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Appropriation of economic values in a rights-based fishery

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ABSTRACT

This study integrates resource-based and stakeholder theories to explore how values are generated and appropriated in a rights-based fishery. We argue that in the fish harvesting industry, a firm's ability to create values is critically dependent on stakeholders outside the firm's boundaries, such as society in general (the principal owner of the natural resource) and the fisheries management of the government. The latter protects the resource from being overfished, and it decides who will get the rights to fish. The empirical context is the seagoing Norwegian purse seine fleet, which has gradually created significant values relative to revenues through the 32-year study period (1985–2016). Specifically, the value appropriation between key stakeholders under a stepwise, more liberalized individual transferable quota system is described and analyzed. The findings show that the vessel owners' share of added values increased gradually from approximately 7% in 1985 to 45% in 2016. Conversely, the labor share dropped from 75% to 42% during the study period. The society's share of the values added (corporate taxes) increased from −5% (net subsidies) to +9% (net tax income). The present study concludes by discussing the findings and their policy implications.

1. Introduction

The Code of Conduct for Responsible Fisheries (The Code) "provides principles and standards applicable to the conservation, management, and development of all fisheries" (Food and Agriculture Organization [FAO], 1995, article 1.3). The Code generally aims to promote the rational and sustainable development and exploitation of world fisheries through responsible management and conservation (Hosch et al., 2011). The Code is the first and only international fishery instrument that includes principles and voluntary best practice provisions. The Code has inspired the development of sustainable fisheries management worldwide.

The Code first recommends establishing knowledge-based fishery harvesting rules such as total allowable catch (TAC) regulations to avoid destructive overfishing. Next, The Code advocates reducing catch capacity to make the fishery economically sustainable for the remaining players. In several countries, the latter goal has at least partly been achieved by closing fisheries and establishing a market arena to buy out excess capacity. Several fishing nations have established ecologically and economically sustainable management systems through these two recommendations. The Norwegian management regime discussed in the present study has followed the recipes of The Code (National Audit Office, 2020).

When commercial fisheries have become ecologically sustainable, economic values are created. How the values created are distributed between legitimate stakeholders is the final challenge to handle (Olson, 2011). This question addresses the third and often neglected social pillar of sustainable fisheries. Many hold the view that economic and ecological objectives are compatible. Also, pursuing social objectives and thus aligning the three sustainability pillars is, however, harder to achieve (Cunningham et al., 2009; Hilborn, 2007) even if not everyone supports this view (see, for example, Anderson et al., 2015, Asche et al., 2018; and Danielsen and Agnarsson, 2020).

In Norwegian fisheries, there has always been tension between the economic and social expectations of the sector (Finstad et al., 2012). The traditional role of fishing as a societal industry along the coast represents the social expectation, whereas the requirement that the fisheries must be competitive in global markets and profitable for the players represents the economic expectation of the sector. Increasingly, these two expectations have conflicted (Holm and Henriksen, 2014, 2016). The basis for the current Norwegian fisheries policy is to prioritize environmental and economic sustainability. This is in stark contrast to the previous compromise, which was to put social sustainability at the top of the agenda (National Audit Office, 2020).

The empirical context of the present study is the seagoing purse seine fleet, which almost depleted the Norwegian spring-spawning herring

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stock in the late 1960s and became dependent on subsidies in the following decades (Flaaten, 2021; Milazzo, 1998). However, today, this fleet segment appears to be very profitable (e.g., Bertheussen and Vassdal, 2019, 2021, 2022; Flaaten et al., 2017).

The first objective of this article is to examine how the values added by the Norwegian purse seine fleet have been distributed between key stakeholders in recent decades. The period analyzed starts in 1985 and ends in 2016 and thus covers 32 consecutive years. The following research questions (RQs) are raised.

RQ1: How have the values added in the seagoing Norwegian pelagic fleet developed relative to revenues during the last three decades?
RQ2: How have the values added been appropriated between labor and capital?

The study's second objective is to analyze whether there is a relationship between the value distribution of the fishery and the three different management systems applied in the period (Bertheussen, 2022a). In 1985–1995 ("the distant past"), Norwegian pelagic fisheries were mainly managed through a limited-access system combined with individual non-tradable vessel quotas (IVQs). In 1996–2004 ("the recent past"), the first individual transferable quota (ITQ)-like harvest right system was introduced: the unit quota (UQ) system. After that from 2005 ("the present"), a more market-oriented structural quota (SQ) system has been at work.

It is, however, not just the management system as such that is crucial for the distribution of values between different stakeholders. Also, the inherent incentive system of a rights-based system is important. This includes a willingness to undertake the necessary investments to maximize the catch's value through better handling and supply of more valuable products. For instance, changing from a low-value output like fishmeal to a high-value product like chilled or frozen mackerel calls for investments in new vessels, technology, and other equipment.

Accordingly, the third and final RQ raised is as follows.

RQ 3: Is the value distribution between key stakeholders related to the gradual liberalization of the management regimes that have been in operation?

Evaluating the longer-term incentive structure of rights-based management systems has become feasible as more data has become available. To our knowledge, few other studies have examined the value distribution between key stakeholders in rights-based fisheries. An honorable exception is a study by Gunnlaugsson et al. (2020), who investigated resource rent distribution between the government, companies, and quota sellers in Icelandic fisheries.

The article proceeds as follows. The theory and the context of this study are respectively described in Sections 2 and 3. Thereafter, the research design, method, and data are presented before the findings. The paper concludes with a discussion.

2. Theory

In the strategic management literature, resource-based theory (RBT) aspires to explain how economic values are generated and appropriated (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). Stakeholder theory is a new research stream with the potential to contribute to this long-lasting effort of theory building (Barney, 2018; Parmar et al., 2010). Stakeholders are those individuals or groups that depend on an organization to fulfill their own goals and on whom, in turn, the organization depends (Freeman, 1984). A stakeholder can affect a firm by providing access to valuable resources. Conversely, a firm can affect a stakeholder through the compensation received for making resources available. Key stakeholders for a firm include customers, suppliers, employees, debtholders, and shareholders (Freeman, 2010). For firms in resource-based industries, the natural environment is also a key stakeholder. This also applies to the government, which provides access to scarce natural resources that firms can exploit (Bertheussen, 2023; Phillips, 2003; Starik, 1995).

Stakeholders have different claims on a firm's revenues, i.e., fixed and residual claims (Williamson, 1979). A stakeholder has a fixed claim when the payment for making a resource available is set ex-ante. In this case, remuneration is not dependent on the firm generating economic values ex-post. A fixed claim is an example of a complete contingent claims contract. Such a contract exists when "all relevant future contingencies pertaining to the supply of a good or service are described and discounted with respect to both likelihood and futurity" (Williamson, 1979, p. 236). This implies that the stakeholders participating in the exchange know ex-ante the quality of the resource provided, the revenues that the recourse will generate, and the payments received by the stakeholder who provides access to the resource.

On the other hand, a residual claim exists when a stakeholder's compensation for making a resource available varies with the values added by the receiving firm ex-post (Williamson, 1979). A residual claim is described as an incomplete contract because the actual payment for access to the resource cannot be specified precisely ex-ante (Hart and Moore, 1990). Residual claimants are compensated after all fixed claims are paid (Jensen, 2002).

