Ineffectiveness of the Common Policy for Fishing Capacity Reduction

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Jel classification : Q220, Q180

Abstract

Fishing capacity is the ability of a vessel or a fleet to catch fish. The excessive fishing capacity, termed overcapacity, is one of the most important problems that cause overfishing. Under the common fishery policies, the reduction of fishing capacity can be achieved by stopping permanently vessels' fishing activities. The European Commission stated that measures aimed to reduce the fleet capacity and, therefore, the overfishing problem have been so far ineffectiveness. In this paper, it is assumed that measures given by policy-makers to reduce fishing overcapacity are not effectiveness enough because of asymmetric information existing in the Principal-Agent relationship. It is the policy-maker's bounded rationality that causes imperfect information between the Principal and the Agents. To overcome the limits of the bounded rationality, and therefore, to reduce the gap between Principal and Agents, information can be provided to policy-makers on the basis of the public choice evaluation. The information could contribute at improving the so-called 'prescriptive activity' of policy-makers. In the paper, ABSCM method is described as a tool for public policy choice evaluation. Finally, as an example, it is reported an application of this method used to evaluate public measures employed in the Italian fishery.

Résumé

La capacité de pêche exprime la capacité d'un navire ou d'une flotte de capturer du poisson. Une capacité de pêche excessive, dite surcapacité, est l'un des problèmes majeurs qui engendre la surpêche. Dans le cadre de la politique commune de la pêche, la réduction de la capacité de pêche est possible si l'on arrête d'une manière permanente les activités de pêche des navires. La Commission Européenne a établi que les mesures visant à réduire la capacité des flottes et, donc, le problème de la surpêche, ont été jusqu'ici inefficaces. Dans ce travail, l'on suppose que les mesures formulées par les décideurs pour réduire la surcapacité de pêche ne soient pas suffisamment efficaces à cause de l'asymétrie de l'information dans le rapport Principal/Agent. C'est la faible rationalité des décideurs qui donne lieu à des informations imparfaites entre Principal/Agents. Pour surmonter ces limites et, donc, combler la lacune entre Principal et Agent, on peut fournir des informations aux décideurs se basant sur l'évaluation des choix publics. Ces informations pourraient contribuer à améliorer l' "activité de réglementation " des décideurs. Ce travail décrit la méthode ABSCM (Attribute based Stated Choice Methods) en tant qu'outil pour l'évaluation des choix de politique publique. Enfin, en guise d'exemple, on présente une application de cette méthode utilisée pour évaluer les mesures publiques appliquées au sein de la pêche italienne.

1. Fishing capacity and the overcapitalisation problem: an introduction

Over the past 45 years, the world's fishery resources have been overfished to the point of collapse (Porter G., 1998). Among the major marine fish stocks, an estimated 25-27% are underexploited or moderately exploited and, therefore, represent the main potential source for expansion of total capture fisheries production; about 47-50% of stocks are fully exploited and are, therefore, producing catches that have either reached or are very close to their maximum limits; another 15-18% are overexploited and have no potential for further increase; the remaining 9-10% of stocks have been depleted or are recovering from depletion (FAO, 2000).

Fishery resources exploitation is due to the excessive size of the fishing fleet. The fleet size is measured not in terms of "number of vessels", but in terms of "fishing capacity". Fishing capacity is defined as "the ability of a stock of inputs (capital) to produce output (measured as either effort or catch). Fishing capacity is the ability of a vessel or fleet of vessels to catch fish" (FAO, 1998). Furthermore, "fishing capacity is the maximum amount of fish over a period of time that can be produced by a fishing fleet if fully utilised, given the biomass and age structure of the fish stock and the present state of the technology" (FAO, 1998). In the EU, fishing capacity is measured in terms of two vessel characteristics: size expressed in gross tonnage (GT) or gross registered tonnage (GRT)[1] and engine power expressed in number of kilowatt (KW). Both characteristics have been registered as fishing capacity indicators in many of Member States.

