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The wrong fish: maneuvering the boundaries of market-based resource management

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ABSTRACT

How can economic actors stay afloat in a highly volatile market environment? By drawing on ethnographic material from the Icelandic fishing industry, this article demonstrates how fishers maneuver the boundaries of market-based resource management that tend to ignore the ever-changing environment of the sea. The empirical material shows how fishers skillfully manipulate their socio-technical environment in order to adjust the market for so-called Individual Transferable Quotas (ITQs) with the movement of fish stocks. Accordingly, three coping practices are deployed: (i) *tinkering with accounts*, (ii) *socio-technical conversion*, and (iii) *redefining boundaries*. While these practices allow fishers to stay afloat, they are likewise undermined by the ever-changing environment of the sea, consequently fueling a money-induced cycle of socio-technical problem-solving and breakdowns.

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Introduction

New Economic Sociology has become a promising field that challenges the core assumptions of neo-classical economics (Swedberg 2003). At the heart of this heterodox view of the economy stands a critical revision of the atomized market actor who in reality is always already embedded in social relations (Granovetter 1985), institutions (Polanyi 1957), and culture (Zelizer 2011). It has rightly been argued, however, that it is not enough to relentlessly point out the empirical errors of the abstract model world of economic forecasting and prediction (Beckert 1996). Instead of gaining access to the motives of individual actors, scholars within the sociology of markets have therefore shifted their attention to the ‘social devices’ such as institutions, norms, and power relations that limit choices in order to cope with the problem of uncertainty in markets (Beckert and Aspers 2011, Beckert and Musselin 2013). In a similar vein, scholars associated with the field of Science and Technology Studies (STS) have highlighted the role of ‘market devices’ (Callon *et al.* 2007, MacKenzie *et al.* 2007, MacKenzie 2009), such as economic models, algorithms, statistics, and government reports for the construction of markets. These accounts, however, shift the focus away from the problem of economic coordination and decision-making in markets by highlighting more broadly the contingent socio-technical arrangements that co-constitute ‘the market’ and the ‘economic’ as political discourse and performative practice (Callon 1998b, Çalişkan and Callon 2009, Çalişkan and Callon 2010).

While both branches have contributed to our understanding of markets with rich empirical case studies, recent publications in the *Journal of Cultural Economy* have pointed at the shortcomings

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arising from viewing markets either as ‘concrete’ social structures or ‘abstract’ discursive arrangements (Frankel 2015). As a consequence, the epistemological tensions between both branches not only hamper a better understanding of different types of markets, but also a grasp of the broader role of non-market agents in the study of markets (Pellandini-Simányi 2016). With regard to current developments in market-based resource management (Pálsson and Helgason 1995, Holm and Nolde Nielsen 2007, Cardwell 2015, Høst 2015) I therefore argue that a more integrative perspective is needed in order to better understand the relations between economic coping and the broader ‘more-than-human’ environment in which the boundaries of markets are materialized and reproduced.

Drawing on an empirical case study of the Icelandic fishing industry, this article shows that in modern market-based resource management fishers are not only confronted with uncertainty in individual markets; they are also simultaneously entangled in the heterogeneous and ever-changing environment of the sea, in which fish stocks and sea currents do not follow the territorial boundaries of modern resource management. The ethnographic material indicates that fishers for the most part engage in pre-reflexive ‘skillful coping’ (Dreyfus 2014) in order to swiftly adjust to a potentially dangerous and highly volatile environment. It is only when the flow of daily coping is interrupted and meaning breaks down – for example, when a fishing line gets tangled or when ‘the wrong fish’ is hauled up – that the routinized order is problematized in terms of socio-technical cognition and problem-solving. The consequences of this coping, however, are twofold: while skillful coping allows fishers to swiftly adjust the boundaries of the market to an ever-changing environment, the ‘fluid spaces’ (Bear and Eden 2008) of the sea co-produce ever new uncertainties and breakdowns that are fueled by an increasingly economized and technized fishery economy.

The structure of the article is as follows. First, a brief review of the existing sociological literature on markets will further explicate the research gap. Second, a brief description of methodology and data will be presented. Third, the case of the ‘wrong fish’ will demonstrate how daily skillful coping on fishing boats enables fishers to stay afloat in a highly fluid and volatile market environment. Henceforth, three general coping practices are presented, (i) *tinkering with accounts*, (ii) *socio-technical conversion*, and (iii) *redefining boundaries*. Finally, the article relates the findings to a general discussion of modern resource management and concludes with regard to the sociological study of markets.