Some scholars adopt a "shareholder supremacy" assumption originating from finance (Jensen, 2002). This perspective argues that shareholders are a firm's only residual claimant (e.g., Denrell et al., 2003). However, the stakeholder model maintain that if stakeholders other than shareholders provide access to resources that are critical to value generation, these stakeholders should use their bargaining power also to become residual claimants (Byler and Coff, 2003; Castanias and Helfat, 1991; Coff, 1999; MacDonald and Ryall, 2004; Zingales, 2000).

Resource-based theory studies how gaining access to resources can help a firm generate economic value (Barney, 1986). In a more recent paper, Barney (2018) argues that a stakeholder version of RBT must recognize that the ability to create values will require access to critical resources from several stakeholders, some of which may reside outside the firm. To create value, the accumulated costs of acquiring access to the resources must be less than the total revenues generated by the resource bundle of the firm (Sirmon et al., 2011).

The resource-based stakeholder (RBSH) model proposes that the process of assembling a bundle of co-specialized resources is critical for value creation in natural resource-based industries. An issue is how these values are distributed among those stakeholders who provide access to their resources. Barney (2018) suggests that the stakeholders that provide access to the most valuable resource in the bundle have residual rights of control because if one stakeholder appropriates all rents, this will make the bundle hard to sustain. Therefore, values should be allocated to different stakeholders based on their relative contributions to the values generated by the resource bundle (Hart and Moore, 1990). However, in many cases, those stakeholders that provide access to a resource may not fully recognize the opportunity cost of doing so (Lippman and Rumelt, 2003). The reason is that the relative contribution of each resource in the bundle can be hard to estimate precisely.

2.1. A RBSH model of value generation and appropriation of a fishery

Clarkson (1995, pp. 106–107) defines a key stakeholder as " … one without whose continuing participation the corporation cannot survive as a going concern." Key stakeholders for a fishing vessel firm are thus those groups or individuals whose demands and needs the firm must attend to in order to operate and survive in the long run. Examples are the natural resource owner (e.g., the people of a nation), fisheries management, the shareholders (i.e., the vessel and quota owners), labor (i.e., the crew), and finally, external vessel and quota financiers such as banks. Customers, that is, land processing plants, suppliers of ships, gears, and provision, and the local community, can also be included in the group of primary stakeholders. However, for clarity, they are not in

the present study.

2.1.1. Society; the provider of the natural resource, makes no resource rent claim

In Norway, the Marine Resources Act (2008) states that the society owns the marine resources, that is, the nation's people. Furthermore, the act stipulates that managing fish resources shall ensure three main objectives: sustainable fish stocks, socioeconomic profitability, and social goals (e.g., coastal settlement). Sustainable stock management has established itself as the overriding consideration in Norwegian fisheries management (National Audit Office, 2020). Nevertheless, there is a goal conflict between profit-maximizing shareholders and the goal of the society at large which needs to finance the welfare state (Holm and Henriksen, 2014, 2016).

Until today, the Norwegian society has not made a residual resource rent claim of its fishery sector (Fuglestad and Almås, 2021), although this stakeholder provides the businesses with indispensable raw material input for free. The approach to capture and redistribute a fishery's rent to society will affect the industry's attractiveness and, thus, the players' prospect of reaping extraordinary profit (Bertheussen and Vassdal, 2019). Internationally, governments have made few attempts to tax the rent from fisheries (Hoshino et al., 2020). In 2004, Iceland introduced a fishing fee to cover management and enforcement costs (Gunnlaugsson et al., 2018). However, the fee was soon increased to ensure that a share of the rent was allocated to the public to encourage public support for the catch-share approach. New Zealand also initiated a resource rent tax, but it was abandoned (Hoshino et al., 2020). Without redistribution, the rent from fisheries accrues primarily to the quota owners and the crew (Flaaten et al., 2017).

2.1.2. The government makes no claim to cover management and enforcement costs

Through fisheries management, the authorities attempt to achieve all three sustainability goals. To ensure sustainable fish stocks, a total quota (TAC) is set annually, indicating how much the maximum catch of each species should be. The authorities regulate how the total quota is distributed between players in the industry through a vessel quota system (Standal and Aarset, 2008). Thus, the quota system contains rules for who can fish, how much a player can fish, which species can be fished, and which gear can be used. The quota system is a complex an important fisheries policy instrument that has been gradually modified over time (Standal and Asche, 2018). Unlike Iceland (Gunnlaugsson et al., 2018) Norway has not introduced a fishing fee to cover the management and enforcement costs of the fisheries.

2.1.3. The shareholders make a residual claim on profits

The quota and vessel owners harvest valuable renewable fish resources. Owners normally focus on profit (Hannesson, 2013, 2017; Jensen, 2002). However, profit maximization is rarely a simple goal for companies, and there is often a delicate balance to be struck. Short-term profits might, for example, be improved by fishing with an old and depreciated vessel, but this is hardly sustainable in the long run (Bertheussen and Vassdal, 2019).

Family owners are typically businesses where ownership by the founding entrepreneur has passed on to their family, for instance, on account of the founder's retirement. For family businesses, retaining control over the company, passing on management to the next generation, and ensuring the company's long-term survival can be the most important objective (Le Breton-Miller et al., 2011). Nevertheless, shareholders are undoubtedly residual claimants (Jensen, 2002).

2.1.4. The crew makes a residual claim on revenues

The crew on the vessels possess the capabilities to harvest the fish resources. Common in Norway, the crew receives their salary ("lott" in Norwegian) as a share of the catch revenue (Ekerhovd and Gordon, 2020). They thus have a residual claim on revenues.

2.1.5. Debtholders make a fixed claim on revenues

After introducing tradable quotas, fishing licenses were allowed to be used as collateral in bank loans (Ekerhovd and Gordon, 2020). This provided incentives for the owners to invest in quotas and increased fishing capacity. The capital requirements for investing in vessels and quotas in capital-intensive seagoing pelagic fisheries are substantial (Bertheussen et al., 2021a). Accordingly, banks and other lenders have become significant stakeholders in the pelagic fishing industry.

This stakeholder has a fixed claim on the firm's revenues.

2.2. A tentative theoretical framework

Fig. 1 illustrates a tentative framework of a resource-based stakeholder model of value generation and appropriation in a rights-based fishery.

The tentative theoretical framework depicted in Fig. 1 consists of two separate but interdependent resource bundles (society's resource bundle and firms' resource bundles) and five stakeholders (society, government, crew, shareholders, and debtholders). Together, the resource bundles and the stakeholders' claims form a model of value generation and appropriation in a resource-based industry that integrates resource-based and stakeholder theory.

An ecologically sustainable fish stock is a prerequisite for creating economic values in the industry. This goal society ensures through its fisheries management regime. A harvesting rule, e.g., total allowable catch (TAC) is critical. This tool has been introduced worldwide to protect natural resources from overfishing and collapse. Further, property rights (i.e., individual catch shares) have curbed the internal rivalry among firms (Birkenbach et al., 2017) and given each quota holder a protected share of the raw material market. The closing of the fishery has created legal and economic barriers to entry. Thus, incumbent companies are also protected against competition from intruders (Bertheussen et al., 2021a).