The excessive fishing capacity, termed overcapacity or overcapitalisation, is "one of the most important problems facing fisheries managers that cause overfishing" (Ward J., 1995). Overcapacity is defined as "either excessive amounts of capital in the form of fishing vessels and gear, or excessive number of participants, or both"[2] (Mace, 1997). From an economic perspective overcapacity is equated with an excessive quantity of vessels and gears that are not fully utilised, whereas from a conservation and social point of view, overcapacity in a fishery is considered a situation where too many fishers depend on the fishery for their livelihood (Mace, ibdem). Overcapacity is believed to

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be the result of the rational behaviour of fishermen to a perverse incentive system (Greboval, 1998). That is, fishers have the ability and desire to produce more and more effort and catch looking for highest profits.

Finally, the overcapacity concept can be defined both in economic and biological terms. From an economic point of view, overcapacity is the level of fishing fleet capacity that reduces yield below the maximum economic yield[3]. From a biological perspective, overcapacity is the level of fishing capacity at maximum efficiency that produces a level of fishing mortality that threatens to reduce fish stock biomass below the maximum sustainable yield[4]. Due to scientific uncertainties regarding the state of spawning biomass, biological overcapacity has not been observed until fish stock have been seriously overexploited and is therefore a less desirable measure.

2. The policy for fishing capacity reduction and the ineffectiveness of the measures

Under the common fishery structural policies, the Council Regulation (EU) No 2792/99 gives detailed rules regarding Community assistance in the fisheries sector to overcome the overcapacity problem. According to the regulation, Member States can adopt a Multi-Annual Guidance Programme (MAGP) in which the reduction of fishing capacity can be achieved by stopping vessels' fishing activities permanently.

The MAGP is a key element of the structural policy to actualise actions decided at the community level. The set of objectives in the programme identified is meant to address the fishing effort towards a global and lasting perspective. It is aimed at modifying the member States' fleet size by means of reduction objectives, in order to adequate the fishing effort to the available resources' stock. Member States are therefore invited to establish four or five years long development programmes for their fleet, on the basis of the criteria fixed by the Council in accordance with scientific surveys. Then, on the basis of scientific reports, decisions are made on the required level of effort reduction. Member States can choose to reach their objectives by reducing the number of fishing days instead of reducing fleet capacity. Six governments have opted for the former solution: Germany, France, Ireland, The Netherlands, Sweden and UK, while the others, including Italy, have opted for a capacity reduction. To target vessels, fleets have been divided into groups, or segments to match their main types of fisheries.

The permanent cessation of vessels' fishing activities may be achieved by means of a) scrapping vessels, with fishermen deciding whether to accept and scrap their own vessel, or not. For those whom accept, monetary aids are given to indemnify fishers[5]; b) permanent transfer of the vessel to a third country, including in the framework of a joint enterprise[6] after agreement by the competent authorities of the country concerned; c) permanent reassignment of the vessel for purposes other than fishing.

Measures to stop vessels fishing may be applied only to vessels over than 10 years, and member. The capacity of vessels, except vessels less than 12 metres overall length other than trawlers which may be replaced without public aid, that are subject to a measure to stop fishing activities permanently may under no circumstances be replaced. Member States shall ensure that the fishing licenses of all vessels withdrawn are cancelled and that the withdrawals of the vessels are communicated to the fishing vessel register of the Community. They shall also ensure that vessels transferred to third countries and declared as deleted from the register are permanently excluded from fishing in Community waters.

