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***Resilience and Related Variety: The Role of Family Firms in an Ocean-
Related Norwegian Region***

Abstract

Recent research in economic geography has introduced two notions that historical studies should explore: regional resilience and related variety. Regional resilience refers to a region's ability to recover from external shocks. Related variety refers to the existence of related industrial sectors in a region, and the relatedness promotes economic development due to spill-overs between sectors. From an evolutionary perspective, external shocks result in new development paths in regions with related variety. This is a dynamic process well suited to historical studies. This article argues that historical studies can contribute to this literature by studying how related sectors interact in resilient regions. We propose that family firms may act as a micro-coordination mechanism by moving financial and human resources from one sector to another related sector as a response to shock. The paper develops this argument by studying how six major regional business families within ocean industries reacted to external shocks over time.

Keywords

Regional resilience, economic geography, family firms, regional history, related variety

Introduction

The Sunnmøre region on the west coast of Norway through the nineteenth and twentieth centuries developed into a strong region within several ocean-related industries—first fisheries; then fish processing, yards for building and repairing fishing boats, and supplying industries for these yards; and later industries that supported the oil industries, meaning design and equipment for supply vessels, as well as owning and managing the fleet. As a historical phenomenon, this development has multiple explanations. This paper, however, explores the relevance of two concepts in recent literature in the field of economy geography, regional resilience and related variety, in relation to a historical case of regional development and change.

Regional resilience refers to a region's ability to recover from external shocks (Boschma, 2015). Related variety refers to the existence of related industrial sectors in a region, the argument being that relatedness promotes economic development due to spillovers between sectors. Sectors are related if they draw on similar knowledge, so that knowledge from one sector can be effectively absorbed by another (Content & Frenken, 2016). From an evolutionary economic geography perspective, external shocks result in new development paths, especially in regions with related variety. The degree of newness may vary. As shown by Pike, Dawley and Tomaney (2010), the reaction patterns to shocks could be characterized as adaptation, meaning changes towards preconceived paths, or adaptability, meaning unforeseen changes.

Regional reactions to shocks involve dynamic processes in time and invite for more research that takes into account temporality (Christopherson, Michie, & Tyler, 2010). Based on an historical approach, this paper offers several contributions to the literature on resilience and related variety. First, we respond to the call for more nuanced research on the sharp distinction between what is related and unrelated regarding regional development (Boschma,

2017). By using a long-term perspective of almost a hundred years and by accepting that the concept related variety is embedded in social-cultural contexts that change over time, we develop the argument that the perception of what is related and not changes and needs to be understood in space and time. (Kuusk & Martynovich, 2018).

Second, we respond to the call for bringing a micro-perspective into the studies of regional development by addressing the role of agency in regional resilience studies (Boschma, Coenen, Frenken, & Truffer, 2017; Bristow & Healy, 2014). By studying how actors in family firms acted as social agent and manoeuvred in a landscape of related and unrelated opportunities in order to respond to external shock, we introduce the behaviour of strong family firms deeply embedded in the regional socio-cultural traditions as a collective agency within the regional governance system for industrial development (Bristow & Healy, 2014; David, 2018).

More generally, we respond to the call for more research that brings business history and social sciences closer (e.g. Decker, Kipping, & Wadhvani, 2015; Suddaby, Foster, & Mills, 2014; Wadhvani, Suddaby, Mordhorst, & Popp, 2018) by showing how theories and concepts from economic geography can structure historical research, and how historical research can contribute to theory elaboration in economic geography. The invitation from economic geography to include historical perspectives in studies of regional resilience (Boschma, 2015) and related variety (Elola, Valdaliso, & López, 2013), make our topic relevant for a cross-disciplinary study.

Theoretical Perspectives and Methodology

Recent research has explored both cluster resilience (e.g. Elola, Parrilli, & Rabellotti, 2013; Hannigan, Cano-Kollmann, & Mudambi, 2015; Suire & Vicente, 2014) and regional

resilience (e.g. Boschma, 2015; Evans & Karecha, 2014; Martin & Sunley, 2015; Sedita, De Noni, & Pilotti, 2017). This stream of literature is still young, and according to Martin and Sunley (2015, p.3), ‘there is no universally agreed definition of regional or local economic resilience’: Here, we adopt Martin and Sunley’s (2015, p.13) definition:

[Resilience is] the capacity of a region or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path (...) so to maintain or restore its previous developmental path, or transit to a new suitable path.

