

Norwegian salmon goes to market: The case of the Austevoll seafood cluster

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Abstract

This paper examines the impact of the globalisation of the farmed salmon commodity chain upon farmed salmon production in the western Norwegian municipality of Austevoll. On the basis of field research conducted in 2002 and 2003, we conclude that salmon farming in Austevoll has responded to the challenges of ‘buyer-driven’ food chains by virtue of its history as a seafood cluster. Despite the vertical relations assumed in the literature on ‘buyer-driven’ food chains, the horizontal relations in Austevoll have proven resilient in this era of ‘homogenised globalisation’. Nevertheless, recent changes in the global farmed salmon supply chain may result in the imposition of vertical relations in the Austevoll cluster. We conclude with suggestions for incorporating the literatures on global food chains and industrial clusters in the study of seafood production and global markets.

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1. Introduction

Global food chains provide a basis for assessing the impact of globalisation upon nation-states, industrial clusters and communities. The growing emphasis on giant retailers in global markets sets the context for assessing how small- and medium-sized enterprises in agro-food clusters interface with global markets while maintaining some measure of autonomy. In short, how linear is the direction of the global food industry? What role is played by industrial agro-food clusters in the face of this industry?

This paper examines the global and local linkages pertaining to the salmon farming industry in the western Norwegian municipality of Austevoll. The salmon farming enterprises that emerged from the pelagic fisheries in the 1970s are nested inside a cluster of seafood firms that capture many of the benefits of the salmon farming supply chain. Local-level relations persist in the midst of ostensible vertical subordination to global capital in ‘buyer-driven’ food chains. Nevertheless, recent developments such as the

move to greater levels of Norwegian investment in Chile, and import quotas for farmed salmon by the European Union (EU), may undermine Austevoll’s seafood cluster. Will the seafood cluster make a successful transition as it did in the 1970s when salmon farming provided an antidote to the beleaguered pelagic fishing industry?

This paper is divided into six sections: First, we discuss the literatures on global commodity chains and industrial clusters as a basis for exploring seafood clusters. Next, we discuss our methods and data sources. This is followed by a consideration of changes to the Norwegian salmon farming industry in the 1990s. Fourth, we investigate the place of salmon farming in the Austevoll seafood cluster and the inter-firm relations and labour recruitment patterns within the cluster. This is followed by a consideration of the impact of global food chains upon Austevoll firms. Fifth, we briefly compare the Norwegian pattern of dispersed industrialisation with the more geographically restricted pattern in Chile and discuss the implications of Norwegian investment in Chile for the future of Norwegian seafood clusters. The final section assesses our findings and points to ways in connecting the literatures on global food chains and local clusters.

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2. Global food chains and industrial clusters

We argue that the trajectories of globalisation are reciprocal and we need to account for the degree to which local-level processes are able to offset the full impact of global food chains (GFCs). Second, industrial cluster analysis shows the resilience of small and medium-sized enterprises (SMEs) in the face of globalisation. Finally, we show the relevance of GFCs and industrial cluster analysis for assessing the place of Austevoll in the global salmon farming food chain.

2.1. Global food chains and 'buyer-driven' processes

Gereffi's (1994, 1999) work on global commodity chains in the apparels industry has influenced agro-food research in developing countries (Barrientos, 2001; Dolan, 2004; Gibbon, 2001; Kaplinsky and Morris, 2002; Kaplinsky and Readman, 2001). Food (like apparels) is structured by 'buyer-driven' chains; downstream actors such as processors, but especially retailers, influence processes at the point of production such as cost, quantity and product quality (Busch and Bain, 2004; Gibbon, 2001). These downstream actors are 'lead drivers' in setting governance standards in food chains (see Humphrey and Schmitz, 2001).

As the agro-food system shifted from 'producer-driven' to 'buyer-driven' processes, quality provisions became more important (Gibbon, 2001). In the 1990s, in the midst of 'food scares', quality provisions for the food supply became mandated. Processors had to abide by inspection criteria such as Hazard Analysis at Critical Control Points (HACCP) (see Juskas et al., 2000; Phyne and Mansilla, 2003) and traceability provisions. This guaranteed quality from the point of production to the final sale (Busch and Bain, 2004; Banks and Marsden, 1997).

Original equipment manufacturing in apparels production to full product lines are used to meet standards required by retailers and design companies in first world markets (see Bair and Gereffi, 2001; Gereffi, 1999; The Economist, 2004). In food production, upgrading involves attention to the quality provisions for fresh products, or the development of processing facilities that produce goods desirable by retailers in western markets (see Kaplinsky and Morris, 2002). Producers are marginalised in an agro-food system that benefits oligopolistic retailers (see Friedland et al., 1991; Winson, 1993).

In contrast to the linear direction of GFC analysis, 'alternative food networks' demonstrate that, in certain cases, producer–consumer linkages can be restructured in the midst of large-scale retail networks. Marsden et al. (2000) show how Welsh producers and consumers forged a short food supply chain (SFSC) around local foods. This minimised the influence of intermediaries and retailers (also see Ilbery et al., 2004; Sage, 2003; Winter, 2003). Raynolds (2002) and Renard (1999) argue that 'fair trade coffee' links consumers and producers across geographical distance and

personalises relations around food. Spatial proximity is not necessary in order to forge alternatives to GFCs.

The limitations of GFC analysis also emerges in the research on New Zealand (Coombes and Campbell, 1998; Hayward et al., 2002; Larner and Le Heron, 2004; Le Heron, 2003; McKenna and Murray, 2002; McKenna et al., 2001). Given its early embrace of neo-liberalism, New Zealand seems to be a good candidate for marginalised farm production in a globalised political economy. Yet, such marginalisation is contingent upon the nature of the commodity in question, the social organisation of producers of a given commodity, and the responses of producers to neo-liberal directions at the national and global levels. Hayward et al. (2002) provide evidence that product upgrading is not a necessary sequence followed by participation in global markets. Le Heron (2003) notes that neo-liberalism is contested by some producers who place checks on the further neo-liberalisation of the New Zealand state. As we will note later in this paper, the governance of the farmed salmon food chain is not some pre-determined end-point determined by retailers and feed companies (cf. Larner and Le Heron, 2002, 2004).

2.2. Bringing back the local: industrial clusters and the problem of embeddedness

Whereas global commodity chain research emphasizes vertical relations across geographical space, industrial cluster research deals with horizontal relations inside a geographically circumscribed area. A cluster is "...a system of interrelated actors, interacting and developing within a specific socioinstitutional environment" (Power, 2002, p. 104). Clusters involve geographical agglomeration, a density of internal transactions, well-developed labour forces, social networks and a group consciousness (Power and Jansson, 2004). The latter is also referred to as 'spatial loyalty' (Pallares-Barbera et al., 2004). Social networks have 'untraded interdependencies' or conventions, informal rules and habits that coordinate economic action (Storper, 1997). Similar to Durkheim (1933), economic geographers imply that some elements of the contract are 'non-contractual'. A socio-spatial context informs economic action (Olsen, 2002).

Cluster analysis points to the survival of SMEs in a globalised world. 'Untraded interdependencies' encourage innovation, product upgrading and market success. The role of clusters is apparent in Sweden's cultural industries (Power and Jansson, 2004; Power, 2002), the economic diversification of Bergueda, Spain (Pallares-Barbera et al., 2004) and in the resilience of the networks of firms in the 'Third Italy' (see the review by Storper (1997)). SMEs draw upon each other in a milieu of competition and cooperation. Economic exchange cannot be reduced to input–output relations. For example, 'formal arrangements' such as subcontracting include informal norms. These include reciprocity, trust and loyalty (Granovetter, 1985).

