

“On Rents of Fishing Grounds” Revisited

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Abstract - Since the 50s, the central idea in the Fisheries Economics is that, in conditions of free access and competition, the market will lead to market equilibrium solutions that imply the overexploitation of the resources. This fundamental result is due to Scott Gordon in his seminal article of 1954, “The Economic Theory of a Common Property Resource: The Fishery”, in the Journal of Political Economy.

But, in fact, another (more antique) article put the problem and suggested this approach to its understanding: In a short paper, in 1911 (exactly 100 years ago), the Danish economist Jens Warming, put this issue and made a very similar analysis for the fisheries sector.

The purpose of this research is to make a reflection on that paper and highlight the explanation proposed for the common property problem and, also, to study the legacy of this interesting fisheries economist to the History of Political Economy.

Keywords: *Common property, Rent dissipation, Fisheries, Jens Warming.*

1. Introduction

The origins of modern Fisheries Economics can be traced back in the 50s with the papers of Gordon (1954), Scott (1955) and Schaefer (1957).

In his seminal paper “The Economic Theory of a Common Property Resource: The Fishery”, Gordon argued that, in a situation of open access and competition, the market would not lead to the most efficient solution in resource use. The common property nature of fish resources implied that, in an unregulated fishery, the result would be the expansion of the industry to a point of economic, even biological, overfishing.

But, in fact, there is another, more antique, article that put the problem and suggested this approach to its understanding. In an article from 1911 (exactly 100 years ago), the Danish economist, Jens Warming discussed this issue and made a similar analysis, for the fisheries sector.

The purpose of this research is to make a reflection on that paper and highlight the proposed explanation for the common property problem. The paper studies the legacy of this interesting fisheries

economist to the History of Economic Thought and ask what went wrong and why did the important achievements of Warming’s research had not the justified academic applause and practical impact.

2. Notes on Jens Warming Life and Career

Jens Warming’s family belonged to the intellectual elite of Denmark. His father, Eugene Warming, was an important and influential professor of Botany in the University of Copenhagen and his contributions on Ecology were internationally recognized.

Jens Warming (1873-1939) was graduated in Law, in 1897, in the University of Copenhagen, and then went to the USA where he worked, teaching in a Danish school, in Nebraska. After his return to Denmark, he made a special master degree in Economics. This degree was usually given to lawyers who wanted to pursue a career in the administration.

Warming went on pursuing a remarkable career in the Danish Central Department of Statistics (1904-1919). He was not a “genuine economist” (Topp, 2008) but, at the same time, he went on being a part-time professor of Economics and Descriptive Statistics in the Danish Agricultural University and in the University of Copenhagen.

This lack of formal graduation in Economics gave him some bitter problems. He was frequently criticized for insufficient knowledge of Economic Theory and when he finally got a permanent tenure in the University was in Statistics, never getting the desired chair of Economics. Even his mentor, Harald Westergaard, leader professor in Economics in the University of Copenhagen, seemed not to understand the relevance of his work.

Jens Warming tried to get the tenure in Economics for two times but, in the first, it was another (later) well known Danish economist to be chosen - L. Birch, and in the second time, it was his previous student, Axel Nielsen, who got the professorship in Economics.

The personal animosity played an important role but it was, perhaps, his proactive attitude towards government regulation and intervention at the microeconomic level (that was not in accordance with the mainstream view of the 20s that the

deregulation was required) that gave him some objections in the academic playground (Topp, 2008).

His fundamental work rested in the Descriptive Statistics. In 1929, Warming published a textbook on Danish statistics with an applied economic perspective. For more than a decade, his book of Denmark characterization was extensively used by Danish economics students. Teaching economic theory was not, of course, his task, but in his statistics textbooks he went on partly disregarding that, making several critiques on mainstream economics and including his theoretical contributions, as it is the case of fisheries.

He also tried, from 1921, to write a textbook in Economics but it was never published because of the dispute between a professor of statistics and the professor of economics in the Copenhagen University.

After the flaw of getting the desired tenure in Denmark he went on trying to get applause, externally. In 1926, he submitted a 230 pages essay to an international competition on the Theory of Wages. He did not win the competition but he had an “honourable mention” and the recognition from foreign colleagues that made him to pursue his efforts in the economic area, finally publishing a paper in the esteemed *Economic Journal*.

His ability in recognizing and applying the *marginalist* revolution was evident and his developments in the area of wages and rents rested upon the most recent developments in Economics. The paper he published in the *Economic Journal*, made an interesting presentation of the multiplier (see Topp (1981) on the link between Keynes theory and Warming’s research). He also made important seminal references about the problem of identification in econometric analysis.

His work has only a few references (Wicksell and Marshall are the most cited; but also Fisher and Germanic authors, especially about the quantitative theory of money).