Since no resource rent tax has until now been introduced in Norwegian fisheries (Fuglestad and Almås, 2021), society does not claim its contribution of wild fish to the firms. Moreover, the government funds the fisheries management regime over the central government budget. However, the companies are exposed to Norway's general corporate taxation system. Currently, they pay a 22% flat tax on profits, and they pay 2–4% of their revenues in product taxes and fisheries research fees.

The government has decided who should be allowed to harvest renewable natural resources by distributing the TAC to the actors through individual quotas (Standal and Aarset, 2008). This political decision has had long-term and far-reaching distributional consequences (National Audit Office, 2020). In Norway, a quota representing a harvesting right must be linked to a vessel. The vessel quotas have gradually become more tradeable (Standal and Asche, 2018). Most of the vessels that were part of the fishing when the quota system was introduced, were given their quotas free of charge (Johnsen and Jentoft, 2018). Those who have since increased their quota holdings have purchased additional quota shares from other vessels at (stiff) market prices (Flaaten et al., 2017; Hannesson, 2017).

The individual harvesting right is the most critical resource for an incumbent firm (Bertheussen et al., 2021a). Without a quota share, a vessel is not allowed to fish. The firm needs an appropriately equipped vessel with a competent crew to harvest the natural resource cost-effectively. In Norway, both the vessel and quota owners and the crew have residual claims in contrast to debtholders, who have a fixed claim on the values being created.

3. Empirical context

First, this chapter describes the emergence of the institutional framework surrounding Norwegian fisheries. Then, the key stakeholders included in the present study are portrayed.

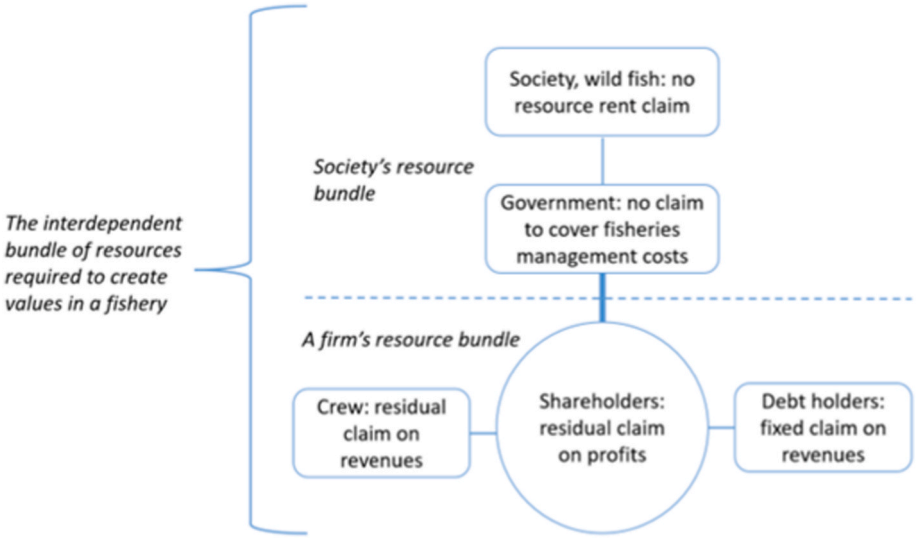

Fig. 1. A resource-based stakeholder model of value generation and value appropriation in a rights-based fishery.

3.1. The distant past: open access (up to 1970) followed by closed entry (1971 onward) and a non-tradable individual vessel quota system (1978–1995)

Pelagic fishing has been going on for hundreds of years in Norway, and the fishing fleet has encountered major ups and downs. In 1968–1969, the Atlanto-Scandian herring stock collapsed. At that time, herring was the largest fish stock in Europe. The decimation represented one of the most significant shakes the Norwegian fishing industry has ever experienced (Bertheussen, 2022a; Flaaten et al., 1995). The crisis was, among other things, caused by more efficient catch technology and a buildup of overcapacity in the industry.

Before 1970, the fishery could be openly accessed, and there were no capacity-reducing measures in the Norwegian purse seine fleet (Standal, 2009). However, the resource crisis halted the registration of purse seiners in 1970, the introduction of TAC regulations for herring in 1971, and a hitherto unthinkable total ban on catching Atlantic herring in 1972 (Kolle et al., 2014). A licensing scheme was implemented in the early 1970s to control vessel entry and capacity (Årland and Bjørndal, 2002). Furthermore, IVQs were introduced in 1978 for purse seiners fishing capelin and extended in the late 1980s to include mackerel and herring (ibid.). During the seventies, more measures were introduced to reduce capacity through scrapping vessels. Finally, public subsidies and natural retirement have led to a decline in purse seiners from 460 vessels in 1967 to 115 in 1991 (ibid.).

3.2. The recent past: the UQ system (1996–2004)

The IVQ system was modified in 1996 under the so-called UQ scheme (Årland and Bjørndal, 2002) to reduce the number of vessels as the catch capacity still exceeded the available quota basis (Hersoug, 2005). Furthermore, UQs were made tradable as a vessel owner could concentrate up to two quotas per vessel (Årland and Bjørndal, 2002). In 2000, the system was extended even further, allowing the merging of up to three quotas per vessel. The measures were anchored to social goals by supporting a regional distribution profile since transfers from north to south resulted in a 40% quota cut. In comparison, internal transfer within a region gave a reduction of 5% (north of Norway) or 15% (south of Norway).

3.3. The present: SQs (2005 onward)

In 2005, the IVQ system was converted to a system known as "structural quotas" as an additional measure to reduce catch capacity and increase efficiency. This was a more flexible and market-oriented system than the UQ system (Hannesson, 2013). However, formally, Norway still does not manage its fisheries by ITQs, but in reality, fisheries management has many similarities with such a system (e.g., Asche et al., 2014; Hannesson, 2013; Standal and Asche, 2018). An ITQ regime is based on a market logic where quota transactions act as an allocation mechanism between fishing vessel firms. Accordingly, it is the sole responsibility of the firms to adapt their quota basis to their catch capacities (Bertheussen et al., 2020a), as it is assumed that the firms act as rational actors that aim to maximize their profit from the given quota basis (Grafton, 1996).

However, a profound criticism of the ITQ model is that the system leads to an intense concentration of quota ownership (Bertheussen, 2022b; Standal and Aarset, 2008) and thus compromises social goals. Additionally, the system does not emphasize the importance of securing fish resources in geographical areas most dependent on fisheries (ibid.) Accordingly, restrictions can be built into an ITQ regime to prevent the market from becoming the sole quota allocation mechanism. Many quota regimes, including Norway's, have features aimed at protecting the social structure and division of equity, for example, geographical restrictions on trade. Modifications include separate markets for different geographical areas (e.g., north/south), built-in limits in terms of quota concentration per vessel (or vessel group), different markets to ensure that a variety of adaptations coexist, and a requirement that a fishing vessel firm must purchase another vessel (which must be scrapped) with attached fishing rights to increase its total quota share (Standal, 2009).