Coping with the environment

In a critical revision of the neoclassical market model, scholars from the vibrant field of New Economic Sociology have revitalized Frank Knight’s (1921, p. 101–120) seminal distinction between incalculable *uncertainty* and calculable *risk* as a fundamental concept of a sociology of markets (Beckert 1996, Dequech 2003). Although actors can rationally calculate the risks of economic transactions, the future can never be known and remains uncertain. Thus, it is this fundamental uncertainty that forms the driving force of the economy, rather than a state of equilibrium between supply and demand. In line with the ‘cognitive turn’ (Knorr Cetina and Cicourel 1981) in social theory, the conclusion is that, economic sociologists should therefore look at the ‘cognitive, structural and cultural mechanisms that agents rely upon when determining their actions without knowing what to do in order to maximize their outcome’ (Beckert 1996, p. 814–815). Sociologists dedicated to the study of valuation and coordination in markets have therefore shifted their attention to the role of so-called judgement devices (Karpik 2010), such as stories (Bogdanova 2013), classification systems (Rössel and Beckert 2013) and identity (White 2002, Aspers 2009) for explaining interaction and decision-making in markets under conditions of uncertainty. Another branch of economic sociologists has highlighted aspects of market organization including non-market institutions and regulators such as the state for market fashioning (Ahrne *et al.* 2015), while others have stressed the role of social movements and politics to explain how markets evolve and change over time (Fligstein 1996, Fligstein and MacAdam 2012).

Although these accounts provide valuable insights into how market actors cope with economic uncertainty, the study of uncertainty holds on to the study of choice driven by intentionally directed and more or less rational market actors ‘inside’ concrete market structures. As a consequence, the external environment of the market remains secondary for the study of economic coordination. Standing in the tradition of Foucault’s ‘decentralization of the subject’ (1970/2002), however, scholars from the field of STS have shifted away from economic coordination and individual decision-making by highlighting historical genesis and discursive practices that translate and frame societal controversies into calculable arrangements (Callon 1998a). From this perspective, so-called market devices (Callon *et al.* 2007) such as economic theories (MacKenzie and Millo 2003), prices (Çalışkan 2007), and valuations (Antal *et al.* 2015) are not mere cognitive tools that enable coordination under conditions of uncertainty, but relational arrangements that co-constitute ‘the market’ as historically contingent techno-scientific practice itself. In addition to this, scholars dedicated to the study of market-based resource management have highlighted the disciplining aspects of markets and technology on the performative practices of production and exchange (Cardwell 2015, (Dobeson 2016a)).

While both accounts give valuable insights into how markets are fashioned and performed beyond mechanistic models of supply and demand, I argue that a comprehensive sociology of markets must include *both* aspects of coordination and coping under conditions of uncertainty and the heterogeneous arrangements and performative practices of market construction. Hence, little attention has been given to the role of what I will refer to in line with broadly as the *environment* of the market; that is, the totality of relations in which the boundaries of markets are materialized and reproduced. In line with recent developments in cultural geography that highlight the ‘more-than-human’ aspects of space by questioning the static territorial conceptions underlying modern resource management (Bear 2012, Probyn 2014, Cardwell and Thornton 2015, Boucquey *et al.* 2016, Herman 2016), I therefore shift the attention to the ‘fluid spaces’ (Bear and Eden 2008) of the sea that tend to ignore human classifications and territorial boundaries in order to further decentralize economic action and capture the contingent situational dynamics underlying economic coping with the environment in modern market economies.

In the following, I will demonstrate that it is not enough for economic actors in modern market-based resource management to be intentionally directed towards ‘concrete’ markets in order to cope with economic uncertainty. Rather, economic coping takes place simultaneously in a highly volatile and fluid market environment, in which socio-technical practices likewise allow for swift and flexible adaptation of market boundaries to moving fish stocks, sea currents, changing regulations, capture technologies, and moving market prices.

Methodology and data

To fully grasp the scope of market-based resource management, the methodological framework of this study is understood in terms of what Desmond (2014) has referred to as ‘relational ethnography’. Hence, instead of focusing on particular groups, places, and sites, the focus lies on the relations and network ties between different actors, such as fishers, quota brokers, auctioneers, processors, and policymakers. In order to account for the heterogeneous environment in which modern market-based fisheries find themselves, I expand the relational perspective to other ‘more-than-human’ relations and ‘market devices’ such as fish stocks, sea currents, computer screens, fishing boats, and capture technologies in order to capture the contingent dynamics in which the boundaries of the quota market are performed and reproduced.

Empirical data were collected during a total of 16 weeks of ethnographic fieldwork on the Icelandic small boat fleet between April 2012 and July 2014. In total, 31 semi-structured in-depth interviews and 62 informal ‘on the spot’ interviews were conducted with key actors, such as quota-owners, fishers, auctioneers, processors, and local politicians along the coastal communities of the Icelandic Westfjords region. To capture the broader environment in which fishing takes place, a total of 55 observations were recorded and documented on different sites, such as fishing boats,

harbors, auction markets, processing plants and, more generally, social sites of the community, such as local pubs, swimming pools, and coffee shops.

Fishing in market-based resource management

The fishing season slowly but surely comes to an end in June, with most fishing quotas already fished up by the local small boat fleet. Unlike in the early 1980s, when the cod stocks were dwindling, a lack of fish is certainly not a problem in this region. Quite often the opposite is the case with regard to the very stable fishing grounds outside the Westfjords region, which have provided income and wealth for rural dwellers since the very early days of settlement. So why not just put to sea on one of the highly efficient and motorized fishing vessels to finish off the remaining quotas before the season closes on the last day of August?