Resilience, or this capacity to react to external shocks, varies from one region to another, and different regions react differently. Conceptually, the existence (or not) of related variety has been proposed as a determinant of regional resilience, and consequently for unequal reactions to shocks (Boschma, 2015). Our endeavour to carry out a historical study of how a region develops and changes through interaction with external shocks calls for the clarification of three questions: What do we mean by shock? What do we mean by related variety? What is the role of regional actors in this process?

Economic geography mentions several types of shocks in the context of regional resilience. According to Molema et al. (in this volume), there are three types of resilience related to the character of the shocks, among which resilience to sudden events like natural disaster or system shortage is the first one. The second one is resilience to macro-economic fluctuations, like business cycles. The third type is resilience to structural economic changes like the emergence of new production technologies and changes in the consumption patterns. Based on this understanding of different types of resilience related to different types of shocks, and based on in-depth readings of historical literature on the development of the region (e.g. Høidal, 2014; Løseth, 1996; Tvinnereim, 1992) we identify four historical

periods of shock in the region we study from the early twentieth to the early twenty-first century. All shocks made all a deep impact on the regional economy, and they represent all three types of resilience. The first was a period of several international and national economic crises in the 1920s and early 1930s (macro-economic fluctuations). The second shock occurred from the mid-1950s, when herring as a main resource for the fisheries disappeared from the coast outside the region (sudden events). The third shock took place from 1973, when the structural crisis in the shipbuilding industry hit this industry in Western Europe, and the last shock began in the 1990s, when globalisation implied new challenges (both: macro-economic fluctuations and structural changes). The four shocks were different in their character, but they were similar in the way that they all led to restructuring in industries that we study. Following the finding from longitudinal studies in economic geography that the reaction to one crises has an impact on the reaction to the next one (Eriksson & Hane-Weijman, 2017), we will argue that having four shock cases enriches the relevance of historical data for the discussion of this evolutionary approach as long as we consider the differences in their character.

Related variety is typically characterised based on the degree of relatedness between comparable factors in the economy. Criteria for defining the degree of relatedness has been that they are technological related, standard industry classification, co-occurrence of products, labour skills, and supplier-buyer relationships, and relatedness could be both similarities and complementarities (Boschma, 2017; Content & Frenken, 2016; Neffke, Henning, & Boschma, 2011). The choice of classification variables have typically been defined in terms of similarities to capture the cognitive aspects of capabilities to learn (Boschma, 2017). The argument is that if activities are closely related—for example, they draw upon the same technological principles—this has a spillover effect, and knowledge will be easily transferred from one sector to another (Belussi & Sedita, 2009). This has an impact

on the capacity to respond to shocks, since regions characterised by a high degree of related variety will be more flexible in their capacity to allocate resources across sectors. Since resilient regions, according to the evolutionary perspective, not only respond by adjusting to the pre-shock equilibrium between sectors but transform by creating new development paths (Boschma, 2015), related variety is a dynamic concept.

Boschma (2017) claims that since regional diversification into new activities is a dynamic process, we need to leave behind us the static treatment of relatedness in regional studies and rethink the sharp distinctions between relatedness and un-relatedness. We add two new dimensions to this discussion. The first one is relatedness according to socio-cultural traditions. Since studies of agglomerations such as industrial clusters show that closeness in values and norms leads to knowledge sharing and learning (Bathelt, Malmberg, & Maskell, 2004) we could assume that relatedness according to socio-cultural variables also would capture actor's capabilities to make sense of changing technological, structural or market environments. Relatedness has a cognitive aspect (Boschma, 2017), and regional identities, norms and values may have a strong impact on collective behaviour in a region (Amdam, Lunnan, Bjarnar, & Halse, 2020). These cultural factors are shared through networks. As Boschma (2015) argues, networks may have a strong impact on regional resilience. Hence, we assume that relatedness in a regional context may be linked to shared perceptions that are rooted in regional socio-cultural factors, which are not captured in quantifiable economic and social observations.