In 2001, the European Commission has stated that public measures aimed to guarantee sustainable fish exploitation are not effectiveness enough and, as a consequence, many stocks risk the extinction (EU Commission, 2001). Within

[1] Historically, tonnage has been measured as Gross Registered Tonnage (GRT), as defined by the Oslo Convention (1947). Then, the EU has been moving to a common standard for measuring tonnage, the measure known as Gross Tonnage (GT) as defined by the International Convention on Tonnage Measurement of Ships (1969). It has to be said that the GT measure often provides a higher tonnage value than the GRT one. According to Council Regulation No 3259/94 existing vessels with a length of 24 metres or more, and new vessels with a length of 15 metres or more have to be measured in GT. Vessels less than 24 metres, which have not been rebuilt or modified, may still be recorded in terms of GRT. However, these vessels are required to be re-measured by 2004 in GT.[2] Overcapitalisation refers to an actual capital stock that is in excess of that optimum capital stock required to produce some desired target level of output. Such target level is defined as "the maximum amount of fish over a period of time that can be produced by a fishing fleet if fully utilised, while satisfying fishery management objectives designed to ensure sustainable fisheries" Even if a difference exists between both concepts, from a debate held by the FAO Technical Working Group on Fishing Capacity Management, has been decided that overcapacity and overcapitalisation are synonymous terms (FAO, 1998).

[3] It is the total amount of profit that could be earned from a fishery if an individual owned it.

[4] It is the largest average catch that can be taken continually (sustained) from a stock under average environmental conditions.

[5] The level of public incentives depends on the size and engine power of the scrapped vessels

[6] Joint enterprise means a commercial enterprise with one or more partners who are nationals of the third country in which the vessel is registered. Ownership of the permanently transferred vessel must be handed over to the joint enterprise in the third country. For five years the vessel may not be used for fishing activities other than those authorised by the competent authorities of the third country, nor may it be used by other shipowners.

[7] The CFP is a multi-objective policy which consists of four principal components. These four components can be characterised as a conservation policy, a structural policy, a market policy, and finally, third countries agreements and international conventions (Rodgers P:E. and G.B. Valatin, 1997).

[8] Franz Fischler is responsible for Agriculture, Rural Development and Fisheries.

[9] So far, four MAGPs have been implemented: MAPG I (1983-1986), MAPG II (1987-1991), MAPG III (1992-1996) and MAPG IV (1997-2002).

the Common Fisheries Policy (CFP)[7], measures aimed to reduce the fleet capacity and, therefore, the overfishing problem have not been so far too satisfactory as the European fleet is currently too large, which leads to the fish overexploitation (European Report, 2000). As declared by Fischler[8], the "Community fleet reduction programmes have so far failed to achieve a better balance between fleet capacity and the available fish resources[9]" (Fischler F., 2000a). To overcome the overcapacity problem, managers and policy-makers should focus on developing socioeconomic measures that discourage overcapacity and that guarantee an efficient use of the marine resources. Therefore, it was suggested the need of better information regarding the fleet capacity (National Research Council, 1999).

3. The ineffectiveness of the public action

3.1 Policy-maker's bounded rationality and Principal-Agent model

It is assumed that public choices formulated by policy-makers in order to reduce the fishing overcapacity are not effectiveness enough because of asymmetric information existing in the Principal-Agent relationship. It is the policy-maker 's bounded rationality that lead to the imperfect information, and not the agents' opportunistic behaviour as stated by the economic literature (Varian H.R., 1993).

Analysing the decision-maker's behaviour and the reasons which have led to ineffectiveness of public choices, attention has been focused on "how", and not to "what", politicians rationally decide[10]. In such analysis, both the decision-maker's behaviour and the ineffectiveness of public choices has framed in the rational behaviour theory of politicians.

In the rational behaviour theory, the policy-maker is seen like a subject with social aims, since he tries to pursue the interest of the society. Guided by social rules, he attempts to integrate ethical principles in the own choices. In doing so, the policy-maker have to be able to acquire information on the environment (for example, the most relevant socioeconomic facts) necessary to him to formulate those properly policies for increasing the society welfare (Elster J., 1983). If the policy-maker interacts with a certain environment as well as agents, it is said that the policy-maker acts by a strategic rationality. Instead, if he is "detached" from the environment, it is said that he is guided by an individual rationality. For the economic theory, the strategic rationality is dominated from the individual one (Marzetti Dall'Aste Brandolini S., 1998). The individual rationality is distinguished in absolute and limited (bounded) rationality[11].