In contrast to the old days, when fishers competed at sea to catch as many fish as possible, most North Atlantic fisheries are today regulated by modern resource management regimes, in which science and technology establish the basis for the distribution of fishing rights in response to the problem of overfishing (Apostle *et al.* 1998, Hannesson 2004, Hersoug 2005, Johnsen *et al.* 2009). In particular, Iceland spearheaded the neoliberal revolution of the 1980s and 1990s by managing the distribution of fishing rights through the construction of markets for so-called Individual Transferable Quotas (ITQs). Accordingly, coastal fishers are not simply allotted an annual fishing quota they can fish off. Instead, they can trade their ITQs independently from fishing vessels and homeport communities. While this development seems to fulfill the neoclassical economists' desired expectations of rationalization and increasing efficiency and investments in the fishing industry (Hannesson 1991, Hannesson 2004, Arnason 2008), it has likewise led to a publicly contested concentration of fishing rights in a few accounts around the capital region, consequently threatening the livelihoods of rural communities around the island state (Helgason and Pálsson 1997, Eythórsson 2000, Benediktsson and Karlsdóttir 2011).

While anthropological and sociological accounts have highlighted the role of modern resource economics and population ecological models for the construction of ITQs (Pálsson and Helgason 1995, Holm and Nolde Nielsen 2007), little has been said about how the boundaries of market-based resource management correspond to the daily practices of production, which are situated in a highly volatile and ever-changing market environment. In the following, the case of the 'wrong fish' will therefore show how the fish themselves fool forecasting models and ideas of supply and demand.

Getting hooked on the wrong fish

When the experienced fishing crew puts to sea, the world of markets seems to be just as detached from the vessel as the atomized world of homo oeconomicus. Rather than being directed toward markets and engaging in reflexive calculative action, the fishing crew rather seems to be absorbed by their immediate, often rough and unpredictable environment of rapidly changing weather conditions, moving fish stocks and heavy machinery.

While finally setting up the fishing gear at the destined fishing spot after hours of sailing through choppy seas, the crew seems to be involved with rather practical dealings with multiple tools such as the steering wheel, the fish finder and the fishing line, which altogether build a meaningful relation with the fishing crew and the sea. With Heidegger (1962, §§12–13) we can therefore say that the crew does not need to first 'discover' their environment in the sense of insulated conscious subjects, as they are already 'in' an already meaningfully disclosed world that lies before any form of mere habitual behavior or cognition. Rather than being intentionally directed towards a particular aspect of reality, the multiple practical involvements of fishing, like any other forms of specialized activity, can therefore be aptly described in line with Dreyfus's Heideggerian phenomenology of everydayness (2014) as *skillful coping* (see Figure 1).



Figure 1. Setting the line. Setting the fishing line requires circumspection and skill of both deckhand and skipper. For releasing the fishing line in an orderly fashion, the skipper slows down the vessel and navigates over the desired fishing spot. In the meantime, the deckhand needs to swiftly attach one line to another while until the desired stretch of water is covered (photo by author).

After hauling in the lines after 6 long hours of non-stop work, however, the crew realizes that a rather unwelcome species, the haddock, is taking up substantial space in their hold. In the words of Heidegger (1962, §16) we can say that the haddock are showing themselves in the mode of *obtrusiveness* (1962, §16) as their presence anticipates bad business for the day. But what could be wrong about catching a highly valuable and apparently abundant species?

The skipper explains that despite the daunting prognoses of the Marine Research Institute on the development of the haddock stocks,¹ which has impelled policymakers to cut the haddock quota in recent years, many fishers have become troubled by the rich fishing grounds just outside their fjords, where the highly priced haddock seem to congregate despite the predictions.² When the quota system was implemented, however, haddock were not really an issue in the area and most fishers chose to invest primarily in their cod quota instead, which has formed the backbone of the industry for decades. Today, however, the wrong fish seem to congregate in their coastal waters around the Westfjords region, as further interviews reveal back ashore:

- Author: I heard that people sometimes want to catch cod and then they get too much haddock?
 Skipper: Yeah, that's a big problem now everywhere, for the last two years! They are always putting down the quota on haddock, but there is haddock all over. But it seems that people who are making the quota, they don't want to listen to the fishermen, it's strange, they never listen to people who know most about it, that's my experience!

In the words of another fisher, 'Haddock is a well-known problem, a lot more is caught than your quota can cover', creating a real problem to fishers who are legally obliged to land all their fish. The mismatch between the quota market and local dynamics of the sea has led to the paradoxical situation of fishers catching too many fish – the wrong fish – despite the concerning prognosis of the Marine Research Institute. In fact, the problem of landing haddock has started to create serious problems for some small boat owners, who are facing increasing financial pressure in the ITQ-system.