Despite the largely urban agglomeration of SMEs in the Swedish cultural industries, some clusters thrive in a rural context. The furniture-making industry in Älmhult includes SMEs based around the 'lead firm' IKEA. There are a large number of SMEs (without a lead firm) engaged in rural clusters based upon tourism (Power, 2002). Pallares-Barbera et al.'s (2004) work on Bergueda, Spain demonstrates that a rural cluster can diversify from a dependence on 'traditional' (in this case textile and mining) industries towards a more diversified economic base (metal goods and food). This diversification was facilitated by the inter-firm cooperation around 'spatial loyalty'.

The work on clusters dovetails with research on embeddedness and social capital in arguing for the resilience of the local in a globalised world. Yet, as Taylor and Leonard (2002) note, embedded firms still have to deal with the market. "[T]he creation of institutions in a place can be seen as much as protecting the status quo of doing business in a place (and so promoting lock-in) as it is a mechanism for generating dynamic development" (2002:6). Boschma et al. (2002) and Fløysand and Jakobsen (2002) argue that 'lock-in' is one consequence of too much embeddedness. The lack of market exposure can be detrimental, as is the case for Båtsfjord in Northern Norway. Here, dependence on government support is linked to the absence of innovation by local firms in restructuring the declining fish processing industry (Fløysand and Jakobsen, 2002).

Taylor and Leonard (2002) state that unequal power relations are ignored in much of the work on embeddedness. Phelps and Waley (2004) and Bair and Gereffi (2001) argue that multinational firms exercise quite a bit of leverage in determining social relations inside a cluster. The integration of the blue jeans industry of Torreon, Mexico inside a global commodity chain demonstrates how 'buyer-driven' processes can structure vertical inter-firm ties, and vertical relations between capital and labour inside the cluster. Torreon's networks are 'hierarchical and vertical' as opposed to 'cooperative and horizontal' (Bair and Gereffi, 2001). We are back to where we started—the power of global commodity chains. Given this, how do we relate GFC and industrial cluster analyses to the study of local and global linkages in salmon farming industry?

2.3. GFCs, industrial clusters and the Norwegian salmon farming industry

GFC and industrial cluster analyses have relevance to our study of the salmon farming industry in Austevoll, Norway. First, although Norway is the world's largest producer of farmed Atlantic salmon, its power is relative depending on whether we are dealing with smaller producers such as Ireland, or concentrated retailers in the EU market. Given that the Norwegians produce a relatively homogenous product for few markets (the EU dominates), the industry appears vulnerable to retailers. However, despite the economic concentration of food

retailing in the 1990s, the dispersed nature of farmed salmon production persisted in Norway during the same time frame. A GFC did not undermine state-based policies that nurtured decentralised production. These policies coupled with the importance of 'place' in Austevoll meant that a diversified seafood cluster thrived in the 1990s in the midst of economic concentration. While vibrant industrial clusters can offset the impact of GFCs in the short-term, recent GFC developments around salmon farming suggest that the Austevoll seafood cluster may need further diversification to survive in the long-term. An elaboration of these arguments is set out below.

3. Methods and data sources

The main data come from 20 exploratory and semi-structured interviews conducted in Norway (Bergen and Austevoll) in March 2002, August 2002 and March 2003 and 2 conducted in Denmark in October 2002. The Bergen interviews ($n = 7$) included three officials at the Directorate of Fisheries, an interview with two officials at the Norwegian Federation of Fish and Aquaculture Industries, Nutreco (a feed and farming company), Biomar (a feed company) and a biotechnology institute. Given the importance of Denmark for the Norwegian industry, we held interviews with a Danish smoke house and the Danish Ministry of Food, Agriculture and Fisheries.

Most interviews ($n = 13$) were with industry and government officials based in Austevoll. We held semi-structured interviews with individuals associated with the largest salmon farming network (4), the second largest network (1) and the smallest network of firms (2). The owner of the smallest salmon farm (outside of any network) was the only operator who refused an interview. We explored the origins of each firm (or unit inside a firm), the role of 'buyer-driven' food chains, economic concentration, the labour market and the impact of government regulations. We investigated the degree to which firms have social as well as economic linkages to Austevoll.

Interviews with a senior official at the Austevoll municipality and a fisheries officer employed by the Directorate of Fisheries provided in depth information on aquaculture and entrepreneurship in Austevoll. The owner of a small pelagic fleet provided information on the pelagic fishery in Austevoll and its relation to salmon farming. Finally, interviews with officials associated with a company that reprocesses waste from salmon farms, and a firm that sells cages and nets for use in the salmon farming industry, shed light on inter-firm relations inside the Austevoll seafood cluster.

The interview data, combined with government and industry documents, provide insights into the nature of Austevoll as a successful seafood cluster. Prior to analysing the Austevoll cluster, we assess recent changes in Norway's fishing, fish processing and aquaculture industries.

4. Changes in the Norwegian salmon aquaculture industry, 1990–2004

In the post-war period, income supports and the rights of fish harvester's mandated sales organisations for first-hand sales in fish encouraged dispersed settlement along the Norwegian coast. By the 1980s, over fishing, the increased globalisation of seafood industries and Norway's pursuit of free trade deals (such as the European Economic Area) placed pressure on this system. The result was major changes in the fishing, fish processing and aquaculture industries.¹

Similar to fish harvesting, aquaculture is influenced by regional development policies. Prior to 1993, salmon farming companies were limited to one license per firm. Licenses were dispersed along the coast. In the early 1980s, the rapid growth of licences was stalled. In the late 1980s and early 1990s, the association mandated to export farmed salmon—the Fish Sales Organisation (FOS)—faced declining prices in the European market. A freezing program was introduced that paid producers for salmon that was placed in cold storage until market prices improved. The result was the eventual collapse and bankruptcy of the FOS and many salmon farms (Holm and Jentoft, 1996).

In the wake of these events, the government restructured the fish farming industry. The dispersion of licenses along the coast was maintained, but some consolidation was permitted. A Directorate of Fisheries' official noted that firms are allowed up to 50 per cent of the licences in a county, but not more than 15 per cent of the national total. Table 1 shows the distribution of licenses and production in the Norwegian salmon and trout farming industry. The 2000 production of 481,140 tonnes meant Norway continued as the world's largest producer of salmonids. Production is dispersed along the coastline. Chile, the world's second largest salmonid producer, has over 90 per cent of its production in one region (see Phyne and Mansilla, 2003).

After the FOS collapse, mergers and consolidations were permitted but only through transfers which maintained the location of existing concessions. In 2000, 6 of the 194 firms controlled over 30 per cent of all the concessions ($n = 854$) in Norway. Despite this, over 80 per cent of firms held 4 or fewer licences (Directorate of Fisheries, 2001). In Chile, the vast majority of the firms have multiple licences (Phyne and Mansilla, 2003).

Fjord Seafood, Pan Fish and Marine Harvest (owned by the feed giant Nutreco), are among the six firms that held 20 or more licenses in 2000.² These firms embarked on

Table 1
Salmon and trout concessions and harvested weight, 2000 (Percentages in brackets)

County	Grow-out concessions	Harvested production (tonnes round weight)
Finnmark	72 (8.4)	20,760 (4.3)
Troms	72 (8.4)	37,890 (7.9)
Nordland	129 (15.1)	84,570 (17.6)
North-Trøndelag	56 (6.6)	32,890 (6.8)
South-Trøndelag	77 (9.0)	53,530 (11.1)
Møre og Romsdal	95 (11.1)	64,430 (13.4)
Sogn and Fjordane	73 (8.5)	54,010 (11.2)
Hordaland	139 (16.3)	94,170 (19.6)
Rogaland	54 (6.3)	31,420 (6.5)
Others	87 (10.2)	7,470 (1.5)
Totals	854 (100.0)	481,140 (100.0)

Source: Directorate of Fisheries (2001). Based on data contained in tables entitled: "Licences on 31.12.00" and "Farmed Fish Harvested in 2000."

