.5 billion (USD 197 million) for the same purpose in 2001 [26].

Alternative, less costly measures, such as the adoption of management regimes that would permanently reduce fishing capacities or prevent further development of capacities, should be preferred. Any subsidies which are likely to artificially reduce the value of vessels (e.g. shipbuilding subsidies) should also be eliminated.

A third set of actions that may be taken to increase FOC vessels capital cost are restrictions on outward investment. For instance, a way of increasing the capital cost of IUU fishing activities could consist in submitting foreign direct investment in FOC States to prior notification to fiscal authorities, in order to prove that these investments are not dedicated to IUU fishing activities. While such a measure may be possible to be circumvented, it could nevertheless increase the cost of the investment (including the transaction cost), and hence reduce the incentive to engage in IUU/FOC activities. An interesting example of such a restriction on outward direct investment can be found in the Japanese reservation lodged under the OECD Code of Liberalisation of Capital Movements [27].

3.4. Increasing the cost of risk of engaging in IUU activities

The cost of risk includes the costs related to fraud, corruption and other types of avoidance behaviour, the cost of expected sanctions, and the "moral/reputation" cost.

3.4.1. Increasing the scope and the level of sanctions

Increasing expected sanctions will directly affect decisions to engage in illegal and unreported fishing activities within national EEZs or on the high seas. However, under the current international framework, this will not affect unregulated activities conducted by FOC vessels on the high seas. The level of expected sanctions is positively linked to two main factors: (1) the probability of being apprehended and (2) the sanction level. To increase the probability of being apprehended, actions that aim to improve traditional MCS capacities and to enhance collaboration between states should be encouraged. Alternatively, actions could be taken to enlarge the "risk zone", for example through the extra-territorial application of domestic sanctions [10]. While different countries have different attitudes to the extra-territorial application of their laws to their citizens, such application is becoming more widespread (its extension to certain types of sex tourism is a recent example). In the context of IUU fishing activities, several OECD countries have passed or are considering passing such regulations (e.g. New Zealand and Spain). This can also take place through the resort to so-called "long-arm approaches", which allow for prosecution by a government of a national who acted in contra-

13The overall efficiency of scrapping schemes in a given fishery depends on various factors, including the management regime in place [25]. Yet, notwithstanding these management issues, physical scrapping schemes are likely to increase the price of remaining vessels.

14The Code is actually a Decision of the OECD Council, which is legally binding on OECD governments. See also OECD Code of Liberalisation of Capital Movements and Current Invisible Operations: Users' Guide, April 2003, p. 6.
vention of a foreign law. Such a mechanism is often referred to as the “Lacey Act” provision or contravention. The Lacey Act, passed in the US to outlaw interstate traffic in birds and other animals illegally killed in their State of origin, can apply to the acts of landing, importing, exporting, transporting, selling, receiving, acquiring, possessing or purchasing any fish taken, possessed, transported or sold contrary to the law of another state [10,28].

Related to this, a third and direct way of enlarging the scope of possible sanctions in any country would consist in making any trade of IUU fish an offence (i.e. in particular the enlargement of sanctions to downstream operators, including final consumers).

Concerning the level of sanction, concerted action should be conducted to raise and harmonise the level of fines, whether at the national (e.g. following the current Australian strategy, where an Indonesian fishermen was fined AUD 130 000 in April 2005, the largest ever recorded for an offence in Australian’s northern waters) or at the international level. Penalties should also take the form of physical actions, such as vessel and catch confiscation or jail sentences. While vessel or catch confiscation can easily translate into reduced profits for IUU/FOC vessels’ operators (in the form of additional capital cost or loss of revenues), jail sentences will act as a deterrent only if they concern skilled crew members or vessel owners. To complement these potential measures, actions should be conducted to identify the “beneficial ownership”. As a major reason for the lack of transparency is the possibility for confidential registration of fishing companies in some countries, any action seeking the elimination of tax havens or other non-cooperative territories/jurisdictions should be encouraged.15

3.4.2. Increasing the other costs of engaging in IUU activities

Fishing operators face three others types of cost when engaging in IUU fishing activities; avoidance costs, in the form of steaming time, steaming fuel costs or “research” operation (e.g. costs associated with the detection of MCS vessels, including electronic equipment costs); moral/reputation costs that are often considered insufficient due to a general lack of recognition of the seriousness of this activity, and fraud costs (repackaging and re-labelling; faking VMS positions in support of misreporting, etc.), including in the form of the cost of financing corruption. Avoidance costs could be mechanically increased through the improvement of public MCS capacities. In addition to public actions, it should be noted that private initiatives may also contribute to increase the avoidance cost of IUU/FOC vessels. For instance, in the Antarctic toothfish fishery, the COLTO legal operators established a “wanted” reward scheme in order to improve the identification of IUU/FOC vessels. While the overall outcomes of the scheme are still unknown, such an initiative is likely to increase the avoidance cost of IUU/FOC vessels.

Any action directed at improving the social knowledge of the harmful effects of IUU fishing could be encouraged to increase the moral/reputation cost. In particular, the valuation of environmental, economic and social damages could provide useful information. Once again, it is worth noting that private initiatives may play a significant role in this context as a complement to public programs. For example, this may be done through educational programs, information dissemination, public campaigns, etc. With regard to the particular case of established companies that might have an interest in heeding corporate governance issues, it should be noted that shaming initiatives could play a significant role. In this context, Stokke and Vidas [13] suggest that typical agents of shaming are business and environmental NGOs that provide detailed information on IUU companies and their suppliers in order to increase the costs incurred. As an illustration, the authors report that the disengagement of Norwegian vessel owners from IUU operations in Antarctic waters is believed to be a consequence of ISOFISH publications having named them.

4. Concluding remarks

IUU fishing is a worldwide problem, affecting both domestic waters and the high seas, and all types of fishing vessels, regardless of their size or gear. IUU fishing is harmful to current global fish stocks and undermines the effectiveness of measures adopted nationally, regionally and internationally to secure and rebuild fish stocks for the future. Hence, IUU fishing not only generates harmful effects on economic and social welfare, but also further reduces incentives to comply with rules.

In order to combat the different types of IUU fishing activities, different responses and widely different actors are involved. This paper shows that multiple possibilities exist to address the multiple roots of the problem, provided that measures are effectively applied. Yet, it is also recognised that every measure carries a cost and further investigation is, in general, needed to clarify each respective benefit.

Some responses rely on the national legal framework which may need improvement; others rely on international frameworks, as is the case with RFMOs. The analysis, for instance, shows that whereas increasing penalties and the detection likelihood can be a way forward to reduce illegal fishing, limitations remain when the crew involved in IUU fishing activities originates from low income countries. In such a situation, alternative measures must be worked out, including the establishment of cooperation and development programs and the identification of the beneficial owner of the vessel(s).

Recognising the limited success that “traditional” control and surveillance-like measures have had in the past in addressing those specific unregulated fishing activities, this paper proposes several alternative or

15 The OECD is also at the forefront of international initiatives on these issues through the Financial Action Task Force on Money Laundering.
complementary initiatives that can be envisaged, such as the use of non-discriminatory trade measures and the extra-territorial application of domestic sanctions. It also suggests that, in general, new forms of governance of the high seas should be considered to improve the effectiveness of the current legal framework.

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