But given that discarding the haddock back into Icelandic waters is illegal, can fishers find alternative ways of coping with the wrong fish?

Coping with the wrong fish

Back ashore. Instead of the expected cod, haddock is abundant in today's catch, causing what Dreyfus (1991, p. 70) has referred to as 'breakdowns' of meaning in which the crew's attention is shifted from 'absorbed coping' to 'deliberate attention' on 'the wrong fish'. The crew now faces a serious problem with regard to their unwelcome guests. The math behind it is simple: if the crew lands too much haddock, they have to pay a hefty fine that will be deducted from their wages. In other words, the haddock have become a problem with regard to the vessel's entanglement with the quota market. This 'breakdown' makes clear that despite its pragmatic base skillful coping does not imply that fishing is merely 'practical' or 'easy'. In fact, fishers engage in 'skipper science' (Thorlindsson 1994) and make hypothetical assumptions about the movement of fish stocks, sea current, weather, and fishing gear that are tested on a daily basis. From this reflexive stance, the haddock are no longer seen as part of the relational whole that characterized the practical world of daily routinized coping, but appear to be *present-at-hand* (Heidegger 1962, §16) as isolated entities that can be problematized by means of theoretical reflection. While this mode of reflection identifies the haddock within the boundaries of the quota market as 'the wrong fish', this form of reflexivity gives way for another form of skillful coping based on the objectification of the environment and deliberate problem-solving.

This section will now illustrate how fishers skillfully maneuver the boundaries of market-based resource management by deliberately deploying three ideal typically distinct, though not empirically mutually exclusive, 'coping practices' that allow fishers to adjust the boundaries of the market with the fluid spaces of the sea: (i) *tinkering accounts*, (ii) *socio-technical conversion*, and (iii) *redefining boundaries*. These coping strategies, however, are not merely the result of intentional rational planning and calculating, but grounded in daily skillful coping with a highly volatile and ever-changing environment.

(i) Tinkering with accounts

From a short-term economic point of view, it seems rational to invest in more haddock quota for the next fishing season when the fish abound in a region. The reality of small boat fishers, however, looks different. Often already carrying the burden of substantial debt in their accounts, investing in more quotas while at the same time seeing a steady reduction of the Total Allowable Catches (TAC) from the government seems to be far too costly a solution, which only big companies can afford. Instead, fishers rather look for short-term solutions over the season in order to keep their operations running. I call this coping strategy *tinkering with accounts*.

In contrast to long-term planning strategies, tinkering with accounts is a short-term coping practice that responds to the contingent situatedness of rules, regulations, market movements, and moving fish stocks. The most basic strategy of tinkering with accounts is leasing quota on the quota market in order to keep the operations running, although the transaction as such is not profitable, as the lease price tends to exceed the auction price for raw materials.³ Hence, leasing quota is an economic tradeoff between potential losses from the lease price and the income provided by the core business of a company, which usually is the cod fishery. A skipper explains this strategy:

Some guys, you know, on the longlines, they have to have haddock [quota] because you cannot say [to] the fish: I just want the cod on the longline, no haddock, you can leave! – You just cannot do that. What bites on the hooks comes up and you have to have quota for it, and they are renting the quota in haddock so they can fish the cod – that is the only reason they are renting haddock. So if they don't have the haddock, they cannot fish the cod they have, you know what I mean?

In this case, quota-owners renting haddock quota for a higher price than they can sell the raw material for is seen as a necessary cost that allows fishers and quota-owners to keep up with their daily business of catching cod. If the catches of haddock become too high, however, the overall profit of the company is reduced. When interviewing a former fisher who is a shareholder and accountant in a family-owned company, I ask her if there ever are any problems because her son, who is the skipper, is catching too much haddock:

Always like that, always! I never had a problem because I have a very good friend who is in quota selling in Reykjavík, I just call her and say: I need this today, uh, you have to be quick! And I always fix it, I never have a problem!

Because there is no official market platform on which all lease offers are collected and the information is distributed, leasing quota is highly dependent on network ties to brokers that mediate between the different parties. Hence, the contact with the broker in Reykjavík gives her the advantage of fulfilling the legal requirements on time. When asking whether her connections in Reykjavík put her in a better bargaining position for prices, however, it becomes clear that due to the scarcity of quota the lenders are in a much more powerful position, which leaves no room for negotiating prices:

Author: So do these personal ties sometimes help you to get a better price or something?
 Fisher: No!
 Author: No, that's impossible? So you have to take what is offered?
 Fisher: Yes ...