The second dimension we introduce is the use of natural resources. What is related may change over time, and regions may diversify into new industries or recombine existing activities in a new way. Consequently, relevant variables for categorizing the degree of relatedness could likely change over time which leads us to search for what has been stable. This could be natural resource as physical phenomenon as well as the regional perceptions of

and traditions in exploiting the resources. We have chosen the region's long tradition in exploiting the resources in the ocean as a socio-cultural variable to analyse relatedness, meaning that industries that are based on exploiting ocean resources such as fish, oil, and gas are related. As we will show, the region we study has developed based on several industries, which all are related to actor's mobilization of ocean resources as they have embedded the region in dynamic restructuring processes over time.

Recent literature argue for the need of including agency theory in studies of regional resilience (Boschma, 2017; Bristow & Healy, 2014). Collective agencies may act as formal governance bodies such as the regional government or business associations (David, 2018), or informal governance mechanism that are anchored in culturally norms and habits (Bristow & Healy, 2014). The inclusion of agencies who purposefully strive to overcome constrains and initiate changes that effect the regional development, fits well to a deep tradition in the history discipline to study actors in relation to societal change (Winter, 2013). The behaviour of a collective regional agency based on shared norms and identities may in certain situations act as informal governance mechanism that have an impact on society, such as the development of a regional industry. Such a governance mechanism can be formal and institutional. It can be coordinated by the market, networks or hierarchies, which in the case of large dominant companies or the state as typical hierarchical coordinating actors, has an element of decision-making and behaviour beyond the structural mechanisms. It can also be coordinated by shared norms that guide behaviour. Regional reactions to shocks are results of how actors behave, and the behaviour is influenced by the regional culture and by the norms that are shared between the actors and how they identify themselves in relation to other actors in the region (Amdam & Bjarnar, 2015).

To search for both structural and behavioural determinants of resilience, we have chosen to focus on the role of family firms strongly anchored in the regional business culture

as collective agency. One reason for that is that business history research has shown that family firms are most resilient at least among large firms (Fernández Pérez & Colli, 2015). Another reason is that in the Sunnmøre region, family firms totally dominated the fishing and manufacturing industry not only in the nineteenth century but also throughout the twentieth (Bjarnar, Berge, & Melle, 2006; Døssland & Løseth, 2006; Høidal, 2014). The family firm is a structural phenomenon as well as a conveyer of values and norms in the region. By studying how family firms have reacted to external shocks, we have an opportunity to investigate not only how knowledge has been transferred between industries through human resources within a region of geographical closeness, but also how other resources, such as financial resources, have been mobilised and transferred between sectors. Within the framework of the family, the allocation of financial resources has been expressed by diversification into new industries within a firm or by start-ups of new firms. In this paper, we use a micro-historical approach, defined as ‘pursuing the idea that a small unit can reflect a large whole’ (Magnusson & Szijártó, 2013, p.149), and we interpret decisions on diversification and start-ups at the family firm level as reflections of regional industrial reconfigurations after external shock. Due to the strong position of family firms in the region, and the centrality of the chosen firms, we assume that the behaviour of the family firms corresponds with the resilience of the region.

Based on the identification of four major shocks, we explore how six family firms that were strongly involved in the regional economy reacted to these shocks, and how they contributed to the development of the region through the reconfiguration of industries. The six families were at various times operating some of the largest firms in the region. The study relies heavily on existing corporate histories, information in business journals and systematic study of the region’s main newspaper, *Sunnmørsposten*, and other newspapers from the 1920s.¹ The general outline of the development of the fishery, shipping, and oil and gas

industry relies on some standard references in the history of Norwegian fishery (Bjarnar et al., 2006; Døssland & Løseth, 2006; Hersoug, 2015; Jentoft & Mikalsen, 2014; Kolle, 2014; Kolle et al., 2017) shipping (Tenold, 2019), and the oil and gas industry (Ryggvik, 2015).

Methodologically we combine microhistory perspectives (Magnusson & Sziójártó, 2013) with perspectives from comparative historical methods (Lange, 2012). Together this constitutes a framework allowing us to highlight family firms as agencies, e.g. microhistory events within broad and more structural patterns and narratives about regional restructuring.