4. Methods and data

4.1. Research design

As outlined in this article, the research design of an empirical study requires in-depth knowledge of the institutions embracing the industry and how these expectedly shape the value distribution between key stakeholders. The design also requires valid and reliable measures of the values added by different stakeholders. Finally, a dataset of representative vessels over a period covering the period before and after the introduction and long-term use of a rights-based management regime (e.g., ITQ) is needed. In this context, a period of 32 years (1985–2016) is considered sufficient to study how the values added have been distributed between stakeholders under gradually more market-oriented

Norwegian fisheries management systems.

4.2. Unit of analysis

The present study focuses on the distribution of economic values between key stakeholders in a rights-based fishery. In stakeholder theory, a stakeholder is normally related to a firm. Using a fishery (or an industry) as a unit of analysis implies that the analytical perspective is raised from the firm level to the industry level. Several empirical studies have used a firm perspective at other levels of analysis. This applies, for example, to Hervás-Oliver and Albors-Garrigós (2007), who used the firm perspective to study business clusters, and Lawson (1999), who used the firm perspective to conduct regional analysis while arguing that competence as a firm resource is just as relevant for a region. Maskell and Malmberg (1999) also analyzed firm resources at the regional level. Besides these empirical studies, classical Ricardian analyses utilize the firm resource perspective with nations as the level of analysis (e.g., see Bertheussen et al., 2020b).

4.3. Sampling and data collection

The objectives of fisheries management generally include improving economic performance. However, vessel data to evaluate this are often unavailable as relatively few fisheries managers collect such information or collect it only sporadically (Pascoe et al., 2019). Accordingly, sufficient detailed longitudinal financial information must be available to measure the value distribution between key stakeholders. This information must also be available for an adequate number of firms to ensure the statistical validity of the conclusions. The Norwegian Directorate of Fisheries requires most fish shipping companies to report income and cost data annually per vessel. The present study has gained access to this unique dataset and based all its analysis on it.

The sample of seagoing purse seiners accounted for an average of 65% of the vessel population in the period studied. The minimum number of vessels in the sample was 32 in 1994 (accounting for 33% of the population that year), whereas 81 vessels were included in the sample in 2002 (accounting for 87% of the population in the current year).

4.4. Measuring value added

To measure the value creation that has taken place in the industry, this study calculates gross value added (GVA), and net value added (NVA) (see Fig. 2). GVA is the firm-level equivalent of the concept of the gross national product (GNP). GNP is the value of goods and services produced in a nation in one (1) year. At the national level, GNP is corrected for net income from abroad to define the national income. A similar correction does not apply at the vessel level but may be appropriate for larger vessel firms operating transnationally. At the vessel level, GVA is defined as revenue minus input in the production process bought at market prices from outside the firm (Carvallo et al., 2020). For a fishing vessel, this is mainly fuel, maintenance of vessel and gear, bait if relevant, insurances, and smaller items summarized as miscellaneous other costs. At the vessel level, GVA is then the revenue left to compensate for labor and capital. More specifically, this involves labor costs, including food and labor duties (cost for pensions included), capital costs, including depreciation of vessels and gears, amortization of intangibles (for example, quotas acquired), and operating profit.

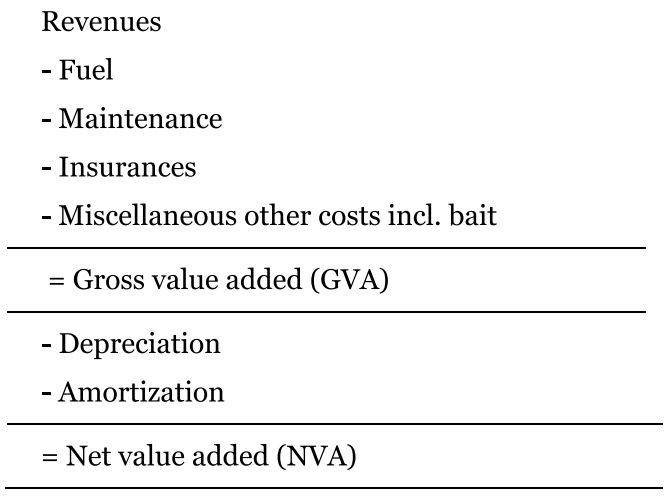

Fig. 2. Calculation of Gross value added and Net value added.

GVA minus depreciation and amortization is the net value added (NVA). Depreciation and amortization are proxies for value reduction due to increased age, that is, the wear and tear of the capital part of the input. Without compensation for this natural value reduction, the capital base in the production process will decline over time, eventually leading to a decrease in future revenues. The proxies for value reduction (book value of depreciation and amortization) are, on average, approximately 12% of revenues and about 19% of GVA in the sample included in the present study.

GVA and NVA will be calculated to compare and enlighten the issue. When using GVA, compensation for value reduction (i.e., depreciation) is included as part of the value-added attributed to the vessel owner. A vessel owner may decide to liquidate his/her assets and leave the industry at any time. This has historically happened in catching whales and other sea mammals, catching shrimps in the Norwegian Exclusive Economic Zone, and harvesting farmed and wild scallops. However, there is no indication that similar aggregate disinvestment is occurring in the Norwegian pelagic sector. At the national level, a policy of general disinvestments in all capital-intensive economic activities is hardly advisable nor probable. Thus, the present study does not include any effect of global population growth, global warming, and restrictions on CO_2-emitting fuel presently used by fishing vessels, nor any possible future degradation of the biological habitat for wild fish.

GVA is generally distributed to labor and capital input (Kitts et al., 2020). The present study has calculated a pro forma national profit tax to account for government revenues, as the general society outside the specific pelagic fishing sector is one of the key and legitimate stakeholders. Labor compensation is gross labor enumeration, including food and specific labor taxes paid for by vessel owners. Capital compensation is profit after taxes, compensation for value reduction, and net interest to debt holders. The calculated taxes make up 25% of the profit after the financial cost. The tax calculated may therefore differ from the actual tax cost paid by the average vessel. In the case of negative taxes due to negative profit, this is registered as subsidies. In fact, negative taxes are not refunded to the vessel the same year as the losses are reported. However, negative profits can be accumulated in the annual tax reports and balanced against later profits.

This study analyzes data for slightly more than 30 years. Over this period, the nominal price level has changed by about 234%. The nominal price level will be recalculated to a fixed (real) level by using the national consumer price index (CPI) published by Statistics Norway. The present average annual index has 2015 as the base year. Both nominal and real GVA per year is shown in Fig. 3 below.

Both time series show considerable variation with a top value in 2011. The real GVA has an about 4% annual growth rate from 1985 to 2016. For the nominal GVA the annual growth rate for the same period is close to 7%. The difference between these to growth rates is a reasonable estimate of the average yearly price level change.