Another interesting fact of his career relates with the links with marine biologists.

Along the period of his research career the current situation in the sector of fisheries went on some important changes.

In 1883, Thomas Huxley said that probably all the great fisheries were inexhaustible but at the end of the 19th century this leading fisheries biologist (working in the northern Europe at the time) started to worry about the decline of fish stocks in the Baltic Sea and in the North Atlantic (see Eggert (2010)). That laid to the formation of the ICES (International Council for the Exploration of the Sea) in 1902. With headquarters in Copenhagen, ICES pretended to be a

forum of multidisciplinary discussion on practical fisheries problems.

Focus was still on Biology. Only in the fifties, the modern Economics of Fisheries (with the research of Gordon (1954) and Scott (1955)) and the modern Fisheries Biology (with the studies of Schaefer (1957) and Beverton and Holt (1957)) evolved. Jens Warming tried to communicate with Marine biologists and to present his vision about the relevance of Economics in the treatment of the problem. He sent his papers to important researchers in this area (H. Kyle, Petersen and Hjørt are most cited in Warming’s notebook). Even for the Danish prime minister, former fisheries minister, but with few results.

3. The Legacy of J. Warming

There are significant aspects of Warming’s legacy in Economics. Our approach highlights his contribution in the fisheries area and the innovative way he treats the problem of common property.

Since the seminal paper of Gordon (1954) the fundamental idea in Fisheries Economics is that the market will not lead to optimal exploitation of the resources. The common property nature of fisheries and the presence of externalities in the process of capture will lead to market equilibrium solutions that imply the overexploitation of the resources and the overcapacity in the industry – the “Tragedy of the Commons”, using Hardin’s (1968) metaphor.

Forty three years before the publication of Gordon’s seminal paper, Warming made an important investigation about the problems of open access in the allocation of a common-property resource and presented his results in a short article “Om Grundrente af Fiskegrunde” (“On Land-rent of Fishing Grounds”), published in the *Journal of the Danish Economic Association*.

After this article of 1911, he made several references of his results in two unpublished books: a textbook from 1921 and another 1926 manuscript. This manuscript, which was intended for an international audience, includes an English new version of his 1911 model and became the main ingredient of a second article on fisheries, in 1931. This model was also the centre of the sections on fisheries included in his textbooks from 1929 and 1938 (revised edition) about the socio-economic conditions in Denmark.

3.1. “On rent of Fishing Grounds”: open access and rent dissipation

In his most cited article, Warming compared the rent available from fishing grounds and land. Land is, in the most part, in private hands and land rents are a privilege of private landowners, whereas fishing

grounds are not privately owned but are considered common property. However, the differences do not change the basic economics of both forms of management. Warming stated that the common property nature of open access to fishing grounds without charges tends to decrease the rent and he proposed to alleviate this through transferable fishing licences.

To summarize the contribution of this first article:

The core idea reflected the marginal revolution. In a competitive economy a worker earns a wage equal to the value of his marginal product. But, according to Warming, there were examples in the economy where this did not hold. One of these exceptions was the case of the fisheries where the problems occurred due to a “lacks in the organization of society”.

These exceptions did not question the theory of marginal productivity as a general fundament but there were situations where these exceptions had practical relevance. Under open access, the potential rent in a fishery is dissipated. As no one has property rights over the resource and there is no possibility of exclusion, the constant entrance of a newcomer in the fishery will not cess until the difference between revenues and costs are zero, that is, until all the rents are dissipated.

Biological regulation, as closed seasons or mesh size specification, can prevent the biological overexploitation of resources but not the economic over-exploitation. Even the use of licences with the objective of maximizing maximum sustainable yield (MSY) would not maximize the total rents. In fact, the “economic optimum” level of fishing effort is in the point where marginal revenue equals the marginal cost. That is, the economic optimum stands at a level equivalent to the monopoly case. Anthony Scott would refer this, in 1955, as the “sole owner” situation, which is now commonly recognized as the one that guaranties the maximum economic yield (MEY).

He also pointed out that a tax, equal to the difference between average and marginal revenue at the optimal level, will lead to an optimal fishery. This idea is also very interesting, clearly reminding the proposals of Pigou, in the 20s, to internalize the external effects.

We note that these results are very close with those of Gordon and Scott in the fifties.

Of course, as Topp (2008) points out, even if the theoretical fundamentals and arguments are the same, the articles are very different with respect to scope and composition and perhaps that explains the different forms they were seen and used by the

academic community. The Gordon article was directly focused on Fisheries Economics and resulted from a program of investigation which, at the time, tried to apply the economic theory to fisheries contemporary programs. This article was published in a highly considered journal (*The Journal of Political Economy*) and when there was a group of researchers very interested in the results of public regulation in this area.