'deepening the value chain' in the late 1990s and early part of this century. Nutreco integrated forwards into farmed production on a global basis and Fjord Seafood integrated forwards into retailing with its investments in the retail giant Pieters of Belgium (Fjord Seafood, 2002). Pan Fish moved to integrate the pelagic and farmed salmon seafood chains through its acquisitions of pelagic vessels and processing plants. This is part of a venture in an 'innovative' feed plan which aims to remove Pan Fish's dependency on feed giants.³

Overinvestment and low prices contributed to a profits crisis. Pan Fish was taken over by its creditors in late 2002 after a period of severe losses (Berge, 2003a). Fjord Seafood also incurred heavy losses (Fjord Seafood, 2003). Rising feed costs and declining prices for farmed salmon resulted in significant losses for most Norwegian firms (Directorate of Fisheries, 2003b). In 2002, profits before taxation were negative for all firms. Firms with 15 or more licenses (−6.7 per cent), 5–9 licences (−13.8 per cent), 2–4 licences (−7.8 per cent) and 1 licence (−10.4 per cent) had the most significant losses. In contrast, firms with 10–14 licences only reported losses of −0.1 per cent. These medium-sized companies were the only ones to report a positive rate of return based on total assets (2.6 per cent) (Directorate of Fisheries, 2003b).

Sjøtroll and Austevoll Havfiske, two of the firms discussed below had more than 15 licenses in 2000 and are by definition among the largest companies, but these were profitable enterprises (Berge, 2003b). These firms are

(footnote continued)

Chile's largest domestic firms (Mares Australes) and merged it with Marine Harvest facilities in Chile. Nutreco acquired Norsk Hydros's salmon farms in Norway and placed these under the Marine Harvest name (Phyne and Mansilla, 2003). Nutreco acquired Stolt Sea Farms in the fall of 2004 giving it a greater percentage of Norwegian and global production (Intrafish, 2004).

³This plant will be covered in conjunction with our discussion on Austevoll Havfiske and its relation to Pan Fish.

¹For details on the restructuring of Norway's fish harvesting sector, see Apostle et al. (1998), Hersoug, Holm, and Rånes (2000) and Directorate of Fisheries (2002, 2003a). The restructuring of the processing sector is covered in Fløysand and Jakobsen (2001, 2002) and Fløysand and Lindkvist (2001).

²In the late 1990s, Nutreco moved into production and acquired Marine Harvest facilities in Scotland, Ireland and Chile. It also acquired one of

between the medium-sized enterprises mentioned in the survey of profitability, and the very largest Norwegian firms. The large companies and the Austevoll firms are moving to integrate most of the aspects of the farmed salmon supply chain inside their networks. Larger companies have done this through capital demanding takeovers (see Berge, 2002), while the Austevoll firms built formal and informal networks.

Most Norwegian salmon farming companies depend on the EU market. Free trade in the European Economic Area (EEA) did not change export duties that favour semi-processed salmon (Fløysand and Jakobsen, 2002). Since 1997 Norwegian exports to the EU have been subject to a minimum import price (MIP). The MIP is viewed by some producers as a ‘disguised tariff’ favouring Scottish and Irish producers. In 2002, 209,201 tonnes or nearly 50 per cent of all Norway’s salmonid exports consisted of fresh salmon to the EU. Denmark, the largest buyer, purchased 59,985 tonnes of fresh salmon in 2002 (Directorate of Fisheries, 2003c). Fresh Norwegian salmon is processed as smoked salmon and other products in Denmark prior to being sold to retail giants in the EU.

The 1990s witnessed major restructuring in the Norwegian seafood sector. Dispersed coastal development faced a number of challenges. The seafood sector emerged with fewer fish harvesters and larger vessels, fish processors and exporters developed closer linkages, more diversified fish plants secured raw materials from local and non-local sources, and a consolidated salmon farming industry developed. This restructuring also affected the Austevoll seafood cluster.

5. Salmon farming and the Austevoll seafood cluster

5.1. Background and setting

Austevoll (see Fig. 1) is a series of islands 1 h south of Bergen, the second largest city in Norway. The population is approximately 4500 (Austevoll Kommune, 2002). Prior to the development of salmon farming in the early 1970s, pelagic fishing was the major coastal activity in the municipality.

After 1860, coastal communities such as Austevoll emerged as more significant actors with the abolition of Bergen’s trade privileges. Austevoll’s development was shaped by participation in local, regional, national and international markets pertaining to the pelagic fisheries. The profitability of the herring fishery increased after World War II. This was structured by government financing of the fishing fleet and the development of infrastructure that linked the two largest islands (Hansen, 1991).

The pelagic fisheries were characterised by strong competition in the 1950s (Jakobsen, 1999). With the development of the hydraulic winch in 1963 and power blocks for the purse seine fleet in 1968, Hordaland County consolidated its hold on the herring fishery. By this time, major stocks had shifted to Icelandic waters. From

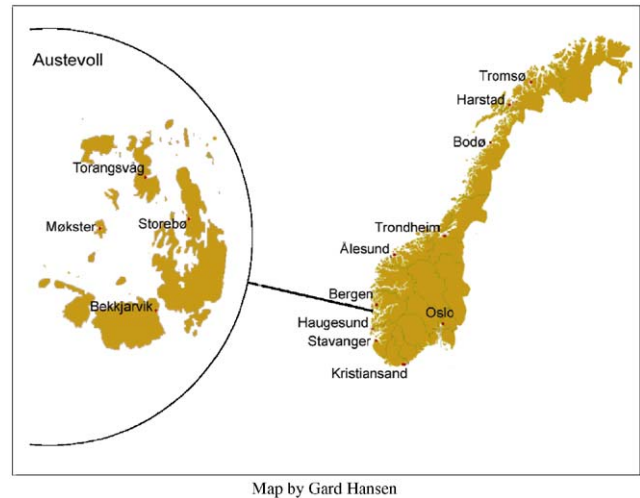


Fig. 1. Map of Norway showing the municipality of Austevoll.

1978–1985, the number of purse seiners in Norway declined from 271 to 149, and in Austevoll from 31 to 18. This downturn was met by the rapid growth of the salmon farming industry in the 1970s and 1980s—a growth that benefited Austevoll. In the 1980s, fish farming became an impetus to fish processing, marine equipment manufacturers and marine service firms (Hansen, 1991).

Today, salmon farming is a major investment outlet in addition to the traditional pelagic fisheries. The largest fish plant in the municipality processed higher quantities of pelagic catches than farmed salmon in the late 1990s, but the latter production was more valuable (Directorate of Fisheries, 1998). Austevoll had 24 salmon farms in the early 1980s or 5 per cent of the national total (Hansen, 1991). This was its share of dispersed development along the Norwegian coastline (Aarset, 1997). The state played a major role nurturing the transition in the Austevoll seafood cluster.

While the number of farms fell from 21 to 10 from 1990–1996, Austevoll fish farmers possessed ‘strong market knowledge’ and operated in a ‘sellers market’ in the late 1990s (Jakobsen, 1999). At the time of our research, the number of salmon farms had dwindled from 10 to 8. There 8 companies are part of 4 remaining firms (see Table 2). One firm (Austevoll Havfiske) controls three firms, another (The Torangsvåg Group) includes three companies as part of a group marketing effort, and one medium-sized (Sjøtroll) and one small-scale firm (Troland) stand alone. The owner of one firm noted that Austevoll salmon farmers control about 45–50,000 tonnes of farmed salmon and trout in Hordaland County. This represented over 50 per cent of the total production in the County (calculated from Directorate of Fisheries, 2001).