The fact is that real GVA over the period is growing faster than the general domestic price level. This may have several explanations. Resources may have become more abundant and thus creating more income. Most of the products from the fisheries are exported, and the exchange rate may have had a positive development for exporters. The

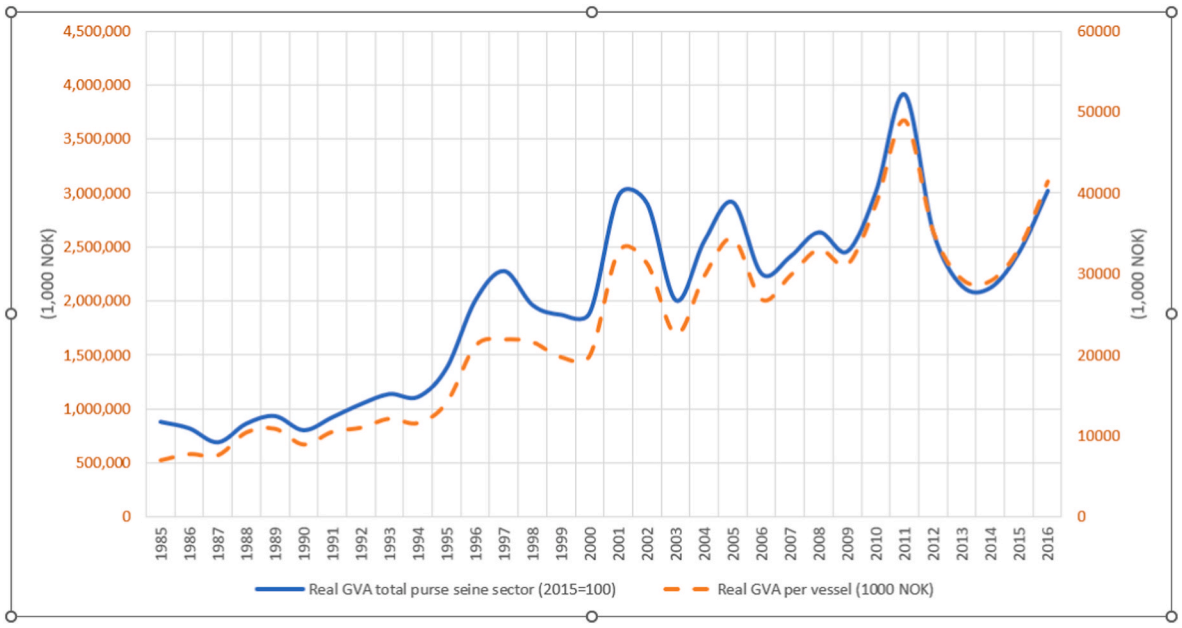

Fig. 3. Real GVA per average vessel (right axis) and total purse seine sector (left axis) (CPI, 2015 = 100).

demand elasticity may be fortunate, given the variability in the annual catch that prevails in most fisheries. There may also have been a long-term shift in demand due to taste, population increase, income, and wealth effects among dominant consumers. Also, value-increasing productivity changes in the production process may be a possible explanation.

This paper focuses on the distribution of the economic value created in the purse seine sector. The process of economic value creation, with its many possible explanations, will not be a significant subject for the study. However, in Chapter 6 (Discussions) we will return to some former studies that may explain some factors influencing the increase/decrease of economic value in fisheries. In that chapter, we will try to contribute to some issues raised by other researchers based on the findings of this study.

5. Empirical findings

This section presents the empirical findings of the present study. The first research question raised is as follows.

RQ1: How have the values added in the seagoing Norwegian pelagic fleet developed relative to revenues during the last three decades?

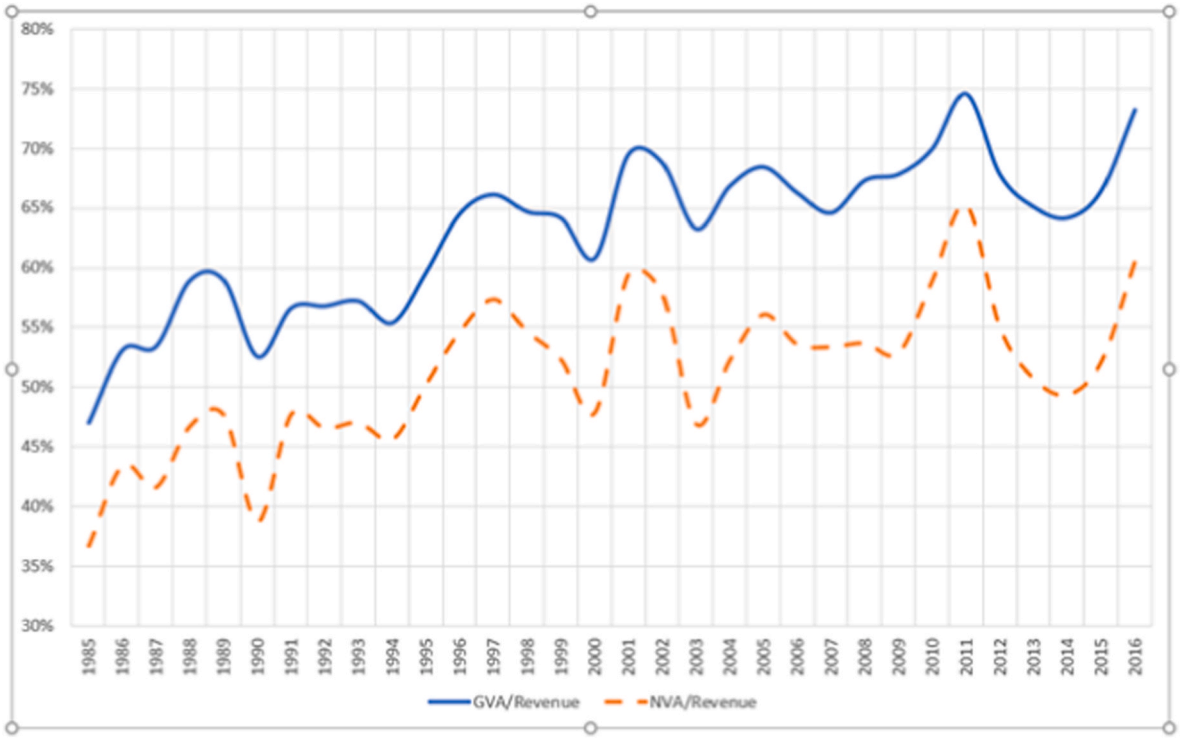

Fig. 4. Gross and net value added relative to revenues from 1985 to 2016 in the Norwegian seagoing pelagic fishery.

Fig. 4 show that the GVA by the key stakeholders addressed in the present study (resource owner, vessel owners, crew, and financiers) has gradually increased from 47% in 1985 to 73% in 2016. By definition, NVA is less than the gross value. Both lines for GVA and NVA have separately been regressed as functions of the variable Year. For GVA $R^2 = 0.70$ and for NVA $R^2 = 0.48$. The coefficient of explanation is larger for GVA than for NVA. Also, the regression coefficient for Year is slightly larger for GVA than for NVA (0.00533 against 0.00477). This observation is an indication of increased depreciations and amortizations from about 2003. We interpret the development of depreciations and amortizations as a valid indication of increased capital intensity. Notably, the increased use of capital is primarily in the form av increases in intangible assets. At the end of the period studied, there are examples of newly built vessels where the value of intangible assets (quotas and licenses) is as expensive as the value of vessels and gear. A major factor explaining the increase in both GVA and NVA over time is the development of fuel costs. The fuel cost relative to gross revenue has declined, although not steadily, due to high variability in crude oil prices during 1985–2016.