Warming’s findings reflects his study about the flaw of competitive market. It did not deal with contemporary and international debate on regulation. However, it contains important elements of fisheries management that had no explicit reference in Gordon’s article. Perhaps for economists this debate did not seem very important but that would have been important for biologists and executives. A very interesting example is the concept of MSY.

3.2. “The Danish Right to Eel Weir”: Rights based Management

In his first article, Warming did not elaborate much regarding the implications, in practical terms, of his proposals. The basic guidelines of thought were that a free market economy did not automatically lead to optimality and that government regulations were needed. The suspicion about the “invisible hand” was a recurrence in his work.

Twenty years later, in 1931, he published another article going into new details and presenting a graphical presentation to explain his findings:

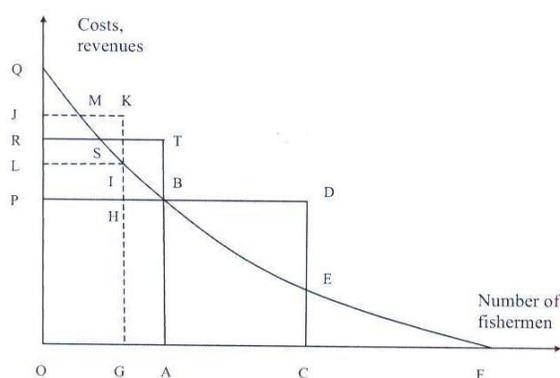


Figure 1 The correct number of fishermen (OA) with a single owner of the rights to a fishing ground, compared to the number (OC) with no owner at all (full freedom)

The returns from fisheries are shown in the vertical axis, whereas in the horizontal axis we have the fishing effort measured by the number of fishermen.

The curve QF shows the diminishing returns as the fishing effort increases. The line PD represents the marginal cost.

In this context, total benefits are maximized when the number of fishermen is OA, and the total income of fishermen is the area OABP.

Warming compares fishing with farming and states that the number of workers hired by a profit maximizing farmer will be such that the last worker hired produces as much as he receives in wages.

The total income from fishing is, in fact, OABQ. So, the value PBQ is the sea rent for access to the resource on the fishing grounds. If no one collects this sea rent and fishing is free, the average income of OA fishermen will be higher than AB and, as this rent is divided among fishermen, their mean income rests AT, that is, the median height of OABQ, so the value RSQ is equal to the value STB.

Of course, high average profit draws more people into fishing. Equilibrium is achieved where fishing effort is OC and total income is equal to the total cost of fishing: so, $PBQ = BED$. The additional fishermen produce only ACEB and could produce more in some other pursuit. They only receive the required ordinary income by having PBQ added to their production. The sea rent is wasted in the sense that it subsidizes the income of extra fishermen whose production do not correspond to their wages.

Finally, he maintains that in order to prevent that the number of fishermen goes up to OA, fees should be collected for the licences. A private owner (or a government agency) would collect such fees and the fee ought to be BT, to result in the optimal number of people in the fishing activity. This would provide PBTR in the form of fees.

He introduces some additional features: A right for the coastal owner to charge a fee for this fishing right in the areas near the coast implied a regulating effect that corresponds to the property right of land. The right of the owner to regulate the entry prevents the excess of fishing effort and maximizes the rent guaranteeing the optimal number of fishers.

Warming also stated that free access can lead even to a negative marginal product implying the utilization of immature stocks. So, even in times of high unemployment (and that was the case in the 30s) it was better to keep away from fishing the superfluous fishers.

We note that this article was also a response to a specific situation in the context of Denmark fisheries. In fact, Danish fishers demanded, at the time, that the "Right to Eel Weir" should be abolished.

This right to eel weir was an exception from the freedom of access that was the general rule in Danish fisheries. According to the Danish Fisheries Act (from the end of the XIX century) no one could be excluded "from a properly visited and marked fishing ground". But there was an exception. Traditional

Danish Law granted shorefront owners the right to set eel traps in the sea adjacent to their land property and property owners were entitled to charge fishers for permission to set traps in some of this specified offshore areas.

In one of their annual Assemblies, the Danish Fishing Association proposed to abolish private eels trapping rights with unanimity. Warming's article was a protest against this change in *governance*. Warming opposed the introduction of free access to replace rental fishing in the limited area in which the latter had applied. He argued that this would lead to the total dissipation of rent.

So, his article was derived from a political debate on whether to abolish the legal title of the owners of the foreshores to restrict the access and to impose fees on those granted permission. Warming was in favor of maintaining the existing system: his argument was that it produced the optimal regulation result. Instead of abolishing this system, he proposed that it was a benefit to introduce a similar system in all sea governance (although it seemed to Warming that was impractical because of the dimension of the transaction costs - negotiation and control, involved).