In the next sections, we give a short overview of the economic development of the region from 1920 to 2010 before we present the chosen families. Then we discuss the four periods of shock and how the region reacted to each of these shocks before we conclude.

A Region with a High Degree of Related Variety

We analyse how regional resilience has been expressed by focusing particularly on the behaviour of six family firms that, over time, were strongly involved in five ocean-related industries in Sunnmøre, a region on the west coast of Norway with around 150,000 inhabitants in 2019. One industry is fishery, which has long traditions in the region. Fishery grew strongly during the nineteenth century with a fleet for deep sea fishing as the core (Bjarnar et al., 2006). The second industry is fish processing, which became industrialised in the region from the beginning of the twentieth century and included the processing of fish and seal to oil and meal, as well as clip fish (or bacalao, which is dried salted fish, basically cod). After World War II, the region emerged as the global centre for the processing and export of bacalao (Richter-Hansen, 2010). The third industry is shipbuilding. In order to serve the fishing fleet, an industry of small yards to build and repair fishing vessels developed in the late nineteenth century. The fourth industry is the service and equipment industry that served the yards with equipment such as engines and propellers, as well as designing the

ships. From small workshops at the beginning of the twentieth century, this industry developed into a relatively strong industry after World War II. The fifth industry is the offshore service vessel (OSV) industry that emerged from the 1970s, when yards and supporting suppliers of services and equipment began to build OSVs for the new oil and gas industry in addition to fishing vessels (Amdam & Bjarnar, 2015; Andersen, 1997).

In the period under study, all five industries had a dominant position within the domestic market and in some segments—clip fish from the 1960s and OSV design from the 1990s—a leading global position. A unique business culture, understood as the product of an interplay between economic practice, norms and values, characterised the region. In the nineteenth century, the region had already developed a combination of a strong work ethic, reinvesting practices, layman- and equality-orientated Christianity, and a puritanical character. Together with a dispersed ownership structure and a high degree of socio-economic egalitarianism, this mind-set promoted cooperative norms between families and family members (the family business field) and between entrepreneurs within fisheries and related industries (an entrepreneurial social field). Not only was ownership of land and fisheries historically widely dispersed: collective and dispersed ownership of boats and equipment was also common as early as the eighteenth century, which reflects the growth of the cooperative culture of the region (Bukve, Løseth, & Gammelsæter, 2004).

Four small coastal communities especially emerged as focal areas, namely Ulstein, Hareid, Herøy and Haram. In 1920, the population in these communities varied between 2,310 and 4,531; in 1970 between 3,938 and 8,417 (SSB, 1932, 1974). Ålesund, the only town in the region with 16,412 inhabitants in 1920 and 39,959 in 1970, also had an important function up to the 1960 as a centre for various ocean related activities, such as fishing boat shipping, fishing industry and trade, and shipyards. Afterwards, the variety weathered, and the city became more specialized in fish processing and trade and offshore

shipping (Berge, 2006a, 2006b). Large parts of the activity that formerly lay in Ålesund, such as shipbuilding and fishing companies, moved to the surrounding rural areas, of which Ulstein, Herøy, and Haram are typical examples (Bjarnar et al., 2006).

Six Families

This paper paints a broad picture of four external shocks and the regional development of related industries, highlighting choices made by the six family firms. The three oldest firms were located in Ålesund, the three youngest ones in Herøy. Some of these families created several firms, and the structure of the firms changed over time. These details are not included in this paper and, as a general principle, we use the family names when we mention the firms. We chose the six families due to their centrality in ocean-related industries in the region. The chosen family firms are Brødr. Aarsæther, Koppernæs, Holm, Voldnes, Sævik and Remøy (see Table 1).