The second research question raised is as follows.

RQ2: How have values added been appropriated between labor and capital?

The findings in Fig. 5 shows that the labor share of net value distribution has decreased gradually from 90% in 1985 to 57% in 2016. The capital share of the value distribution has increased correspondingly from 10% in 1985 to 43% in 2016.

The analysis of the distribution of NVA demonstrates the same broad picture but now with somewhat different numbers. Labor share has declined from approximately 80% to approximately 60%, and capital share has doubled from approximately 20%–40%. Total assets relative to NVA is 6.3 for 2003–2016 (information on intangible assets are not available for the period before 2003). The same fraction has a value of 7.6 for 2012–2016, indicating a relative increase in input in the form of capital stock (vessels and licenses being the two major components).

The final research question raised is as follows.

RQ 3: Is the value distribution between key stakeholders related to the gradual liberalization of the management regimes that have been in operation?

A summary of the average value distribution between key stakeholders for the sample of seagoing vessels under study covering the period 1985–2016 is provided in Table 1. The table is split into three subperiods reflecting that the rights-based systems were implemented in different stages (IVQs, UQs, and SQs). In the first subperiod covering 1985–1995, closed entry combined with the gradual introduction of nontransferable vessel quotas were in operation. Two other subperiods then follow this period with an increasingly liberal management system. In these systems, it was made possible to collect several quotas on one vessel through quota trading, given that the selling vessel was scrapped.

In the first period (1985–1995), the fishery was closed entry combined with non-tradable vessel quotas (IVQ). The vessel owners' average share of the value distribution was 14.2%; however, it gradually increased and peaked at 26.8% in 1995. The vessel owners' share was relatively stable during the UQ period, the first period of tradable harvest rights (1995–2004). The share then averaged 35.4%, which was significantly higher ($p < 0.000$) than in the previous period (14.2%). During the final SQ period of the study (2005–2016), the vessel owners' share was, on average, 39.5% but not significantly higher than during the previous UQ period ($p = 0.065$). The bank share of the value distribution dropped during the study period, although most significantly between the limited-access period (22.3% on average) and the UQ period (8.7% on average). Also, the crew's share of added values fell during the study period. In the limited-access period, the crew's share was, on average, 65.2%, and then, it fell to 50.1% in the UQ period before ending up with 45.8% on average in the SQ period. The share of the society (corporate taxes) increased from an average of −1.7% in the limited-access period, which implies net subsidies to the industry. It grew to an average of 6.8% in the SQ period.

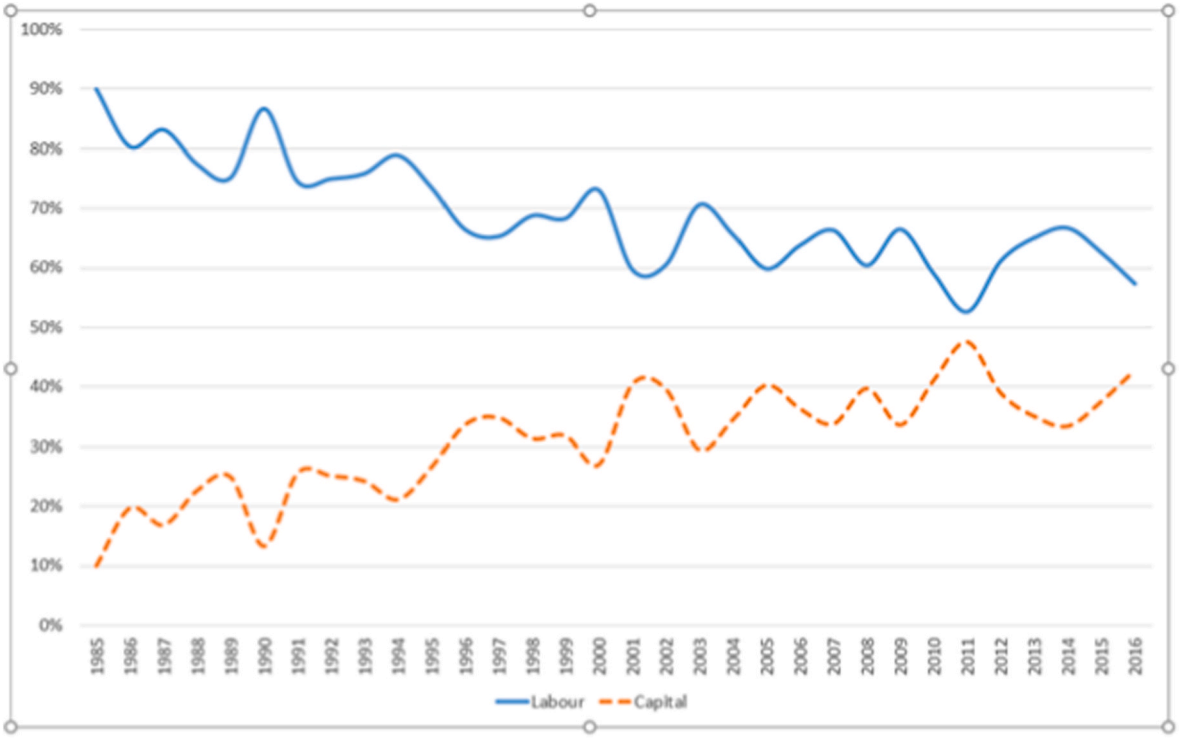

Fig. 5. Relative distribution of net value added between labor and capital.

Table 1
Value distribution of the Norwegian seagoing pelagic fishery between key stakeholders for 1985–2016.

	Year	Population (N)	Sample (n)	Vessel owners share[a] (%)	Debt holders share[c] (%)	Labor share (%)	Society's share[b] (%)
The distant past: closed entry combined with the non-tradable IVQ system	1985	126	67	7.1	23.1	74.7	−4.9
	1986	106	49	9.9	24.9	68.0	−2.8
	1987	91	42	6.3	29.8	69.2	−5.3
	1988	83	38	16.0	23.0	62.6	−1.6
	1989	86	44	15.9	23.6	61.6	−1.1
	1990	90	47	7.0	29.8	69.5	−6.4
					25.0		
	1991	88	43	12.4	25.0	63.6	−1.1
	1992	95	44	13.6	25.3	62.6	−1.5
					17		
	1993	94	45	19.7	17.7	61.9	0.7
	1994	96	32	21.8	12.9	63.9	1.4
	1995	98	38	26.8	10.2	59.3	3.7
The recent past: closed entry combined with the UQ system that opened up for quota trading	1996	95	44	36.2	5.2	51.6	7.0
	1997	104	36	35.7	5.1	51.7	7.5
	1998	91	78	34.3	5.6	53.8	6.3
	1999	95	65	31.6	11.3	52.7	4.4
	2000	95	79	27.6	14.3	56.0	2.1
	2001	91	76	37.4	8.5	46.5	7.7
	2002	93	81	36.3	10.2	46.7	6.8
	2003	89	74	31.6	15.5	51.0	1.9
	2004	86	66	40.4	6.2	47.2	6.2
The present: closed entry combined with the SQ system allowing more liberal quota trading	2005	85	72	42.5	5.2	44.2	8.1
	2006	84	63	40.6	5.2	47.0	7.2
	2007	81	61	41.5	1.0	49.4	8.1
	2008	80	70	30.6	19.8	46.1	3.5
	2009	79	65	43.1	2.7	47.1	7.0
	2010	78	66	41.8	5.0	44.5	8.7
	2011	80	65	42.9	6.2	40.7	10.2
	2012	75	58	39.9	7.7	45.3	7.0
	2013	73	57	35.4	12.3	47.8	4.5
	2014	73	60	36.6	10.6	48.3	4.5
	2015	74	58	37.1	11.9	45.8	5.2
	2016	73	61	45.1	3.6	42.1	9.3
				Vessel owners share[a]	Banks share[c]	Labor share	Society's share[b]
Average Closed entry/IVQ period (1986–95)[d]				14.2%	22.3%	65.2%	−1.7%
Average UQ period (1996–04)[d]				35.4%	8.7%	50.1%	5.8%
Average SQ period (2005–16)[e]				39.5%	7.8%	45.8%	6.8%