The debate, in 1931, faded away, leaving the law unchanged but when the debate was revived, in 1955, the economic arguments of Warming remained ignored and the Danish parliament abolished the right in 1956 (Gislason, 1995). Private rights of shorefront owners to set eel traps adjacent to their property were abolished and the owners were compensated for this loss of privilege.

We must also note that his clear opposition to maintain extra-workers in fishery, appealing to the economic efficiency in the sector, could not be well accepted at the time.

In the 30s, Great Depression was at higher level in Denmark. But (still) Warming argues strongly against using employment in fisheries as an alternative in recession days, because extra fishers will impose an extra-external cost to the other fishermen, dissipating the potential rent. And he added another problem: the typical inertia in this sector where socio-professional mobility is difficult. After entering, the superfluous fishers will not move fast enough for more productive sectors when the recession is over.

4. Conclusions

It's not easy to make a balance of the relevance of Warming's work to Political Economy, but we can summarise the achievements and ask what went wrong in his trajectory.

The fundamental achievements were:

- A. The central idea that relates the open access with the dissipation of rent and its corollaries:
- the market failure resulting from insufficient specification of property rights,
 - the overexploitation and overcapacity resulting from these specific conditions of market operation,
 - necessity of public regulation, including some kind of rights based management to mitigate the market inefficient allocation.
- B. His previous comments on regulation methods to internalise the external costs associated with the capture process:
- the fees from licences, in a sense that reminds the pigouvian taxes,
 - the presentation of licences and other forms of property rights as possible tools for sea governance and fisheries management, that reminds the Coasian solutions.

What went wrong? Why did important achievements have not the justified academic applause and practical impact?

First, there are some difficulties of academic nature.

The fact that his article on fisheries was published in a Danish journal and in the original language of the author was a significant factor for its weak disclosure. Only in the 80s, an English translation of the seminal article of 1911, by an important fisheries economist, P. Andersen, and a study from Hannesson and Anderson (1981) on the contribution of Warming, gave the relevance that Warming's legacy deserved.

However, is to be noted that, in the 50s, during a round table, promoted by FAO, to discuss the advances in Fisheries Economics, one of Warming's former Icelandic students (O. Bjornsson) called the attention to the work of Warming and made an English presentation of his model.

Last year, 2010, the journal *History of Political Economy* published an English version of his article from 1931, translated by H. Eggert.

Note that the personal animosity and suspicion in the academic circuit that we referred in the beginning, made difficult his task. Also, some singular idiosyncratic aspects, as the one of not including extensive bibliographical references, were not conform the usual "correct policy" in academic context.

Second, we must note that his findings and recommendations were not in line with the mainstream.

A lot of his results were indeed interesting in practical terms for fisheries regulation, but derived from an economic analysis. That economic perspective had no impact on the decision-makers of fisheries management. In fact, only in the 60s and 70s the Economics of Fisheries went on being really considered. Until the Second World War the management of fisheries were only administrative and the focus (and the decisions) came exclusively from Biology.

Even for economists it seems that his results were always in the opposite side of the mainstream. He proposed a regulation approach where economists and the fishers associations proposed more liberalisation. He proposed the creation or, at least, maintaining the existing property rights when everyone defended the free access.

But, at the same time, he was against the use of fisheries as a sector to absorb the unemployment resulting from Depression. That is, his defence of economic efficiency and sustainability of the sector put him in the unpleasant role. It seems that he was always on the "wild side of the street".

Note also that there is a miss in his work. In fact, what is missing is the description of the dynamic nature of the problem of fisheries management that went, in the early 70s, to solve the model by applying a capital theoretic framework (that gave to the Fisheries Economics research a real "gold period").

Finally, note that his ideas have, nowadays, even if his name is not cited, a real relevance.

His preoccupation with superfluous workers in fisheries is now the subject of an important discussion on the Common Fisheries Policy (CFP) reform (see Coelho et al, 2011). The CFP points to the necessity of making the balance between the social stability in the coastal areas mostly dependent on fishing, with the objective of getting sustainable fisheries (implicating a reduction in fishing effort to put it in line with the necessary renewal of the stocks). But these are contradictory objectives. To solve this equation is, perhaps, the major difficulty in the process of reform that is intended for 2012. And now, with the economic crisis and the high levels of unemployment in the E.U., it seems more difficult to ask for a reduction of capacity.

Some problems (as the case of "quota hopping") are creating the idea that a system of quotas and TACs are not enough to get sustainable fisheries. That is, the command and control instruments, that made the core of the conservation and management regime of the CFP, can have results in terms of biological over-exploitation but, as Warming defended, cannot solve the economic problem. This problem rests, basically, in its common property nature. The solution of the externalities associated

implies an economic analysis and the introduction of Rights Based Management methods. They are also in discussion in the next CFP reform.

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