< Table 1 here >

Three of the family firms were established (in 1877, 1884 and 1887) prior to the first shock we focus on. By the time the first shock in the early 1920s set in, all of them had expanded into new ocean-related businesses. Anders and Nils Aarsæther established a firm in 1877, Brødr. Aarsæther, to produce cod liver oil based on their experiences in farming, country trading, sloop traffic, and cod liver oil production for other employers. In 1911, they owned four plants and two vessels for cod liver production and four settlements for fish landing. In addition, they were actively involved in the export of fish, including clip fish (Vollan & Heli, 1977). In 1884, Hans Peter Koppernæs, a merchant and licensed trader, together with Ole Nørve, established a firm to trade fish and timber. They split ten years later. Nørve continued to trade with timber, and Koppernæs diversified from trading fish to trading fishery gear. During the next ten years, Koppernæs diversified into fishing and sealing by

buying vessels and manufacturing seal oil. The latter activity was a response to a crisis following a fire in Aalesund where the firm lost most of its buildings (O. M. Ellefsen, 2009; Koppernæs, 1959). In 1887, Oluf Holm, a cooper with experience in the cod liver oil industry, established a firm to produce cod liver. During the first ten years, the firm expanded into fishery and the export of fish and oil (Skorgevik, 2015). Gerhard Voldnes, a fisherman with experience in trading fish, established the fourth case firm, Voldnes, in 1917 for the processing and trading of fish. The two last family firms, Sævik and Remøy, established in the mid-1970s, were selected due to their centrality and reconfiguring role in processes following the shocks in the 1970s and 1990s.

1920s and 1930s: Crises in Ocean-Related Activities

In the first part of the twentieth century, fishery was the driving industry of all ocean-related industries in the region. During the 1920s and the first part of the 1930s, several national crises struck the region. Due to these crises, several local municipality economies almost collapsed. Many local banks went bankrupt or encountered severe problems, which made access to capital for investments in fishery more difficult. For example, the local community of Herøy witnessed 33 fishing vessel foreclosures in the 1920s and 1930s (Løseth, 1996). Diminishing prices for white fish coincided with a collapse in the catch in the region due to a sudden local species breakdown. Until 1939, this cumulative process reduced the number of fishermen in the county of which Sunnmøre is part by 50 per cent. In general, the market became utterly weak for fish and fishing products. Most of the catch and fish products had gone to international markets; however, lower prices led to increased competition from foreign businesses, since importing countries set up import quotas and built up their own fishing fleets. Breakdowns in fisheries and declining international exports also had an impact on the processing industry. For example, Norwegian clip fish exports had fallen dramatically during the war. Britain and Germany fought to gain control of the Norwegian fish resources,

and this led to a substantial reduction in Norwegian salt fish and clip fish exports in important markets. (Løseth, 2006; Nakken, 2006).

As a response to these shocks, three different strategies emerged within the fisheries. First, a lot of fishing actors tried to reduce costs by returning to simpler and more primitive technology and operation patterns. An expression of this was how fishermen started to row their boats again instead of using motors. A second strategy was to enhance effectivity through existing methods. Local ship-owners managed to set in operation larger net vessels that the shock had made abundant. For example, a single ship-owner like Einar Hareide commanded a fleet of net vessels employing up to 130 fishermen in the 1930s. In fact, active fishers took over most of the idle fleet of steam-driven vessels belonging to banks, ship-owners and trading houses in Ålesund (Løseth, 2006).

The third strategy, which will be in focus here, was to diversify into related activities by moving resources between catch, processing and trade and balancing dynamically between ocean segments and within the value chain. For example, during the years 1925–1935, entrepreneurs within fisheries set up large deep-sea expeditions. During more than a decade this employed hundreds of people, going after whales, seals, polar bears and polar foxes. On the microhistory level, this move is reflected in account figures for the shipping companies in Ålesund and Hareid confirming the effect of related variety. In 1938, 49 per cent of their income emanated from catching herring, 22 per cent from seal hunting, 16 per cent from herring fisheries in Iceland and 13 per cent from other related activities.

Aggregated data also indicates a regional effect of how white fish actors managed to shift to pelagic fisheries, which coincided with surplus herring in the 1930s. By pelagic fish, we mean fish that live in pelagic zones that are neither near the shore nor close to the bottom. Growing species allowed for a vast increase in herring catch, which again compensated for

general low herring prices throughout the 1920s and 1930s. Microhistory event data strongly indicate that a shift between related activities turned out to be a powerful result of agency as a large and growing number of fish oil and fish meal companies were set up that consumed an increasing herring catch (Løseth, 2006).