The absolute rationality is a concept elaborated by the classic economic thought which implies that who is guided by the rationality is "a perfect human being whose omniscience and omnipresence" (Mises von L., 1988) since all the information useful in a decision making process is available to him[12]; But, the information is perfectly known just for hypothesis. This concept of rationality is an "artifice" used by the economic science for adapting choices to the external environment. In that condition, "if we have all the information needed to us, if we could get a set of preferences, and if we have complete knowledge of available means, also the current problem is purely logical" (Hayek F.A., 1945). In such cases, the policy-maker's purpose is to choose among feasible alternatives the one that allows him to reach the highest preference, termed "optimum objective", since the choice is determined considering only objective conditions. From an other point of view, the classic thought is based on the assumption of independence between subject and object (or between logic and real world) that bar to the individual the opportunity of getting a realistic description of the environment. Under this point of view, the policy-maker: identifies the decision problem and analysis constraints and resources; defines objectives; foresees and implements actions; evaluates consequences in terms of "removal" from the determined objectives; identifies those actions which lead to the "optimum objective". Following the above steps, the decision-maker's aim is to get a final product (that is, a policy) which maximise benefits and minimise costs.

In the rational behaviour theory of the policy maker, it is thought that human beings are not able to reach the condition of "optimum objective" because of the limited ability to acquire and elaborate all the necessary information. In other words, it is said that the policy maker is guided by a

[10] One choice is defined rational if it is compatible with individual's aims as well as the condition in which he is (Mongin P., 1984).

[11] An important contribute to the rationality concept was given by Max Weber. He emphasises the rationality in two senses: the goal rational and the value rational. Goal rational behaviour is whatever course of conduct is well-adapted as a means to one's end, whatever they may be. But form time to time he says that the rationality of actions is not always determined by their effectiveness in furthering goals, but sometimes by some other sort of relation to values that are not goals, and that goals and other values also can be rational or irrational. So occasionally he distinguishes between goal rationality and value rationality, the rationality of goals (and not merely as means to some ulterior goal) and other values, and of actions in their relation (otherwise than as means) to some value. (Weber M., 1947).

[12] Such individual, called "Homo Oeconomicus", attempts to maximise the own utility without consider the welfare conditions of others (self-welfare goal), and makes choices only in order to satisfy own needs and pursue own purposes without take into account the preferences of others (self-goal choice) (Sen A., 1985).

[13] The policy-maker's bounded rationality amplifies a problem already existing in the Principal-Agent model and termed "the disappointment of the first best". In the real world, agents try to be as discreet as possible and avoid therefore to give own information which could be used by public authorities in making decision. That is, agents assumes a opportunistic behaviour. Agent's behaviour an opportunistic behaviour essentially because they fear that giving information the public choices formulated could modify the own economic and social status quo.

limited (or bounded) rationality. This kind of rationality subtends the individual incapability both in giving a complete description of the facts and identifying all the objectives as well as all the available tools needed to reach them. Even consequences of each action can not be foreseen[13] (Simon H.A., 1982).

Herbert Simon is one of the first Authors who has distinguished a behaviour which leads to the "optimum objective" and the one that attempt to reach the best solution taking into account the limited individuals' ability. In his thought, Simon (1955) first clarifies the limits of the classical thought: "the classical model requires the acquaintance of all the available alternative choices; it requires the complete acquaintance about consequences of each alternative choice, or the possibility of estimating it; it requires that the policy maker gives with certainty an evaluation of current and future consequences; it requires the ability to compare consequences among them, it doesn't matter how various and heterogeneous they are in terms of any utility measure". Besides, the same Author highlights how "any actor is not endowed with an absolute rationality and he can not acquire a complete information needed to solve the problem. In the research he can not find satisfactory solutions only exploring and using further information about the environment. The heart of the decisional process is an interaction between the research activity carried out by individuals towards the environment, and the complex diversified structure of the environment".