5.2. The salmon farming enterprises and the supply chain

As Fig. 2 shows, salmon farming consists of a supply chain that includes input providers such as cage and feed

Table 2
Seafood networks and Salmon grow-out concessions, Austevoll, Norway, 2002

Seafood networks and/or firms	Salmon farms in Austevoll	Salmon farm concessions	Total area
Austevoll Havfiske	Kvernsmolte	9	102,000 ³
	Kobbervik	2	24,000 ³
	Veststar	1	12,000 ³
		12	138,000 ³
Sjøtroll	Sjøtroll	3	48,000 ³
	Torangsvag Group		
	Melaks	1	12,000 ³
	Langøy laks	2	24,000 ³
	Austevoll Fiskefarm	1	12,000 ³
		4	48,000 ³
Troland	Troland	1	12,000 ³
Totals		20	246,000 ³

Sources: Interviews and data provided by staff at the Directorate of Fisheries.

manufacturers that are local and/or national in scope. There are actors outside of the cluster such as national feed suppliers and EU retailers. Here we focus upon relations inside the cluster directly linked to the production of farmed salmon. The role of input providers (such as feed companies and cage manufacturers) and the receivers of output (such as retail firms) will be dealt with later.

Farmed salmon begin as fingerlings in hatcheries. After the smolt-rearing stage, salmon are raised for 18–24 months in grow-out cages. During this time, operating costs are largely consumed by feed and labour. Harvested salmon are shipped by well boats to holding tanks near processing facilities. The salmon are starved to remove remaining medicinal residues (Directorate of Fisheries, 1999a). Once salmon are slaughtered, the typical pattern is for semi-processing to take place. Semi-processed salmon go to retailers (in the case of fresh fillets) or processors in the EU who make a more finished product such as smoked salmon. One Danish smoker noted that Norwegian farmed salmon is suitable for smoking, given its high fat content, a reflection of the growing percentage of oil in salmon feed. In many cases, Norwegian firms act as export agents for fresh and semi-processed salmon.

Austevoll's salmon farming enterprises have different sets of relationships to the simplified supply chain discussed above. Austevoll Havfiske controls most aspects of the farmed salmon supply chain. It is part of a family firm that also provides offshore services to the oil and gas industry and shipbuilding and repairs. The seafood network includes pelagic fishing vessels, salmon farms, a processing company and a sales company that markets to the EU and elsewhere.

Austevoll Havfiske has 12 concessions. Through its ownership of Kvernsmolte, minority ownership of Kobbervik and new acquisition of Vest Star, it has access to an overall total of 20 concessions containing an estimated 15,000 tonnes of salmon. In addition to its Austevoll concessions, Kobbervik has two other concessions in Hordland County and Vest Star has 6 other concessions

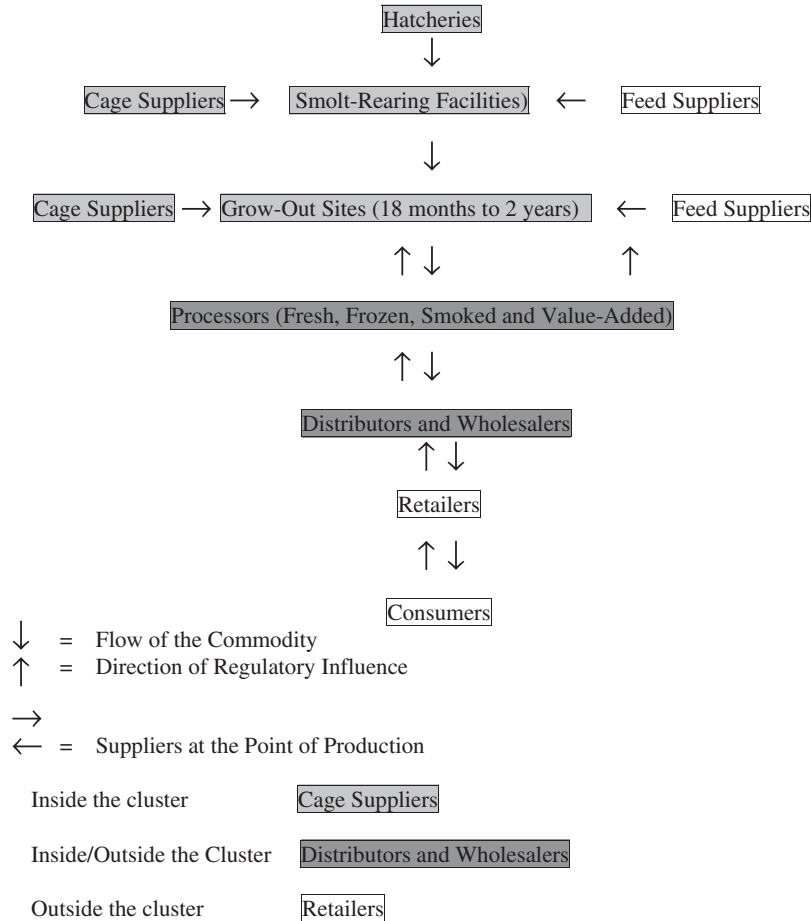
in the county. Vest Star established an operation in Scotland in 1996 in order to get better access to the EU. This operation has an annual production of 2500 tonnes. Kvernsmolte produces 70 per cent of its own smolts and Vest Star has its own smolt-rearing facility.

A Kvernsmolte manager discussed the consolidation taking place in Austevoll:

...[T]he reason behind the merging in the local industry basically is that it has been a shift of generations. In the early days of salmon farming every company had one licence and was owned by one person, but this generation is now gone. This generation-shift and the high prices that have been paid for the licences could therefore explain the merging. Another factor is that the big companies have integrated several different functions in their field of activity such as smolt-production, packing and processing. To utilize these investments a company needs a secure supply of raw material.

This official is alluding to the integration of the supply chain. A Vest Star official added that his firm entered the Austevoll Havfiske fold for economic security. "The main reason for this is the insecurity in both the market and the production conditions. It is difficult to stand alone, but when standing with others it's easier to cope with the ups and downs... The Austevoll Havfiske Group provides good services."

One of these services is Austevoll Fiskeindustri—the largest fish processing plant in Austevoll. All 20 farms in the Austevoll Havfiske network provide the plant with farmed salmon. Austevoll Fiskeindustri was started by local fish harvesters and business people in 1972 for processing herring stocks. In 1998, 80 per cent of the plant's production (35,000 tonnes) consisted of herring and mackerel products with the remainder being farmed salmon. Farmed salmon is the most lucrative product; in 1998 gutted and packed salmon received nearly 25 NOK (Norwegian Kroner) per kilogram in export markets



Source: Based upon 'Figure One' in Phyne and Mansilla (2003)

Fig. 2. A simplified model of the salmon aquaculture supply chain.

(Directorate of Fisheries, 1998).⁴ A manager stated that "...in 1994 the factory was upgraded with automated production lines...the plant processes fillets and packs mackerel and herring. Salmon is gutted and packed (round). Eighty per cent of the salmon is packed and sold ice-fresh, 20 per cent is packed and sold frozen." Most of this fish is sold to EU processors (largely in Denmark).

Sea Star International (acquired in 1997) is the marketing arm for the network. In addition to exports of farmed salmon to the EU, it sells pelagic fish to Eastern Europe and Japan. In 2001 the company sold approximately 60,000 tonnes of pelagic fish and 12,000 tonnes of salmon. Nearly 40 per cent of the firm's total sales "... are based on raw materials produced by companies in the Austevoll Havfiske group" (Austevoll Havfiske ASA, 2001).

Austevoll Havfiske's activities in the 1990s internalised many of the functions of the farmed salmon supply chain. The only major exceptions are feed production, the further

value-added part of the processing segment of the chain (such as smoked salmon) and the retail outlets where farmed salmon is sold. Later we will briefly discuss how Austevoll Havfiske attempted to internalise its feed costs by allying itself with Pan Fish in the early part of this century.