The closer the fishing year comes to its end in August, however, leasing quota increases operational costs, as larger shares have already been fished up during the season. Sometimes, vessels have already exceeded their allotted quota and are running the risk of costly fines for the owner by the end of the fishing season. Especially for small companies that are trying to finish their regular cod quota but have caught excessive haddock this can be a problem because they lack the financial means to rent large amounts of increasingly expensive fish. In this case, quota-owners with strong ties may help out, tinkering with each other's accounts to avoid costly fees:

[A]nd sometimes if you have [a] problem [by] the end of the fishing year, if you know someone who trust[s] you, he can let you have quota and you can give it back, you know ... If some fisherman want[s] quota, they can know they can have it after few days I can put them, put the quota on their boat and they can put it back and the same if I need quota and someone can help me to let me have quota on my boat and they have to write the papers, and you have to fax it with fax – I always can fix, it's no problem, not for me.

When leasing haddock, tinkering with quota accounts may also include renting out fishing quotas that are of little use-value for the quota owner. In this case, market devices such as the online 'quota calculator' (kvotareiknir), as provided by the Directorate of Fisheries, become an important tool for tinkering accounts (Figure 2):

[S]ometimes I need haddock, and then I put another kind, what you call it, saithe, we cannot fish that fish so much and then I rent it away and take another kind into my boat and then I have to look into my computer and see how much, and [at the] end of August [final month of the fishing season] I do this.

It becomes clear that the marketization of the coastal fisheries has created a system that requires especially small to medium sized fishers to skillfully tinker with quota accounts in order to adjust the boundaries of the market with the fluid spaces of the sea. Although the informant's remarks suggest that her network ties help her to fix any quota-related problems, it is obvious that the company has an interest in avoiding these type of transactions, which nevertheless involve a high level of uncertainty and economic losses. Furthermore, the more the annual haddock quota is reduced by policymakers and the more the demand on the lease market increases due to increasing catches, even the best network ties will not help a company from running into high extra costs if a vessel lands a lot of haddock. Instead of asking for new loans to invest in expensive haddock quota, fishers have therefore developed strategies of avoidance at sea to reduce their annual haddock landings. Two of these strategies are presented in what follows.

Kvótategund	Porskur	Ýsa	Ufsi	Karfi/gullkarfi
Úthlutun	72.303	18.389	38	29
Sérst. úthl.	0	0	0	0
Milli ára	1.408	75	11	9
Milli skipa	5.000	5.000	0	0
Aflamarksbr.				
Aflamark	78.711	23.464	49	38
Afli	54.605	19.220	20	320
Aflabreyting				
Staða	24.106	4.244	29	-282
Tilfærsla	-603	-106	-1	282
Ný staða	23.503	4.138	28	0
Á næsta ár	10.845	2.758	6	0
Umframafli	0	0	0	0
Ónotað	12.658	1.380	22	0

Figure 2. The quota-calculator. This market device gives quota-owners an overview of their allocated (úthlutun) and actual catch quotas (aflamark) for a fishing year resulting from transactions between vessels (milli skipa) and fishing years (milli ára), as well as catches (afli) for the species cod (porskur), haddock (ýsa), saithe (ufsi) and redfish (karfi) in kilograms. Moreover, the quota-calculator enables forecasting of changes in catch quotas based on subjective estimations of future catches and quota transactions (blank fields). This tool is publicly accessible for all registered fishing vessels in Iceland (source: www.fiskistofa.is).

(ii) Socio-technical conversion

A second strategy deployed by fishers to skillfully cope with the mismatch of quota share and stock movement is socio-technical conversion. Conversion in this context refers to a skillful coping practice that allows flexible socio-technical adaption to the fluid spaces of the sea. In this case, it allows fishers to switch between different types of fishing gear depending on the weather situation and the fishing season. As one skipper explains:

And then the best catch is normally in the winter for lining, but when the ocean is getting warmer in the summer, then it's good for jigging.

Fishing with longlines is considered by far the most efficient capture technique over the winter months when the metabolic system of the fish is rather low. On average, a fisher expects 700–800 kg of fish per fishing line. When the water heats up over the summer months and the fish start actively chasing their prey, the catch can fall below 100 kg per fishing line, which is not considered profitable anymore. For this reason, fishing with ‘active’ bait by means of jigging computers has proven to be more cost-effective in terms of catches over the summer months, when the cod is chasing after huge shoals of baitfish. Hence, when the fish are active, skippers can cash in on an extra profit due to the lower costs of labor, fuel, and bait:

Under 15 tons I can choose long line and I can choose computers ... I have a lot of quota in cod and now I've started to choose computers because I don't need two persons to [bait] a long line, I can be on one [boat] just myself on the boat alone and I can make a good process, you know, for me myself and the company, because I don't have to pay as much salary with the computers, and last summer we worked with the computers and we had 60 per cent or 50 per cent of the money that was left in the company, but with the long line, we are sometimes going down to 10 per cent left of the money into the company, which makes it just 10 per cent, you [cannot] manage to pay the credit, to buy a new line, to buy the oil, to pay the new skatt [tax], which the government has put on all the fishing ...

Accordingly, jigging is a much more cost-efficient alternative to longlining, as it involves only a fraction of the cost for labor, bait, and fuel that comes together for a single longlining trip, as another skipper points out:

It's a more expensive fishery [longlining], and when you are jigging your only cost is fuel, so if you take a long trip and burn fuel for 100,000 [Icelandic króna] or something, it is not so much [compared] to longlining. You are also baiting about 30 stacks [of longlines] that cost about 200,000, and then you have almost the same fuel cost there ...