We have detected strategic moves within the selected family firms that confirm the context specific character of related variety as a resource and the larger picture outlined above. One move was to invest in new production units for processing herrings. For example, Voldnæs established a herring oil factory in 1921, and Koppernæs extended its production of oil from seals to oil and herring meal in 1925 (Fiskaren, 20 December 1984, p. 7). The regional effect of this strategy among family firms was deep indeed. In 1920, the processing industry consumed only around 5 per cent of the catch of herring, and in 1950 approximately 15 per cent. Furthermore, related activities like salting, icing, and the production of conservation and shipping equipment grew rapidly, together with yards and related equipment industries. By 1948, almost 60 per cent of the national fish processing industry was located in Sunnmøre. Moreover, around 30 per cent of the regional labour force was connected to land-based related industries.

This regional effect of embedded interactive process of mobilizing knowledge and resources between related opportunities is finally documented by a striking long-term dynamic of adaptation. While fish meal was mainly exported and used as fodder, herring oil was refined and used for industrial production domestically. Despite economic and resource crises, the number of oil processing factories in the region grew from eight in 1921 to 17 in 1929. In this case, technological modernisation processes on the supply side were crucial as a means of shifting production from salted to fresh fish products. Moreover, a richer winter herring fishery could only flourish as a fresh fish market to the extent that the fish oil industry vastly expanded to process the catch. Otherwise, the pelagic fishing sector would have

collapsed due to a complete price fall for herring (Løseth, 2006: 415). This therefore exemplifies a related fishery-industry reconfiguration that, for the time being, brought both parties out of the depression.

Another family firm, Brødr. Aarsæther, responded to macroeconomic fluctuation shocks by investing in the processing of cod to clip fish (Vollan & Heli, 1977). Aggregated sector data tell that the clip fish industry faced increasing competition after the beginning of the 1900s (Vollan, 1956). Iceland and the Faroe Islands produced clip fish of better quality compared to Norwegian producers, and eventually Norwegian businesses lost their market almost completely in Spain. Norwegian alcohol prohibition laws accentuated the crisis, since the import of wine and liquor from Spain and Portugal had been an important trade-off related to clip fish export (Hamran & Myrvang, 1998). However, at that time, clip fish producers showed agency as they succeeded in opening markets in South America and the Caribbean. This agency gave collective effect. In 1960, exports to Brazil accounted for 50 per cent of the total clip fish export. New technology for clip fish drying modernised production and reduced the need for workers. In this respect, Sunnmøre emerged as the leading region for indoors mechanical drying in the 1920s, while producers in other areas mainly kept on drying fish outdoors. Later, Sunnmøre also became the leading clip-fish region nationally in quantitative terms (Berge, 2006b).

Brødr. Aarsæther and Oluf Holm also invested in freezing and refrigerating plants, as well as new technology for frozen fillet production (Fiskaren, 23 March 1931). Brødr. Aarsæther's diversification into new activities made the company one of the largest in the region, with 600 employees in the 1960s (Vollan & Heli, 1977). Holm's investments in the freezing industry made the firm the largest private entity for freezing fish in Norway in the 1930s (Skorgevik, 2015), almost by itself creating larger regional effects. Holm also invested in industrial activities that were new to regional actors by moving into the pharmaceutical

industry. The firm had produced cod liver oil since 1887. As a reaction to the crises in the 1920s, it focused on developing fish oil to the highest quality and specialised in medicine oil. This involved an interest in vitamin research, which again brought them into contact with the pharmaceutical company Apothekernes Laboratorium in Oslo (Amdam, Hagberg, & Sissener, 2003). In 1937, Holm bought 17 per cent of the shares of the pharmaceutical company and established AS Vitapan to produce vitamin tablets (Sunnmørsposten, 23 July 1937, p. 8). Through these investments, the financial situation strengthened, or, as the CEO, Aksel Holm, expressed in 1944 after having complained about bad times in the 1930s: “It is maybe during the bad times my company has earned most money” (Private letter 1944, quoted in Skorgen, 2015).