Limits of the classical thought lead to the theory of bounded rationality "in many global models of rational choice, before making a choice, all the alternatives are appraised. In the decisional making processes, alternatives are often in series examined. When alternatives are in series examined, we can consider the first alternative as satisfactory as the one effectively selected. In looking for alternatives, when an individual finds easy discover others satisfactory alternatives, his level of desires grows; when he finds difficult discover other satisfactory alternatives, his level of desires go down. Changing in the level of desires should guarantee both the existence and the singleness of satisfactory solutions. It because failure in discovering one solution would make go down the level of desires and emerge satisfactory solutions" (Simon H.A., 1985).

In decision-making process politicians guided by bounded rationality may not choose the best alternatives in a way that properly accords with preferences reflecting social desirability. The reason is that decision makers simplify, misunderstand, have incomplete information about alternatives, and make evaluations of alternatives whose results depend upon seemingly irrelevant details to do with how the problem is framed. Furthermore, the complexity of the environment is assumed to prevent the Principal from calculating the best course of actions, with policy-makers unable to get and elaborate all the necessary information. Given these limitations, the environment that policy-makers are aware of is only a fraction of the real environment within which decisions are made. The number of possible alternatives is so wide that they can't all be examined in order to implement optimal decision procedure and formulate optimal actions. Decisions so formulated don't promote any improvement of the social welfare, even if politicians satisfy their utility function (Simon H.A., 1985)[14].

To avoid the consequences of the bounded rationality it is suggested searching for methodological instruments able to give more information for evaluating alternative public choices (Lucas, 1986). Lucas's suggestions have led to the development of instruments, which describe agents' reaction to the environmental changes[15] (Marzetti, 1998, ibdem). In other words, to avoid the limitations of the bounded rationality policy maker has to be acquiring a rationality strategic behaviour[16]. Strategic rationality guides policy-makers to take decisions through a searching and learning process in order to get environmental details by which policies have to fit with actors' desires. Strategic rationality supposes that public actions depend on the acquaintance of both the real world and choices made by others (Hurwicz, 1945) since "the behaviour of an individual is determined if the way to behave of someone else can be known in advance"[17].

3.2 Asymmetric information and agents' behavioural diversity

Until the second half of the XX century, neo-classical thought has analysed the behaviour of those individuals who act under imperfect information. The analysis has shown that economic actors adapt their choices to the conditions of uncertainty since the acquaintance of relevant variables useful to better decisions it is supposed not to improve (Saltari, 1990). According to Quadro Curzio's studies (1988), most of politicians attempt to interpret the main economic facts even if some explanatory variables - for instance, socioeconomic variables - necessary to better interpret the objective function are not available.

[14] In the rational behaviour theory Tinbergen gives further reasons, which induce politicians to assume a bounded rationality. He criticises policy makers for not giving a value to the tools, which allow them to reach predetermined objectives. As a consequence, objectives are incompatible with the whole set of tools. According to that, the Author writes "in most of the books of economy or economic policy, policies – such as commercial policy, agricultural policy, policy of credits, policy of salaries - are dealt with giving not much attention to their interdependence, and objectives and tools of each policy are often separately considered since this type of coherence is neglected" (Timbergen J., 1960).

[15] In a second model it is assumed that policy changes don't influence the agents' objective function. From such function, optimal agents' decisions are calculated. (Petit M.L., 1990).

[16] Strategic rationality has been employed in the fields of international co-operation and natural resources exploitation.

[17] Some economists state that when the human being lives within the society he acquires an identity related with both his belongings sense and common knowledge. In this case, the decision making process has to include ethical principles of society members (Simon, H.A., 1993).

As before mentioned, some explanatory variables useful to public authorities are those which describe agents' reaction to the environmental changes. Such variables could guide politicians' understanding of the agents' behavioural diversity as well as support theirself in judging and appraising which policies are socially desirable. It is assumed that the agents' economic behaviour is guided by social variables (i.e. age, number of family components, social roles, studies level, social expectations, etc.) and economic ones (revenue, investments, etc.). The unavailability of some information leads the principal to formulate choices under uncertainty conditions. As a consequence, the policy impact could not be effectiveness enough.