Hence, in contrast to a longlining operation, the boat drifts when using the jigging computers and the artificial rubber baits can usually be used for many trips until they are lost or worn. Due to the high operating costs of longlining and its lower effectiveness in the summer months, many coastal fishers in the hook-and-line quota system therefore deploy hybrid vessels, which allow them to switch between different types of fishing gear, depending on fishing season and weather situation, as jigging itself requires a fairly calm sea state to allow the smooth and slow drift that is key to success. Lately, however, conversion has not only become an important means of general cost-reduction, but also a strategic means of coping with haddock in the region:

So this position we are in now is very, very difficult and very weird and that's why I'm saying to you we want to fish with the computers, because we just get the cod on the computers, there is no haddock ...

The skipper furthermore tells me that the family is 'thinking to change the boat over to computers, maybe for 6–7 months over the year and have the long line for the rest, yeah, for 5 months'. In fact, it will turn out that the skipper is not alone in his knowledge of the haddock's behavior, because other vessels from the region are following a similar strategy – even if their vessels are not really suitable for conversion. For instance, when talking to a skipper about the vessel at the docks, I was wondering why one of the newer 15-ton longlining vessels is equipped with jigging computers. He replies: 'They don't have so much quota, and they do it because of the quota, their haddock quota is very low'. Due to its wide hull and half-deck, however, the skipper has some difficulty controlling the vessel for a good drift as it is very sensitive to wind due to its size, or in the words of the skipper, 'It is like a sail'.

Although socio-technical conversion allows fishers to adjust their quota accounts to the local ecosystem by fishing more selectively, it has social consequences in the community-bound coastal fisheries, in which community members make a living from the services provided to the fishers. Far from being opportunistic, fishers are aware of this dilemma, as one skipper explains:

That (using jigging computers) makes it difficult because you have people who [are] working for you (on deck at sea and baiting the lines ashore) and what are you gonna do with the people. So that makes it very difficult, and they cannot wait for seven months and come again when I need them, so it's confusing, you know, it's not working together ... It's okay to take maybe two, three months and we say 'You take off free one month' but 7 months, 6 months is too long ...

While it is clear there is a tension between perceived economic pressures that push quota-owners towards increasing cost reductions, on one hand, and social responsibility towards the members of the community on the other hand, conversion itself seems to be an attempt to balance cost-effectiveness with community responsibility:

Skipper	So many, they try to have both jigger and line in the summer, like the boat they have here, they do that, they go maybe once or twice a week with the line so the baiter will have some work, then he is jigging.
Author	So there is some kind of responsibility towards these guys ...
Skipper	Yeah, I mean he is thinking about the people, very very good!

At the time of writing, it was unclear to what extent the rhetoric of responsibility could withstand the financial pressure of the ITQ-regime. By the end of the field phase, however, I witnessed the launching of a new vessel. In contrast to the family's previous, smaller vessel, which certainly showed signs of heavy usage over the years, the new vessel appeared to be not only bright and shiny when sailing over from the wharf, but also slightly larger than and more than twice as fast as the old vessel (27kn compared with 12kn). Of course, it also outclasses the old vessel in terms of navigation technologies and digital navigation devices. Most interestingly, however, was a special device underneath the wheelhouse by the bunks, which was proudly presented to me at the launching: a drift bag, which

can be launched manually when seas turn rougher to maintain a smooth and slow drift to preserve perfect conditions for jig-fishing.

(iii) *Redefining boundaries*

A third coping practice for reducing the landings of haddock is simply fishing where it does not abound: in high seas. For this reason, I call the third strategy for reducing landings of haddock *redefining boundaries*, in which small boat fishers move the traditional coastal boundaries of the small boat fleet into the open waters of the Arctic Ocean. As a skipper makes clear:

[W]e have to go very long to get cod ... Today the haddock ... I don't know how ... He is everywhere! So it is very difficult if you are just fishing cod. I think maybe in the summer it's not a big problem for us to go to sea, [but now] maybe you have to go like 30–40 miles to just go *over* [the] haddock ...