Sjøtroll, a different branch of the same family that has controlling interest in Austevoll Havfiske, began in 1980 with the purchase of a hatchery at Fitjar (also in Hordaland County). The company has 25 concessions (3 in Austevoll) growing Atlantic salmon (10,000 tonnes) and rainbow trout (10,000 tonnes) making it the largest producer based in Austevoll (see Table 2).

Sjøtroll also has 5 hatcheries and a smolt-rearing facility. It is one of the largest sellers of smolts in Norway. The firm has two processing facilities—one of these is at Bømlo—to the south of Austevoll. The firm purchases additional capacity because its own plants needs more than the production volume from its grow-out sites. Farmed production is largely marketed by Lerøy and Coast Seafood. Sjøtroll also deals with 4–5 other exporters. Much of the farmed salmon production is exported to

⁴In 1998 the export value for frozen herring was 3.6 NOK/kg (NSEC); in 1998 approximately 30 per cent of Austevoll Fiskeindustri's production consisted of frozen herring (Directorate of Fisheries, 1998).

France (by Lerøy) and the trout is exported to Japan (by Coast Seafood).

This firm was concerned with the EU's MIP for farmed salmon. Prices declined in 2002 and the Sjøtroll official argued that his firm was sceptical about the accuracy of the EU's MIP. They try to gauge the 'true MIP' through their investment in a salmon farming company on the Shetland Islands.

Sjøtroll controls many of the service needs for farmed salmon. It owns a company that makes feeding equipment systems for hatcheries and grow-out sites, and a firm that makes and handles nets necessary for the smolt-rearing and grow-out stages. Finally, Sjøtroll owns 50 per cent of a well boat company that transports harvested salmon from grow-out sites to shore-based processing facilities. This service is made available to other Norwegian (such as Austevoll Havfiske) and Shetland producers.

The company has internalised many of the functions of the supply chain and the servicing network for this chain; it exhibits a diversity ranging from pelagic fishing vessels to well boats to the provision of vessels to the Norwegian oil and gas industry. These provide leverage during downturns in markets for farmed salmon. Feed is the only significant aspect of the input side of the supply chain not controlled by Sjøtroll. We will deal with the firm's relationship to feed suppliers later in this paper.

The Torangsvåg group (our label) emerged in 2002. It consists of three salmon farms that collectively buy inputs (such as feed) and market their output to a seafood processing company. A Torangsvåg salmon farmer noted that the merger was due to the need to compete in the global salmon farming industry. He also pointed to the growing power of the Austevoll Havfiske and Sjøtroll networks.

All of the firms in the Torangsvåg network emerged from the pelagic fishery in 1970s. One farm in the group (production of 1200 tonnes) was concerned with "... Pan Fish floating shares at the Norwegian stock exchange and their share value is falling, if they collapse, everyone else will suffer. In my view it is not the small operations that is a problem, but the big ones. They make the market price go down."

Despite their 'individualistic' orientation, Austevoll salmon farmers have a tradition of cooperating in order to secure their feed supplies (Jakobsen, 1999). One owner in the Torangsvåg group indicated that this collective buying of feed was coming to an end: "One group of companies in Austevoll have bought feed in common for 15 years now. In the beginning, there were 30 [salmon farm companies] in sum. Now there are eight buying from Ewos. This contract lasts until April of next year (2003). There were 10 companies in the last agreement but now Sjøtroll and Kvernsmolt go for themselves."

One point of leverage that other small farms in the Austevoll had (until late 2002) was the presence of Norsk Akvakultur. In 1998, over 4000 tonnes of farmed salmon was packed at Norsk Akvakultur whereas nearly

5800 tonnes was packed by their competitors at Austevoll Fiskeindustri (Directorate of Fisheries, 1998). Norsk Akvakultur marketed products throughout Europe. In 2002, it marketed salmon on behalf of the Torangsvåg group. However, in contrast to Austevoll Fiskeindustri which also processes mackerel and herring, Norsk Akvakultur processes only farmed salmon. When we contacted the firm in March 2003, the manager noted that Norsk Akvakultur closed the previous summer. The problem was a shortage in raw material necessary to make the plant profitable. Given the downward pressure on farmed salmon prices in 2002, increased amounts of farmed salmon were needed to make the plant profitable. The failure of Norsk Akvakultur further limits the degree to which the Torangsvåg group is able to internalise some of the processing functions of the commodity chain. This group now needs to rely upon another firm for processing its farmed salmon.

The Torangsvåg group emerged in 2002 in response to prevailing conditions in the industry. It is squeezed at various points in the supply chain. It is subject to rising feed costs at the front of the chain, greater economic concentration amongst Austevoll firms in the middle of the chain and to the demands of retail giants at the back of the chain (cf. Phyne and Mansilla, 2003). The impact of retailers will be discussed later; next we shift our focus to inter-firm relations inside the Austevoll cluster.

5.3. Relations inside the cluster

Salmon farming enterprises are drawn to other seafood firms in Austevoll. SMEs survive in an era of vertically integrated multinationals by virtue of inter-firm linkages within given spatial confines. Within these confines are formal and informal exchanges and 'spatial loyalty' (cf. Pallares-Barbera et al., 2004). There are approximately 11 marine service companies within the Austevoll industrial cluster.⁵ Here we focus upon a cage supplier, well boat operations and a fish waste processing firm.

Rabben Fiskeredskap was founded in 1983. It sells cages and nets and provides net maintenance (washing and disinfection) and repairs. The firm concentrates its activities in Western Norway with some exports to the United Kingdom. The activity in Austevoll is almost 20 per cent of Rabben Fiskeredskap's turnover. All of the salmon farms in Austevoll purchase their nets and services from Rabben Fiskeredskap. An official with the firm stated that "...[l]ocal patriotism is a factor, but not as significant as the practical advantages of closeness. Rabben Fiskeredskap cooperates with the fish farmers in finding new solutions. We talk to customers to find out about their ideas and needs. This kind of local market orientation is important in Rabben Fiskeredskap's ability to compete in markets outside of Austevoll."

⁵There are also marine repair firms that service the aquaculture and fishing industries.

Well boats used to transport harvested salmon from grow-out sites to shore-based processing facilities have increased in importance since 1989. That year a regulation made it illegal to slaughter farmed salmon at sea. An Austevoll Havfiske official indicated that "...[t]hey use Sjøtroll well boats despite the fact that Sjøtroll is in the other constellation of companies... they always prefer to cooperate with local actors. It is not important if that would be a company under the Austevoll Havfiske umbrella or not." In addition, one of the firms in the Torangsvåg group has a well boat. The owner stated that in 1993—in the aftermath of the FOS collapse—the well boat was the only part of the firm that earned income.

Waste products from farms are taken by another local company—Hordafor—and reprocessed for export products such as feed supplements for the Danish pig farming sector and oils for leather jackets. Hordafor deals with all of the salmon farms in Austevoll and has operations along the Norwegian coast. A manager with Hordafor stated that the firm was founded in 1983 by "... a skipper on a fishing boat in Austevoll [who] got the idea about this firm from noticing how much fish offal was dumped at sea. To begin with Hordafor started collecting fish offal from the pelagic fleet, but today they only take waste from the fish farming sector." The firm also deals with the removal of diseased and dead fish. "Hordafor can use the boats to pump up and destroy the fish before the disease spreads. This fish waste is not used as fodder."