[a] Residual estimated.
[b] Corporate taxes estimated.
[c] Bank and other external financing (net).
[d] A paired *t*-test showed a significant difference between period 1 and period 2 ($p < 0.000$).
[e] A paired *t*-test did not show a significant difference between periods 2 and 3 ($p = 0.065$).

6. Discussion

The RBSH model developed in the theory chapter of the paper (see Fig. 1) argues that several stakeholders must collectively provide resources to the bundle required to generate economic values. In a rights-based fishery, some key stakeholders are outside the firm's boundaries. This applies, for example, to society that owns the natural resource and the government that controls the extraction of the renewable resource through its fisheries management system. The theoretical framework in Fig. 1 further argues that the economic values created should, in principle, be distributed relative to the contributions of the different stakeholders, even if this can be hard to estimate precisely (Lippman and Rumelt, 2003). The model argues that a fair distribution among the stakeholders can be necessary to maintain the resource bundle in the long run (Barney, 2018).

Furthermore, one of the fisheries' social responsibilities is the commitment by stakeholders to behave ethically and create economic values while improving the quality of life of local communities and society at large (Hosch et al., 2011; Rasche et al., 2017; Wang et al., 2016). Another underlying theme in this article is that fisheries management has a responsibility to fulfill multiple objectives of the principal owner of the natural resource, i.e., both pursue ecological, economic, and social goals (FAO, 1995; National Audit Office, 2020).

The empirical backdrop of the present study was the Norwegian pelagic fisheries that collapsed in the early 1970s due to overfishing (e.g., Bertheussen, 2022a). In the two following decades, most vessels had to leave the fishery due to overcapacity in the industry, and the remaining became dependent on state subsidies to survive (Flaaten, 2021). At this point, the industry was thus neither ecologically nor economically sustainable. Therefore, fisheries management was forced to take pivotal measures to change the negative development. First, the fishery was closed, and TAC regulations were introduced.

Furthermore, overcapacity was reduced through public subsidized condemnation arrangements. Finally, a system of fishing rights was implemented (in order: IVQs, UQs, and SQs) to avoid a race-to-fish and protect incumbents from rivalry (Standal and Aarset, 2008). In this critical phase of the industry, ecological and economic goals were prioritized by fisheries policies (Finstad et al., 2012). However, at the same time, the social significance of fishing for coastal communities remained underlined in fisheries policy documents (National Audit Office, 2020).

6.1. Values added

The first research question (RQ1) raised in this study was, "How have the values added in the seagoing Norwegian pelagic fleet developed relative to revenues during the last three decades?" The findings (see Fig. 4) show that the GVA by the industry increased gradually from 47% in 1985 to 73% in 2016. This implies that the relative share of the values added to be distributed to the key stakeholders discussed in this paper (society as resource owner, government through its fisheries management regime, vessel and quota owners, crew, and debtholders) increased significantly. In contrast, the suppliers' share of GVA decreased correspondingly. This finding is in line with Ekerhovd and Gordon (2020), who found that increased output prices for the most important species, namely, herring, mackerel, and blue whiting, have been the main revenue drivers of the Norwegian pelagic fisheries in recent decades. The price increase of pelagic products is partly due to the better quality of the catch of herring, and mackerel landed due to improved handling and storage capability on board.

Furthermore, higher fish quality has supported a value shift from low-priced fish meal/oil to the higher-priced consumption market. In summary, the total revenue distributed to the key stakeholders included in this study has become significantly larger in recent decades. The suppliers' portion has decreased, which has benefited the other primary stakeholders. However, investments do not occur just by themselves. The vessel owners, i.e., the capitalists, must invest. New investments call for higher depreciation and amortization. The capitalists also need to profit from their investments on par with the opportunity cost of capital. According to economic theory, the investments aim to increase revenue and GVA, and that is just as it should be."

6.2. Values appropriated

The second research question (RQ2) raised was, "How have values added been appropriated between labor and capital?" The findings (see Fig. 5) show that the development from a subsidized to a profitable industry has come at the expense of the labor share of the value distribution, which decreased by 33% in the period studied (90% in 1985 and 57% in 2016). Labor has thus been substituted for capital, a finding that is in line with Ekerhovd and Gordon (2020).

The regulatory environment may determine a fishery's obligations toward its stakeholders (Mikalsen and Jentoft, 2001). Accordingly, the third and final research question (RQ3) raised in this study was, "Is the value distribution between key stakeholders related to the gradual liberalization of the management regimes that have been in operation?" The value distribution between key stakeholders under the three different management regimes addressed in this study is shown in Table 1. The overall picture is that the vessel owners come out by far the best in line with the increased liberalization of the management regimes. Their share of the values added nearly tripled during the study period as it grew from 14.2% in the limited-access period (1985–1995) to 39.5% in the SQ period (2005–2016). When the total values added in a fishery increase simultaneously as fewer boats claim a proportion of the values, the remaining vessels are left with a larger share.

Additionally, when more capital is tied up in fishing, for example, related to quota purchases, this may also contribute to a larger share for the vessel owners. Finally, "money talks," and the more significant share a stakeholder seizes of the values added, the more powerful they will become (Mitchell et al., 1997). A stakeholder can utilize this extra power to influence the fisheries policy even more in their favor.

Society has also gained a larger share of the value distribution, increasing from −1.7% in the limited-access period to 6.8% in the SQ period. Notably, society's share was negative in the first eight years of the period. This period marked the end of the subsidization of Norwegian fisheries (Flaaten, 2021). However, management costs are covered by the society through allocations from the state budget. Net receipts to the principal resource owner are thus less than the average 6.8% indicated in Table 1.

Furthermore, as indicated in Table 1, the vessels' crew appears to be a "loser" in the value appropriation battle of the industry. The crew's share has fallen from an average of 65.2% in the early limited-access period to 45.8% in the latest SQ period. This corresponds to a decrease in the crew's share of approximately 30%. This significant fall is somewhat surprising since their wages have historically been a fixed share of the vessels' revenues, i.e., a residual claimant. One reason may be that seagoing purse seiners could manage with fewer men on board in the latter part of the period than in the first, although the new vessels have become physically larger than those swapped. In this case, technology has replaced manual work. Another reason may be that the crews' share of the vessels' revenues has been renegotiated and reduced as it is the vessel owner and not the crew who purchases and finances expensive quotas to increase the revenue base of the vessel (Hannesson, 2017).