While fishing offshore has become a widespread practice in some regions for these reasons, it can only be practiced by those who have skill as well as the technological and financial means, as another fisher with an older vessel explains: 'It is very risky to go out 50 nm (nautical miles). But they have good boats, and they have the quota to do it'. Thus, sailing offshore on small boats not only involves the threat of physical danger, but also additional economic risks: the crew must land more fish than when fishing closer by in coastal waters to compensate for extra fuel costs. As it will turn out, this is not always the case despite modern technology such as fish finders on board: during a field trip on a vessel that put out way beyond the traditional coastal waters, the previous motivation and euphoria of the crew already faded after the first line was hauled up: instead of heavy lines, the skipper was only spotting some odd smaller fish, and his experience was telling him that he had laid the lines in the wrong spot, although a friend of his reported a really good haul just one day before: 'It is always a risk you take when you go that far out. Either you hit the jackpot or get nothing!' To make the extra costs, labor, and time spent on the high seas worth the journey, the crew had to literally 'fill up the boat' with 10–15 tons of fish. Instead, they only landed around 5 tons, which would be a good catch in coastal waters but way below the expectations in this case. But not only high economic risks are at play with this strategy, as it bears the risk of more serious breakdowns: while sailing back to port the skipper tells me that he once ended up being in distress at sea when fishing a similar spot. On that particular day about two years previously, big winds turned up and a wave of about three meters hit the boat so that it almost capsized and half of the fishing lines and fish went overboard. It was only because of the skipper's navigational skill and the nearby trawlers shielding the vessel from being turned upside down by the growing waves that the vessel made it back to port. When I asked the same skipper whether he did not foresee that a storm would be coming up, he explained:

Yes, I knew that it was coming, but it was nice weather like this and I thought I could get away with it. But see, it also has something to do with this quota system: we've been catching a lot of haddock that time closer to shore, but the haddock quota on this boat was very low. So I had to take some risk and go far out to get more cod.

Obviously, fishing always takes place in a potentially hostile and dangerous environment. But this example makes clear that physical danger and economic risk lie very close to each other, as the margins of sea-worthiness for a coastal vessel are very slim in rough seas. Moreover, the skipper faces constant uncertainty about the movement of the fish and even cognitive coping devices such as navigation technologies providing underwater maps are no insurance against potential economic losses. Market-based resource management, however, takes this entrenchment of economic uncertainty and the fluid spaces of the sea a step further: fishers do not only take risks at sea in hope of a good haul, but in order to avoid collisions with the regulations of the quota market. It is for this reason and the increasing economic pressure quota-owners face that fishing in high seas has become a widely practiced strategy, especially for the newer bigger vessels of the coastal fleet.

Transcending the boundaries of the small boat fleet, however, implies more than merely expanding the geographical scope of the fishery, as the practice itself transforms the relation between the

fisher, the fishing vessel, and the sea. The next section will now discuss the broader implications of these findings.

The paradox of market-based resource management

The case of the wrong fish points at a paradox resulting from the underlying rationale of market-based resource management, in which modern technology and investments have become both the solution and the problem to fishers.

While modern resource management has developed tools to tackle the problem of overfishing by means of quantifying and translating the ocean into calculable resources that in theory can be harvested at a 'sustainable' level, it ignores highly local and fluid spaces of the ocean that ignore the boundaries of scientific classifications, stock predictions, and demand curves. For instance, although population ecologists have developed astonishing tools such as Virtual Population Analysis for modelling development of fish stocks (Holm and Nolde Nielsen 2007), they must simplify 'nature' to isolated parameters and feed their models with standardized samples taken from the sea. As a consequence, models and samples represent only a fraction of a globally cross-linked, highly complex, and ever-changing marine eco-system that can be at odds with the standardized world modern resource economics. When deployed, such 'market devices' are therefore more than mere technical solutions to the problem of overfishing as they *enframe* the natural environment as a disposable 'standing reserve' ready for utilization, as Heidegger (1977, p. 16) put it. Within the context of daily economic coping, however, it becomes clear that the rationale of modern resource management tends to be at odds with the local contingencies fishers face when they put to sea. As a consequence, fishers must find socio-technical solutions that make the environment fit with the abstract world of supply and demand.

Within daily skillful coping with their environment, in which fishers oscillate between practical coping and reflexive problem-solving, however, the ever-changing environment of the sea spur new uncertainties and breakdowns, as the case of the 'wrong fish' has made clear (see Table 1): tinkering with accounts is based on the uncertainty of changing rules and regulations and volatile market prices; socio-technical conversion is highly dependent on resources and materiality, which determine feasibility and success; redefining boundaries comes with a high economic risk of having to compensate for the extra costs of the fishing operation. At the same time, these coping practices bear the risks of more serious long-term repercussions involving physical, social-economic and material breakdowns: tinkering with accounts is usually associated with high costs due to scarce resources and skyrocketing lease prices, which in the long-run can become a problem for the liquidity of a company with regard to mortgages and wages; socio-technical conversion entails the problem of creating a social vacuum, because baiters, as members of the community, cannot only be employed during the longlining seasons over the winter months and some vessels – in particular, bigger longliners with wide hulls – might not be suitable for conversion after all; finally, redefining boundaries incurs the risk and danger of technical breakdowns, in particular of the engine due to attrition and

Table 1. Coping with the wrong fish.