Some explicitly referred to cooperation with local actors. According to a Sjøtroll official, "...[w]e are friends and discuss business on the street ... For big projects, if we can't do them alone, we cooperate and borrow equipment from each other. In some cases we get permission from other fellows to use their area which we don't have access to." An official with Vest Star stated "...[o]f course everybody wants to do better than their neighbours, but the atmosphere is good, everybody is talking to everybody and buying supplies and services from each other." The owner of a small pelagic fleet noted that "...[t]he local politicians, and many of our colleagues, are the businessmen—we cooperate, we are a group of small islands, no connection of tunnels or bridges, we have to cooperate, we are forced to be friends."

Some viewed the history of seafarming in Austevoll, and the knowledge stock associated with this, indispensable to the municipality's success. A fishery officer nearing retirement discussed how males, young and old alike, became knowledgeable about the 'ways of the fishery':

Males from this place get education, and go to the fisher boats. They earn good money, but the important thing is that [they] played fishermen and fisherboats [as children]. They knew everything—all the details—about the boats—they were raised with this. At Austevollhella for instance there is a coffee place in which all people meet, the shipowners, the fishermen, the kids. Here they all—including the kids—get information and impressions.

This social institution promotes development. The difference this community makes is primarily caused by the social institutions that create the entrepreneurial spirits. It is the local environment that makes the difference. The kids get the spirit with their mother's milk.

For him, this knowledge transmission point persisted even after Austevoll made a transition from a pelagic-based community to one that also involved salmon farming, fish processing and marine servicing industries. A municipal official (from elsewhere in Norway) discussed the entrepreneurial culture in the municipality. "The industrial culture in Austevoll is a winner's culture. The Austevoll people don't take no for an answer, as they believe in their ideas. Some succeed and some fail, but try again. With many companies within the same business, there is of course intense competition, but the business culture is at the same time characterized by cooperation." The 'coffee shop' as a point of knowledge transfer and the norms of cooperation are 'untraded interdependencies' that underscore innovation (Olsen, 2002; Storper, 1997).

Despite recent consolidations, throughout the 1980s and 1990s, the salmon farming industry of Austevoll is part of what Power and Jansson (2004) and Power (2002) define as a cluster; it is a network of inter-firm relations inside a milieu of norms, conventions and practices (Storper, 1997). Furthermore, in line with Pallares-Barbera et al. (2004) example of Bergueda, Spain, Austevoll underwent a successful transition in the 1980s from a pelagic to a more diversified seafood cluster.

These informal ties arguably connect to patterns of innovation (cf. Boschma et al., 2002). All of the salmon farming enterprises, and some suppliers, emerged from the pelagic fisheries in the 1970s; what is noteworthy is the degree of differentiation that has taken place. Economic concentration has occurred at the point of production, but the firms that service this sector remain significant local actors, some of whom have reached national and international markets. Economic actors such as Rabben Fiskeriedskap 'try things out locally' prior to testing non-local markets; experimenting with other actors inside a cluster is a 'trial and error' method that may underscore innovation.

5.4. *The labour market: sourcing local and migrant workers*

Although the interplay between competition and cooperation underscores interconnections among SMEs in Austevoll, one cannot assume that this is the case for labour. Taylor and Leonard (2002) argue that the embeddedness model ignores social inequalities. The Austevoll labour market is an example of the limitations of the embeddedness argument.

The Austevoll seafood labour market consists of employment in harvesting, fish hatcheries and grow-out sites and in processing plants, as well as knowledge workers in the Aquaculture Research Station. There is a declining

preference by locals for seafood work as we move from harvesting to processing; employment in fish hatcheries and grow-out sites occupies an intermediate zone. The scarcity of local labour necessitates recruitment of migrant labour for the seasonal pelagic processing sector. This scarcity is accentuated by the on-going problem of rural out-migration (Hansen, 1991, 2004).⁶

Despite the presence of women in fish harvesting, males still predominate.⁷ One respondent pointed to the local fishing culture as a mechanism for recruiting young males into fishing. It is still an attractive occupation characterised by the highest wages for seafood workers.⁸ The owner of a pelagic fleet noted that such wages are enhanced by a Nordic labour market agreement that makes it difficult for employers to substitute more expensive local labour with cheaper foreign labour.⁹

Once young males 'settle down', there is a preference for work on salmon farms; salmon farms require year-round workers who sometimes live by 'relatively isolated' grow-out sites. The remuneration is lower than harvesting work, but it is higher than what is available in the processing sector. A stable supply of year-round labour is needed for managing grow-out sites and local labour is preferable to migrant workers. The latter are more likely to be found in the processing sector.

Research shows the emergence of migrant labour in the Nordic seafood processing sector (Apostle et al., 1998; Hovgaard, 2001; Phyne et al., 2005). In Austevoll, migrant labour is present in seasonal low-end pelagic processing lines in the late summer and early fall of each year. The more continuous production lines for semi-processed

farmed salmon are characterised by local labour recruitment. But, even here, the wages are lower than is the case for harvesting work and duties associated with fish hatcheries and salmon farms.

What do these labour recruitment patterns mean for research on industrial clusters? One cannot assume that firms embedded with other firms have the same relationship with local labour (cf. Taylor and Leonard, 2002). The seafood labour market is fragmented and the embeddedness between local capital and labour is highly contingent upon the material dependence of the former on the latter. Given the scarcity of labour in the processing sector, firms are recruiting seasonal workers from Sweden, other European, and in some cases, African and Asian countries. It is only in the areas of work in fish hatcheries and grow-out sites that one may argue that there is some degree of embeddedness. This is because such labour has to be local. However, these conclusions are tentative and depend upon more data than we have here.¹⁰

5.5. Relations outside of the cluster: food retailers and feed giants

Austevoll's seafood diversification was enhanced by state policies and the strategies of local capital. The 1990s, and early part of this century, witnessed growing economic concentration in Austevoll, but the aquaculture service sector still assumed a vital role. There is local-level coordination in the production, processing and servicing sectors. However, powerful exogenous factors include the role of food retailers and feed giants.

Pricing, and more recently food quality provisions, are mechanisms whereby food retailers attempt to exercise vertical coordination across food chains (see Busch and Bain, 2004; Winson, 1993). Direct ownership is not necessary for retailers to exercise control—contracts with producers achieve integration without production costs. However, in addition to research on 'alternative food networks' mentioned above, Mansfield (2003a, b) shows that the power of retailers can be exaggerated. The differentiation of surimi production is associated with a number of retail markets. Mansfield (2003b) notes that there are different quality assemblages for each of the commodity chains in the global surimi industry. Quality is constructed among the various actors in each of these chains.

⁶Out-migration is an ongoing issue in rural Norway, and it is not easily offset by the provision of employment for rural youth (Hansen, 2004). Since 1951, with few exceptions, Austevoll has experienced net out-migration. A notable exception was in the 1970s when, perhaps, the emergence of salmon farming provided a basis for retaining community members. In the 1990s the pattern of net out-migration reemerged. See 1244 Austevoll. Population. 1 January and Population Changes During the Calendar Year 1951–2003 (Statistics Norway, 2002). http://www.ssb.no/english/subjects/02/02/folkendrhist_en/tables/tab1244.html.

⁷For the gender breakdown in fisheries employment, see Tables 38–40 in Directorate of Fisheries (2002). For data on male and female employment in hatcheries and farms, see Directorate of Fisheries (2003c).

⁸Fishing vessel workers can receive up to 500,000 NOK per year. Salmon farm employees receive 250,000–300,000 NOK per year, and processing workers receive 200,000 NOK per year. Sjøtroll employs 150 people in its processing plant in Bomlo (near Austevoll). On the day of our interview, 30 Swedes were hired for pelagic processing. The firm has processing workers from 10 different countries. Austevoll Fiskindustri employs 110 workers per year, but only 55–60 are permanent workers—most of these are local. 80 per cent of the remaining seasonal workers came from Sweden, but 10 came from other countries such as Ghana, Somalia, Thailand, the United Kingdom and France. An official with Austevoll Havfiske noted that processing work is attractive to 'young Swedes' who take advantage of the higher value of the Norwegian Kroner. At the time of our research, approximately 8 Norwegian Kroner equaled one €.