Since it is assumed that it is the policy-maker 's bounded rationality that lead to the imperfect information, and not the agents' opportunistic behaviour as stated by the economic literature, the proposed theoretical approach involves:

a) enterprises are considered as "places of acquaintance" (Arrow, 1984) in which to interpret agent's behaviour;

b) the need to "make endogenous" those socioeconomic variables that describe agents' behaviour and guide agents to elaborate specific choices. All that leads to the development of an information theory "allows to get out from easy hypothesis of perfect information and create new scenarios of analysis in all the fields in which interactions between economic subjects are not under complete conditions as well as transparency" (Muraro G., 1992).

c) the existence of interdependence problems between enterprises and public authorities. Such problems make private objectives to diverge from the public ones:

a. profit maximisation for enterprises;

b. improvement of social welfare for institutions.

In literature, the existence of conflicts of interests between the Principal and the Agent are broadly recognised. Many studies have tried to identify the optimal way to reduce divergence among public and private objectives. Such problems could be weakened if the Principal has more information on the current and future Agents' behaviour, since that would allow the Principal to know if Agents act compatibly with the Principal interests. Besides, the complete information would allow the Principal to determine an optimal way to grant monetary. But in many real situations, the Principal is not able neither to control the Agent neither to acquire perfect information because of the high costs the first has to support to gather data. Since the Principal can not directly observe Agents' act, it is difficult to understand the way to behave of agents. If the Principal trust on agents' ethical principles he would put under risk the all decision-making process.

4. To overcome limits of the bounded rationality: an evaluation for public choices

Valuation of public choice consists in the description and explanation of the causes and consequences of the government actions, and it aims to increase knowledge concerning the public conduct (descriptive activity) and help politicians to improve policies quality (prescriptive activity) (Dye T.R., 1976).

According to Wildavsky (1979), decision-makers try to solve problems through a process of creativity, imagination and expertise. In the Author's thought, problems are never completely solved, but replaced, since the role of valuation is to allocate problems where it is possible to find solutions; thinking on decisional problems (specifically termed intellectual meditation) and searching properly solutions have to be made by interaction among people. In Wildavsky's point of view, valuation activity should not play a merely informative role, but should also influence political decisions. In other words, researchers should not "anchored" to their academic work, since it is necessary to find a way of implementing ideas that spring from research and to contribute in this way to the improvement of the decisional processes[18].

One of the policy evaluation's pioneer, Lasswell (1951), emphasises the development of a "policy orientation" which implies to improve decision making processes by acquiring more information. In the some way, Dror (1971) identifies policy orientation as a contribution from systematic knowledge, structured rationality and organised creativity for improving the policy process. Similarly to Lasswell, also Dror believes that politicians have to improve decision-making process to mitigate social problems. However, while the first claims that politicians should concentrate on the fundamental problem of the human being in the society and aim at attaining human dignity both in theory and in practice, the second affirms that political science is essential to improve human conditions.

Different types of evaluation are in literature known. A first classification is the one due to Gordon and et al (1977) in which a distinction is made between a evaluation of policies and a valuation for policies. Substantially, it is a distinction between an academic analysis meant to acknowledge the effects of the public choices in terms of benefits, and an analysis aimed for solving social problems and improving policy quality. Furthermore, Hogwood and Gunn (1981) distinguish the evaluation of policies, from the evaluation for policies. To the first belongs: evaluation of public choice content; evaluation of politic-administrative processes; evaluation of the public choice output; impact studies. This evaluation form divide the evaluation of policies from the following evaluation for policies: information for the politic-administrative process; efforts to improve the processes; efforts to improve policies. The distinction between evaluation of and for policies is equated to quantitative and qualitative evaluation. Researchers who adopt quantitative methods translate information into nu-

[18] A researcher involved in public decisions valuation studies is considered as an academic that works in bureaucracy (Meltsner A.J., 1976).

merical measures, whereas those using qualitative methods think that the process to translate information into numerical values leads to a distorted description of what really happens.