The reinforcing effect of family firms’ agency can be further documented. Geographically, some families, such as Voldnes, expanded their processing industry to the neighbouring county, Sogn og Fjordane, and to Finmark in the north of the country. Oluf Holm expanded strongly internationally by acquiring the US firm Scott & Browne Ltd. with operations in London, Danzig and several other European locations, and by inviting a US firm, Royal Manufacturing Company of Duquesne, to produce medical cod liver oil for export at Holm’s location in Ålesund (Fiskaren, 17 August 1938, p. 4). Moreover, new methods for both fresh fish and canned fish export contributed to this extensive picture of internationalisation based on related activities. Canned sardines, for example, went to South Africa, Australia and the USA, and later also Britain and New Zealand.

In the interwar period, national crisis affected the region and spread to fishery and related activities. Through diversification into new activities within the fishery and related industries such as processing and manufacturing of vessels and equipment, many firms expanded, strengthening the region’s position as a leading region for fishery and related activities. Other firms applied fish oil in dairy products, canned products and even cosmetics.

Moreover, fish processing industries combined pelagic fish oil with oil from whales and seals and other species, which further interconnected sectors and actors. In addition, Sunnmøre emerged as a centre for the production of frozen fish and herring. Parallel to this, the region experienced the growth of an innovative equipment industry for shipbuilding based on innovations such as net technology, engines, propeller systems and hydraulics. When this mechanical industry ran into a crisis in the 1930s, the geographical expeditions of the regional fishing fleet to Greenland and other places pulled the industry out of stagnation. Moreover, a number of smaller shipyards and mechanical workshops established themselves during the 1930s as many others had to close down, and were based on a variety of repairs and building assignments (Løseth, 2006).

Through developing a strategy of diversification, local actors made their experiences in manoeuvring within a space of related variety to a regional asset, which made the region prepared for future crisis. On the other hand, the regional economy was also increasingly geared towards a herring economy, which exposed the region to a natural disaster when the herring disappeared.

Resource Crisis from the Late 1950s

The successful diversification process created a regional and firm optimism. At the microhistory process level, just after World War II, Brødr. Aarsæther reported growth and profitability in all of their activities: herring fishery, production of cod liver oil, dried fish and clip fish (Vollan & Heli, 1977). By the late 1940s, the region was unmatched by any other regions in Norway in terms of the completeness of the fisheries and related yards and mechanical workshops, including equipment producers and related fish industries (Løseth, 2006, p. 411). However, this economy suddenly ran into a serious shock in the late 1950s when the herring disappeared from the coast. Government regulation prolonged the

challenges in the pelagic sector. Due to the enormous utilisation of both pelagic and white fish species worldwide, governments during the 1970s and 1980s imposed a number of national and international regulations—for example, quotas and fishery zones. Regarding herring fishery, the government did not allow any herring fishery in 1970 and 1972, which not only prolonged the crisis, but also accentuated the overcapacity in the processing industry. The government's structural rationalisation policy contributed to the downturn, as it reduced the number of meal factories in Norway from 76 to 41 during the 1970s. By 2006, only nine had survived nationally, and just two were still running in the region (Berge, 2006c, p. 347). By 1963, the blooming herring fisheries had collapsed. Just as in the interwar period, the actors within the fishery reacted in different ways. However, the diversification strategy to a larger extent now was combined with a regional specialization strategy. In a later phase this specialization also drove forward a maritime clustering process now congesting activities around oil sector services.

One way to react to the herring disaster was a strategy of searching remote fishing areas for new species, and established a prosperous capelin and blue whiting fishery during the 1960s and 1970s (Bjarnar & Berge, 2006, p.10-16). In this way, the crisis was met by specialisation and modernisation of the fishing fleet. For example, Brødr. Aarsæther met the need for more fish resources by modernising the fleet and expanding to new areas in the north of Norway and Greenland. The firm acquired new and modern trawlers, established Båtsfjord Havfiskeselskap AS in 1966 to fish outside Finmark and, in 1971, AS Grønlandstrål for Greenland (Vollan & Heli, 1977). The broad narrative shows that specialisation and modernisation constituted a major break from the season-based fishing. Based on new technology within hydraulics, construction of vessels, propulsion systems, equipment and fish detecting, Sunnmøre emerged as a national centre for long distance fishing and for the shipbuilding industry and related industries. A long distance fishing fleet now came to