⁹A telephone inquiry with a Directorate of Fisheries official revealed that while there are restrictions on the hiring of non-Nordic nationals, one-half of the fishing crew can be hired from abroad. However, the skipper has to be Norwegian.

¹⁰The housing of these migrant workers was noted as a problem. Some of our respondents said that since Austevoll is a rich municipality, it pays more in taxation revenue than it receives. There is a paucity of funds for infrastructural and social programs. The result is that items such as housing for seasonal workers and a new nursing home are being partially financed by local businesses. We could not find exact details on these items, but Berg (2004) argues that changes in the Norwegian taxation structure favour social programs in densely populated areas. This means that thinly populated rural areas are often net losers in the distribution of taxation revenue.

SFSCs and the diversified seafood assemblages associated with surimi are, for the most part, not available to the seafood networks discussed here. EU duties mean that a largely homogenous semi-processed line leaves Norway for further processing in Denmark and other EU countries. Products are subject to quality provisions favoured by the EU and food retailers. Norway responded to these standards by introducing national legislation (see *Directorate of Fisheries, 1999a*). What latitude is possible for actors in their relations with firms and markets outside of the cluster?

HACCP and Codex Alimentarius are global benchmarks for food production.¹¹ These are ‘scientific standards’ accepted by the WTO, nation-states and part of the mechanisms used by food retailers in their efforts to coordinate food chains (see *Juskas et al., 2000; Larner and Le Heron, 2004; Phyne et al., 2005*). *Larner and Le Heron (2004)* argue that as benchmarks in food production moved from ‘quantity’ to ‘quality’, technical tools emerged as calculative practices linking producers and consumers across space, and providing a basis for the coordination of food chains. Benchmarks provide for the measurement of standards in spatially distant places. HACCP are one such set of criteria. HACCP criteria are used throughout the processing cycle for wild and farmed fish in Norway. In line with the European Food Safety Authority (EFSA), the Norwegian state has streamlined the inspection process. A fish veterinarian with the Directorate of Fisheries argued that Norwegian standards are higher than international ones. There is no evidence of this, but higher national thresholds may facilitate ‘permissible deviance’ that can meet lower EU thresholds. If this is the case, it points to ways in which quantifiable standards may be negotiated at the local level. Criteria from the EFSA (such as limitations on PCB levels in fish and GMOs in animal feed) are examples of GFC governance mechanisms that impact upon farmed salmon producers and processors (*Phyne et al., 2005*). In addition, governance mechanisms used by food retailers (such as Codex Alimentarius) contribute to the re-regulation of the agro-food system (*Busch and Bain, 2004*).

¹¹*Busch and Bain (2004)* and *Juskas et al. (2000)* indicate that Codex Alimentarius and HACCP underscore the re-regulation of the global food industry. The former originated with the FAO/WHO and is endorsed by the WTO as the scientific basis for assessing food quality and safety standards and ensuring that such standards are not disguised trade barriers (see *Phyne et al., 2005*). HACCP originated in the US in the 1970s. It became a measure for food standards in meat-processing plants in the 1990s in the wake of *E. Coli* outbreaks (see *Juskas et al., 2000*). The Norwegian government provides fish processors with an ‘own check guide’ for the internal auditing of fish processing. This prepares processors in the standards required for exports. For farmed fish, checks include a withdrawal period to ensure the removal of chemical residues and visual inspections of each batch of farmed salmon by the processing supervisor (see *Directorate of Fisheries, 1999b*). Our respondents also point to inspections by supermarket representatives.

A production manager for Sjøtroll noted the power of French retailers:

France is the largest market, almost daily shipments. The French supermarkets have 85 pages of specifications we need to follow. It is very difficult, almost impossible, to meet what they want. They are becoming bigger and bigger, more powerful, it is easier to deal with the Japanese—you can talk more directly to them. You can meet the right people. [With] the French supermarket chains you are dealing with a system.

He added that power has shifted down the agro-food chain from feed giants to retailers:

Ten to fifteen years ago feed companies were the big power. They sold to lots of small producers. Now growers have grown bigger and bigger and now the feed companies have lost their powers. They operate with small margins. They don’t have the power they had ten to fifteen years ago. The power in the chain will be the supermarkets. In France there are six to eight buyers that supply France with fish, they have such power it’s incredible.

Feed costs are not an issue for this firm. Sjøtroll purchases feed from Biomar, which according to a Biomar sales executive is the most expensive feed of the three largest feed companies. While forward contracts are used, Sjøtroll negotiates with Biomar over the composition and quality of the feed; this was confirmed in an interview with the Biomar sales executive.

The Torangsvåg group feels squeezed by both feed giants and food retailers (cf. *Phyne and Mansilla, 2003*). “[T]he feed is the big share of our expenses and the main problem is that there are only a few feed companies left. In feed there are now three big actors and there must not be fewer because then you have no real competition.” Most production goes to Mercadona in Spain. Mercadona has “...inspectors visit from Spain two or three times a year. The market demands are clearly becoming stronger and stronger. Everything has to be written down, for instance what kind of fodder you use, etc. Traceability is now an important newer aspect of market demands.”

Traceability was raised by an official with Austevoll Havfiske’s fish farm division. He thinks that the firm “...should become more market oriented in the future because there is a trend in the market to emphasize the fish’s history, traceability and such qualities. At the moment, [we] just try to produce as quick and as inexpensive as possible.” Austevoll Havfiske was also the salmon-farming network least likely to emphasize the power of retail giants. A possible reason for this is that the presence of Sea Star International as a marketing arm gives Austevoll Havfiske more leverage in the supply chain for farmed salmon than is the case for other companies.

Austevoll Havfiske tried to lessen its dependence on the feed giants by forging an alliance with Pan Fish. In June

2001, Pan Fish bought a 19.9 per cent holding in Austevoll Havfiske. In 1998 Pan Fish acquired 34 per cent of the feed manufacturing company Sea Grain, which also has investments from Austevoll Havfiske. Sea Grain encountered difficulties (Pan Fish ASA, 2000). According to the owner of a pelagic fleet in Austevoll:

The fish meal plants have to bid high to get the catches. This keeps up fish, fish meal and fish oil prices. The salmon farmers try to get around this by controlling fishing, meal production and feed production... The idea of Sea Grain was to produce a pellet without separating the oil from the drying matter... After a couple of experiments, it was realised impossible to deal with this [i.e. to process feed without separating the oil and meal] (own emphasis).¹²

Despite the restructuring of Pan Fish that occurred in the aftermath of its acquisition by its creditors in late 2002, Sea Grain is still part of Austevoll Havfiske's plans. "... [We] plan to use this feed in the farms owned by Austevoll Havfiske and Pan Fish, but if the feed is of good quality and able to compete on price and delivery they might expand. *By owning their own feed factory they can integrate more of the value chain into the company.* The 'fall' of Pan Fish does not affect this plan (own emphasis)." The prospects for this feed plant remain to be seen.

Although quantifiable standards are used in GFCs, the local context matters. Our respondents pointed to the power of retailers, but did not indicate if any product was rejected due to the lack of adherence to quantifiable standards. HACCP and other benchmarks are relational and not linear standards. What takes place between enterprises in the global political economy is subject to fluidity; benchmarking "...initiates a game of constant learning in which there is no single or ultimate solution" (Larner and Le Heron, 2004, p. 227). This latter point is important for our consideration of Sjøtroll. It may have a contract to buy feed from Biomar, but it negotiates with that firm over feed quality and price. Further research on the relations between producers and processors and/or retailers may show similar types of negotiations in the evaluation of quality in the purchasing of semi-processed farmed salmon for smoking (cf. Wolf et al., 2001).