Finally, the bank share of the value added dropped significantly, although the vessels' debt burden increased due to increased quota investments and vessel renewals (Bertheussen and Vassdal, 2020). The banks' reduced share of the values added is mainly due to a sharp fall in interest rates during the 32-year study period.

6.3. Policy implications

This study argues in line with resource-based stakeholder theory (Barney, 2018) that vessel owners (the shareholders) and the crew (the labor) are not the only stakeholders who have a legitimate claim on the values being added in a natural resource-based industry, such as fishing. So has society, as this stakeholder is the principal owner of the natural resource and makes the resource available so that the fishers can capitalize on it. Society's claim on the values being added is further strengthened by its need to establish and operate a management regime to prevent the resource from becoming extinct due to overfishing. Accordingly, this study argues that value appropriation in natural resource-based industries should incorporate a stakeholder perspective (also see Bertheussen, 2023). It is society's resources (e.g., fish) and capabilities (fisheries management) that form the basis for the value creation within the industry.

Under harvest right systems, such as ITQs, the main objective is to create economic profit for the players by increasing their efficiency (Clark and Munro, 2002). However, when the players become more efficient, for example, through economies of scale resulting from quota concentration on fewer vessels, this may contradict the social objectives of the fisheries (Hilborn, 2007; Olson, 2011). In Norwegian fisheries policy, social goals are expressed, among other things, through a desire to achieve socioeconomic profitability on behalf of the principal in contrast to maximizing the business profitability of their agents. It is further explicitly stated that the fisheries shall contribute to the employment and settlement in coastal communities (National Audit Office, 2020). Nevertheless, the social goals can hardly be the same for all fisheries. Pelagic fisheries consist, to a greater extent, of large vessels and large processing plants, whereas the demersal fisheries are more of a mix of small and large vessels and plants. This different structure of the pelagic and demersal fisheries makes it difficult to have the same social objectives. The reaction of stakeholders to the proposed fisheries policy will likely depend on their attention and power related to the issues at hand (Ocasio, 2011; Ocasio et al., 2018). There are many situations where stakeholder reactions could be crucial. Vessel owners will have financial expectations to be met, so a proposed policy that might reduce their profitability is likely unacceptable. Bankers are concerned with the risk attached to their loans. The extent to which a proposed fisheries policy could affect the company's capital structure could thus be an issue for them. Employees, unions, and local communities may resist policy moves such as relocation, outsourcing, or divestment if they see them as likely to result in job losses (Allison and Ellis, 2001).

In general, there is a need to be conscious of the impact of the various

stakeholders on the policy options being considered. Fisheries managers should also understand how the capability to meet the varied expectations of stakeholders could enable the success of some policies while limiting the ability to succeed with other policies. There are several goals of a fisheries policy, so an important focus is the consistency between these goals. Accordingly, ecological, economic, and social objectives must be considered and consistent (Hilborn, 2007; Cortes et al., 2002). To prevent fisheries policy decisions to create arbitrary and unintended consequences, the decision-making should be based on a knowledge base where the connections between causes and effects are known. In their recent evaluation of the Norwegian quota system, The National Audit Office (2020) emphasized that it is highly reprehensible that the consequences of various fisheries policy changes have not been sufficiently studied and known before the measures have been implemented.

The present study highlights the problem of balancing the interests of diverse stakeholders. This study also underlines the importance of fisheries governance, with the vessel owners appropriating an increasing part of the values added at the expense of social stakeholders such as the crew and the society at large, who is the legal owner of the natural resource (see Fig. 5 and Table 1). The stakeholder stance of social responsibility explicitly incorporates multiple stakeholder interests and expectations (Letza et al., 2004). The argument is that fisheries' performance should be measured more pluralistically than just through the financial bottom line of the shareholders. Such fisheries adopt the principle of sustainability in their policy, ensuring welfare by attending to all three dimensions of sustainability; fish stocks protection, economic welfare, and social responsibility. Performance is thus measured and rewarded in terms of a triple bottom line approach, environmental and social benefits, and profits for the players. A fishery in this category is, therefore, prepared to bear reductions in the profitability of a specific stakeholder for the social good.

Fisheries policies are, however, the outcome of bargaining and the powerful influence of major stakeholders (Hilborn, 2007). Fisheries politicians will have different views on issues and how they should be addressed. They are, therefore, likely to position themselves such that their views prevail, and they will seek to pursue policies that enhance their political status (Narayanan and Fahey, 1982). A political perspective suggests that the rational and analytical processes associated with developing politics may not be as objective and dispassionate as they appear (Pettigrew, 1977). Objectives may reflect the ambitions of powerful people.

Furthermore, the information used in debates is not always politically neutral. A stakeholder or a stakeholder coalition may exercise power over another because they control important sources of information. Powerful individuals or groups may also strongly influence which issues get prioritized. In such circumstances, bargaining and negotiation give rise to fisheries politics rather than careful analysis and deliberate intent (Hilborn, 2007).

In approaching policy problems, stakeholders will likely be interested in preserving or enhancing their positions (Maitlis and Lawrence, 2003). There are two reasons to expect policy development to build gradually on the current policy. First, compromise may be inevitable if different views prevail and parties exercise their political muscle. Second, it is quite possible that from the pursuit of the current policy, power has been gained by those using it. Indeed, it may be very threatening to their power if significant policy changes were to occur. A search for compromises accommodating different power bases will likely end up with a policy that adapts to what has gone before (Ocasio et al., 2018).

6.4. Limitations and further studies

Based on the high quota prices registered in Norwegian pelagic fisheries (Flaaten et al., 2017; Hannesson, 2017; The National Audit Office, 2020), significant values are distributed to former quota holders when they sell their grandfathered fishing rights. The value-adding that occurred in the hands of the quota sellers has not been included in the perspective of this examination because resource rent generation is outside the scope of the study. Hence, the values distributed to the vessel owners are underestimated. However, this may be a reference for future research (Gunnlaugsson et al., 2020).

Furthermore, through legislation and other white papers, Norwegian fisheries policy has emphasized the great importance that fisheries have had, still have, and will continue to have for settlement and employment along the coast. This study has not analyzed the regional distribution of the values added from pelagic fishing. The seagoing pelagic fleet's ownership is strongly concentrated in a few southern Norwegian municipalities (see Bertheussen, 2022b). How the regional values added along the Norwegian coast have developed over time under the liberalization of the management regime can be a good starting point for a future research project on the regional distribution effects of pelagic fisheries.

It was beyond the scope of the present study to compare the development of GVA in pelagic fisheries with other fisheries and other important Norwegian industries. A similar comparison could be carried out on the distribution of the GVA and NVA between different stakeholders. Comparing wages in pelagic fisheries to wages in other fisheries and industries is also interesting. These issues can form the basis for future research projects.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The authors declare that there is no conflict of interest.

Data availability

The authors do not have permission to share data.

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