5. A tool for public choice evaluation and an application in the Italian fishery

The tool for public choice evaluation is called Attribute Based Stated Choice Method (ABSCM)[19], which it is assumed to bridge the information gap existing in the Principal-Agent relationship and, consequently, it would be useful by providing policy-makers those explanatory variables, which describe a certain environment in order to better decision-making process[20]. ABSCM is an approach aimed to collecting preference data from subjects in hypothetical situations. The objective is to place agents in a realistic frame of mind to compare a number of alternatives, each described in terms of a number of attributes (Boxall P.C., et al, 1996). A specific attribute or any other characteristic of goods or of scenarios is called factor, its value is called level, and their combination is called profile. The profiles are obtained by means of experimental design techniques, that are meant to minimise the number of alternative choices to be presented to the respondents and to facilitate the subsequent statistical identification of preferences. Once preferences have been identified, they are analysed on the basis of the consumer utility theory (Random Utility Theory), by means of the appropriate regression models[21].

In Italy, Attribute Based Stated Choice Method has been used to contribute to better decision-making by providing policy-makers those explanatory variables which describe the preferences of those who make the decision whether to accept and scrap their vessel, or not (Santise A., 2002). It has been demonstrated that the explanatory variables identified could help decision-makers optimise the financial transfers of public aid given to those who agree to withdraw vessels from fishery. It is reminded that while until now scrapping premiums which indemnify fishermen have been calculated only on the basis of vessel size and engine power, to be more effective, this should be changed to allow other criteria, not just physical elements, but also socio-economic ones, to be included. In the case study, the research aim was both to evaluate if the current criteria "induced" a conspicuous number of fishers to accept to scrap their vessels, and qualify variables that could explain the policy ineffectiveness given uncertain environmental conditions.

In the case study it resulted that just the 25% of the interviewed fishermen sample[22] accepts public aids for the permanent stopping fishing vessels' activity[23]. By statistic and econometric techniques, fishers' information collected by the survey[24] has been analysed in order to describe the preferences of those who has taken the decision to accept and scrap their vessel.

By statistic frequencies it has been highlighted that those who accept to scrap the vessels earns low profit P (less than 25.000 eur per year), has established recently the enterprise Ec (after 1990), fish by means of old vessels Eb (up to 25 years), has small number of carats K (less than 6)[25], are old

[19] It is to be noted, with regard to this, that in the scientific literature there are no scientific works that employ this methodology as an instrument for the evaluation for the public choices. Such methodology has been often used for the evaluation of environmental assets. A vast bibliography on this topic can be found in Adoamowicz W., Louviere J.E., Swait J. (1998), and in Hanley N., Mourato S., Wrigth R.E., (2000).

[20] The main steps employed in the policy evaluation are: characterisation of decision problem, attribute selection, construction of alternative scenarios and choice set, choice of survey modality, questionnaire development, questionnaire pre-test, questionnaire revision, sample definition, econometric model specification, parameter estimation.

[21] The Random Utility Theory is used to explain the selection process in individuals' choices. In this theory, utility is considered random because it can assume several values, each with a probability between 0 and 1. According to the theory, individuals choose within a set of choices C the options that provide them the highest utility. The utility that a respondent obtains by choosing a certain scenario is associated to the attributes and levels used to describe that specific choice.

[22] In order to defining the sample of fishers to interview, the vessels' population N from which to extract the sample has been first individualised. In doing that, the current normative according to which the "permanent stopping vessels' fishing activity" has to be applied only to vessels of 10 years old or more, has been taken into account. Such vessels' population N is 16.472 units. Then, in order to define the sample size it has been used the Neyman's stratified sampling by which the population is grouped into a number of subpopulations (each of them are called strata) that provide small standard errors. In order to apply the method the following steps have been done: N has been divided in strata Nh according to the maritime region of affiliation M and the vessels' fishing gear G; therefore, based on vessels' revenues (which represent the stratification variable), for each strata Nh it has been calculated: the sample variance of the stratification variable; the standard deviation; the sample size n for each admitted percentages of error of sampling 2Ø 5%, 8%, 10%; and finally, per each 2Ø it has been made the repartition of n: nh-5%, nh-8%, nh-10% . Taking account the survey cost, the sample size of 99 vessels has been judged the properly one. To it corresponds an 2Ø of 8%.