Yet, the negotiation of standards cannot be over-emphasized. One must be in a good position to 'enrol' (to use an actor-network term) with others in calculative discourses. Austevoll's remaining salmon farming enterprises have an *uneven* relationship with feed giants and retailers. The ability of producers to negotiate with supply chain actors outside of the cluster is contingent upon the strength of local-level linkages. Not surprisingly, the firm (Torangsvåg group) with the weakest local-level linkages is the one most vulnerable to actors outside of the Austevoll

cluster. To that end, a consideration of the Chilean salmon farming industry is useful as the development of seafood clusters there (some under the aegis of Norwegian capital) has implications for the future of the Austevoll cluster.

6. Salmon farming and seafood clusters in Chile

In contrast to Norway's geographically dispersed and limited vertically integrated industry, Chile has a geographically concentrated (around the island of Chiloé) and more vertically integrated sector.¹³ Chile's liberal investment guidelines facilitated geographic and industrial concentration (Chile, 2004). A concentration of production, processing and servicing firms are located near Puerto Montt—the highway from the airport to the city passes by a 'who's who' of the Chilean industry. Networks of firms are also located in the major towns of Chiloé—Ancud, Castro and Chonchi (see Aquanoticias, 2000).

The state is viewed, by some, as playing a minimal role in the development of clusters outside of Region X (location of most of the industry). The manager of a net installation and changing company complained that the Chilean government will not finance the necessary infrastructure to enable the salmon farming industry to increase production further south (Regions XI and XII); as a result firms have to finance infrastructural development themselves. This contrasts with the Norwegian policy of deliberate dispersed industrialisation (Aarset, 1997).

Ongoing problems with the EU market, restrictions on the geographical and economic concentration of licences and labour costs have motivated Norwegian capital to invest in Chile. Nutreco, Cermaq and Fjord Seafoods acquired major Chilean companies in the midst of declining exports to the Japanese market during the financial crisis of the late 1990s. Foreign investment is facilitated by Chilean law. A firm can "...repatriate capital one year after its entry and remit profits at any time." The Chilean state promotes the country as a "springboard into new markets" (Chile, 2004). This is relevant to the Norwegian aquaculture sector; the combination of duties in the US (up to 26 per cent), the MIP and now quotas in the EU, means that investment in Chile is attractive for gaining access to both markets. Chile has free trade agreements with both the EU and US. The recent EU quota on farmed salmon imports deals with Norway and the Faroes, but does not apply to Chile which has a small (but growing) percentage of the EU's farmed salmon imports (European Commission, 2004).

Austevoll Havfiske is following its larger Norwegian salmon farming counterparts into the Chilean market. The firm's owners feel negative about low prices in the EU and the tendency of Norwegian firms to flood the market. One owner stated that "...I would rather invest in Chile. The

¹²In 1999, the export price for frozen herring was just under 3.5 NOK/kg. By 2001, this price had risen to nearly 5.5 NOK/kg (Norwegian Seafood Export Council, 2002).

¹³Unless otherwise noted, the data are from Phyne and Mansilla (2003). Some material is from Chilean field notes and semi-structured interview data not reported in that article.

salmon producers there are more coordinated, the labour and the feed is cheaper and it costs less to process the fish.” Austevoll Havfiske expected to have 8 production licences in Chile before the end of 2003 (Berge, 2003c).¹⁴

Given the dominance of retail giants in EU markets and the limitations to vertical integration in Norway, salmon farming enterprises realise savings on labour and feed costs. Austevoll firms have long invested in farmed production and/or servicing contracts outside of the cluster. While this may be a feature of balanced embeddedness, it may point to a future of low embeddedness (Boschma et al., 2002). Will Austevoll capital's past and current global movements end in ‘undermining’ the Austevoll seafood cluster?

7. Discussion and conclusions

Research on global commodity chains (including GFCs) and industrial clusters are in their extreme forms contrasting viewpoints. The former points to a globalised world in which vertical relations in GFCs entails producers must adhere to ‘buyer-driven’ standards in order to survive. The latter points to horizontal relations amongst SMEs in a geographical agglomeration that is resilient in the face of globalisation. This research suggests the need for a nuanced account that links both perspectives.

Our research on Austevoll demonstrates that while GFC analysis points to the vertical influences of ‘buyer-driven’ processes, in Austevoll the economic concentration amongst producers (in response to the FOS collapse) did not undermine the level of diversity and local interaction among SMEs. Cooperation inside a cluster of like-minded firms persisted. This research supports the role of SMEs and ‘untraded interdependencies’ inside a cluster. Furthermore, the cluster made a successful transition from a pelagic to a more diversified seafood basis with the advent of salmon farming in the late 1970s.

However, there is evidence that the vertical relations in GFCs are being felt at the local level. With the collapse of Norsk Akvakultur, the Torangsvåg group lost its main source of inter-firm solidarity, and exposed itself to the power of its two large rivals. In addition, the pursuit of international investments by Austevoll Havfiske and Sjøtroll in the 1990s and early part of this century may have implications for the SMEs inside the cluster. These are emerging as ‘lead firms’ that may impose more vertical relations at the local-level (cf. Bair and Gereffi, 2001; Power, 2002).

The presence of the Aquaculture Research Station and investments in halibut and cod farming by local producers may facilitate another seafood transition. Neither of the

two largest firms had investments in cod farming at the time of our research, but a firm in the Torangsvåg group was making an application for a cod farming licence. Norwegian farmed cod lags significantly behind farmed salmon in production (2181 tonnes sold in 2003), but sales have grown by 150 per cent since 2001. In addition, investments in cod hatcheries may spur more production in the future (Statistics Norway, 2004). We do not know what impact this will have upon Austevoll, but given the overall global decline in farmed salmon prices, coupled with the growing presence of Chile in the EU market, one should not be surprised if lower-volume but higher-value cod emerges as a more significant seafood product by the end of this decade.

In conclusion, the intersection between GFCs and industrial clusters points to a number of possibilities. We suggest that future research on GFCs and seafood clusters pay attention to the following possibilities: (1) Vertical relations in GFCs may be balanced by horizontal relations inside a cluster. This is most pertinent in areas where local producers are able to make use of ‘alternative networks’ such as SFSCs to limit their exposure to long-distance trade. (2) The vertical relations in GFCs may be met by a combination of horizontal and vertical relations inside a cluster. The horizontal networks of SMEs in the formal and informal exchange of goods and services coexist in the midst of economic concentration around a ‘lead firm’. This pattern may be most likely where exposure to distant markets is greatest, and there is the absence of a SFSC alternative. Here, the nature of the commodity coupled with the existence of trade barriers may further vertical relations at the local level. (3) Finally, vertical relations in GFCs may undermine horizontal relations and further vertical relations inside a cluster. The dynamism of a cluster is undermined and a limited number of firms dominate. Furthermore, relations between capital and labour may become more polarised, in that lower commodity costs can only be balanced by lower labour costs. Once again, this may occur in a situation where there is absence of a SFSC alternative.

For the most part, salmon farming nations require export markets. Insofar as this is the case, researchers should be aware of limiting their analysis to the role played by clusters; GFCs loom in the background and must be seriously considered. The pursuit of non-EU markets is critical for the future of the Norwegian salmon farming industry (see Hansen, 2005). This enhances the possibilities for further value-added production. But that is a story for another paper.

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¹⁴At the time of writing, Austevoll Havfiske had a subsidiary in the Chilean pelagic fishing industry that had over 10 per cent of the Chilean quota for horse mackerel. This is most likely prosecuted by the two large Chilean pelagic vessels owned by Austevoll Havfiske. The status of the application for Chilean licences is still unknown.

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