Coping practice	Reference in the world	Technique	Risk/Uncertainty	Potential breakdowns
Tinkering with accounts	Stock assessment (MRI), government regulations, scarcity of fishing rights	Matching of accounts with landings, regulations and markets	Fluctuating market prices- and changing regulations	High costs
Socio-technical conversion	Congregation of haddock in region	Cost-reduction by fishing method (selectivity, fuel cost)	Weather, sea state, fish activity	Conflict with baiters, Vessel might not be suitable
Redefining boundaries	Congregation of haddock in region	Selectivity, chance of exceptional haul	Weather sea state, fish activity; economic risk and danger	Attrition of engine

rapidly changing seas unsuitable for ‘small’ coastal fishing vessel.⁴ The response to these new uncertainties and breakdowns is to yet again ‘bracket’ the world by developing and investing in new technologies, creating new debt that intensifies pressure on economizing operations and risk-taking at sea. As a consequence, daily skillful coping with the ITQ-regime creates socio-technical feedback loops, in which both problems and solutions tend to be triggered by technology itself.

In this light, fishers can no longer be merely understood as more or less atomized actors that try to maximize their outcomes, as they appear to be more deeply entrenched within the rationale of an increasingly encompassing techno-scientific ‘harvest machinery’ (Johnsen 2004), which ignores the contingencies of local economies in the name of supply and demand. Hence, fishers have been transformed into economizing agents that maneuver the boundaries of ‘the market’ by ensuring that models of supply and demand keep up with the fish in the sea. This development has not only changed the practices of fishing at sea, but has induced a more substantial transformation of the material culture of the small boat fisheries from a rather low-tech seasonal occupation to a globally entangled and highly professionalized year-round harvesting operation that involves vast investment, debt and technological intensification (Dobeson 2016b). It is in this context that we have to understand the lobbying efforts by larger quota-owners to expand the legal classification of the small boat fleet from 15 to 30 tons⁵ or calls to abolish subsidies for hand-baited lines in favor of automated baiting machines.

Conclusion

This article has highlighted the mundane socio-technical practices that allow economic actors to stay afloat in a highly and fluid volatile market environment. The ethnographic description of daily economic coping in the Icelandic small boat fisheries has shown how fishers skillfully maneuver the boundaries of market-based resource management, in which the fish tend to ignore the dogma of supply and demand. Hence, instead of simply trying to maximize their outcomes under the condition of uncertainty, fishers perform and adjust the market to the sea by manipulating their socio-technical environment in order to stay afloat. For doing so, small boat fishers deploy three general coping practices that provide them with the needed flexibility required to swiftly adjust the market to the fluid spaces of the seas: tinkering with accounts, technological conversion and redefining boundaries. At the same time, however, the case study has made clear that these practices open up new risks and uncertainties that spur a money-induced cycle of new investments and breakdowns.

The empirical findings have some general implications for the sociological study of markets, in particular for scholars dedicated to the study of market fashioning and coordination, which despite important insights about the social, cultural, and institutional embeddedness of the economy still presupposes a surprisingly atomistic conception of economic action that reduces economic coping largely to isolated acts of intentional decision-making. In line with Dreyfus’ Heideggerian phenomenology of everydayness, this article has however shown that a comprehensive sociological understanding of coordination in markets cannot be reduced to the study of cognitive tools that allow for decision-making under conditions of uncertainty, as human cognition and technology are yet always entrenched in a broader relational web of a historically contingent and more-than-human environment. While these findings should encourage economic sociologists of different backgrounds to integrate geographical approaches to the study of markets, it should also motivate them to dig deeper into the nitty-gritty of economic coping in order to better understand how the boundaries of different types of markets are materialized and reproduced in an increasingly technicized and rapidly changing world.

All in all, more work needs to be done in order to fully grasp the highly dynamic relation between markets, modern technology, and the environment. A promising point of departure could be the increasing sociological interest in the study of excess (Abbott 2014) and overproduction (Prasad 2012). While these accounts remain largely historical, further in-depth ethnographic studies of markets and production in highly technicized and economized industries such as modern agriculture are

needed in order to fully grasp the historical ‘struggle’ (Thoen and Soens 2015) with the environment, which has spurred unforeseen economic growth as well as unsustainable intensification since the dawn of modern agriculture.

Notes

1. The Total Allowable Catch for haddock has seen a steep and steady decline from 93,765 tons in the fishing year 2007/2008 to a mere 27,404 tons in 2014/2015 (Fiskistofa 2015b).
2. The abundance of a species around a certain region does not necessarily contradict the results of scientific stock assessment, as fish are known to congregate in a few areas in times of declining stocks (interview with marine biologist, 2011).
3. There was a steep and steady rise of the quota lease price for haddock from roughly 50 ISK in the period 2004–2008 to well above 300 ISK in 2012–2015, increasing the rent price over 500 per cent (Fiskistofa 2015a). Simultaneously, auction prices for raw fish fluctuate a lot and prices can be well above the lease price. When the prices are low, however, they are often on a par with the lease price of around 300 ISK, leaving no surplus to the coastal fishers.
4. During fieldwork, I witnessed numerous cases of engine failure on vessels known to be under strong pressure to put to sea.
5. The maximum size of small boats has been changed from 15 to 30 tons in 2014.

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