[23] Before drawing the questionnaire up, it has been important to choice the way of surveying: by mail, telephone, or directly (face to face interview)? Since face to face interviews give to the interviewer the opportunity to explain what is not understood from respondents, this type of survey has been adopted to fill the questionnaires. The task to make fill questionnaires to the Italian fishermen sample has been supported by different IREPA's members who are distributed in each Italian region. IREPA (Economic Research Institute on Aquaculture and Fisheries) is a specialist Italian research institute which provides advisory services to national and international public bodies (such as OECD, EU, FAO, RNC) involved in fisheries and aquaculture management.

[24] By the survey, for each fisherman the following information has been collected: region and maritime compartment of affiliation, fishing gear employed, tonnage of vessels, length of the boat, engine power, days at sea per year, type of the enterprises, year of the establishment of the enterprise, age of the vessels, number of crew members, profits, level of public aids, name of the vessel, role on board of the interviewed, since how many years he is working in the fishery, fisherman age, carats possessed from the interviewed, the reasons of beginning the fishing activity, the existence of kinship among crew members, type of employment contract.

fisherman Ep (more than 60 years) who work in the fishery since many years L (up to 35 years). The mentioned characteristics have represented the variables estimated under the Random Utility Theory. Before doing that, two more variables, vessels' size (GRT) and engine power (KW) - used by EU to calculate scrap premiums and indemnify fishers - have been added in order to compare their statistic significance with the ones identified by the survey. Estimating all the variables[26] it resulted that those which guide fishermen to accept the scrapping vessels measure are the followings: carats, fisher's years of labour[27], fisherman age (Santise A., ibdem). In addition, the results showed that those who would be willing to scrap the vessel and stop permanently the fishery activity are the ones who works in small and economically weak enterprises and has started to fish recently. Nevertheless, even if these enterprises are not efficient and competitive, they continue fishing and exerting a strong pressure on the fishery resources.

6. Conclusion

Redesigning the criteria for granting public aid taking into account the "new" variables identified would be important to reduce the capital owned by those enterprises in which operators have a small number of karats or have been carrying out fishing activity for a small number of years. A new system for granting monetary aids might lead these fishers to leave the sector and therefore accelerate the withdrawal of those boats, that is, of those capitals that are not competitive. In these cases, indemnities would become a sort of social contribution which would compensate for the "precariousness" and the "weakness" of small investments, that is, of the small and numerous enterprises present in the sector.

Therefore, redesigning such criteria by parameterising the incentive in ways that take into account, not the size and age of the vessel, but the number of karats, the years of work, and the age of the fisher, might motivate the "small" fishers to accept the public aid and to contribute to the conservation of resources, respecting at the same time the intergenerational equity. Addressing economic incentive towards the new and small vessels or towards those who do not possess the whole amount of karats, would increase the efficiency of the public action, because it would concentrate financial resources on the correct target of fishers.

[25] The karats represent the m capital quotas invested in the activity of each operator. These m quotas are subdivided among fishers that are partners in an enterprise, on the basis of the capital M invested. Usually, they are not owned by a single operator. Such "fragmentation" of M among the so-called "karatists" implies that the subdivision of profits is proportional to the number of karats owned. Therefore, those who possess a small number of karats receive a minimal share of profits

[26] Following the Random Utility Theory, an OLS regression and maximum likelihood estimation procedures have been used. In particular, the Logit model has been specified, since it is the econometric model most commonly used for this type of analysis.

[27] Which is, for fishery operators, the total number of working years, i.e., the period of time (in years) elapsed since when the fisher has invested the capital for starting the enterprise.

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