operate with hitherto unmatched efficiency in areas like Jan Mayen, the Barents Sea, the North Sea, Greenland and Newfoundland based on a new fleet consisted of small, regionally-designed factory trawlers with a stronghold in Herøy, and some smaller industrial trawlers more geographically dispersed. Fishermen in the region were also prominent participants in the technological revolution that occurred in ring net fishing. Moreover, a new fleet of long distance large longline vessels anchored in small communities like Vartdal and Hareid, and some special smaller longline boats were also somewhat more geographically distributed within the region (Bjarnar & Berge, 2006, p. 442). Overall, throughout the technological revolutions of the 1960s and 1970s, deep sea fishing vessels became some of the most advanced boats imaginable. This happened in close interaction with suppliers in the region; ship designers, shipyards and equipment manufacturers (Berge, 2006c). This time, many actors moved more into distinct specialised activities while exiting others. This development illustrates that more specialisation and adaptability alongside adaptive diversification could be combined.

Another reaction to the resource crisis was expressed through investments in and restructuring of the process industry. Although the traditional oil and meal processing factories over time disappeared almost completely, the fish industry as a whole still had a stronghold in the region and expanded geographically. Brødr. Aarsæther established a cannery for fish in Vadsø in 1959 as the first of many production units in Finmark. It also expanded the production of cod liver oil and increased its share of Norwegian cod liver oil from 13 to 25 per cent in ten years (Vollan & Heli, 1977). Voldnes transferred the production equipment for fish oil from the region to Honningsvåg in Finmark when the herring disappeared (E. S. Ellefsen, 1967). These case firms also drove regional adaptation. For example, Brødr. Aarsæther made investments in the clip fish industry in the region, and it was during these years that the region began to establish itself as a dominant region for clip

fish production in Norway. One key geographical area was Ellingsøya, on the other side of the fjord to Ålesund. Being located close to Ålesund with several family firms that had been active in processing, trading and exporting fish for generations, farmers at Ellingsøya from the nineteenth century used to dry salted fish on the rocks for the Ålesund merchants. This activity increased and became professionalised after World War II. Oddvin Bjørge, for example, established his own company in 1946 to produce clip fish. He started to acquire fish himself from Lofoten, and in the 1950s he also became co-owner of one of the merchant companies in Ålesund, Brødrene Jangaard (Bjørge, Grytten, & Bjørge, 2000).

A third reaction was to expand from fishery and processing to shipbuilding. Both the shipbuilding and the equipment supplier industry grew rapidly in response to the modernisation of fisheries that came out of the resource crisis. One family that moved both financial and human resources to the shipbuilding industry was Voldnes. In 1962, Gerhard Voldnes, the owner of what was one of the largest fishery companies in Norway at that time, established a shipyard, Voldnes Skipsbyggeri. According to the company history, “the yard was established as a direct consequence of the failure of the fisheries, and the group needed a leg to stand on” (Voldnes Skipsverft, 2002). The yard grew out of a small mechanical workshop that served Voldnes’ processing industry. The narrative about the shipyard tells that employees who worked in the processing unit could switch to the shipyard when activity was low. The yard built three modern fishing vessels for Gerh. Voldnes in the 1960s. In 1968, the yard built the first hall for building vessels of up to 80 metres indoors (Gerh. Voldnes, 2016).

A fourth strategy was to expand internationally. For example, Koppernæs met the crisis in the herring fishery by moving production from the region to Peru. In 1963, the CEO, Inger Koppernæs, heard about the rich fish stocks in Chile and contacted the Norwegian Council for Export for support to make a visit to Chile. This did not lead to any investment in

Chile, but rather to a general interest in fishery in Latin America, including Peru. In 1964, Koppernæs dismantled its production unit for fish meal close to Ålesund in Norway and rebuilt it in Tambo de Mora, 250 km south of Lima, Peru (O. M. Ellefsen, 2009, p.84).

1970s: The Dual Oil Shock

The oil crisis in the 1970s underpins the observation that regional resilience in a business landscape of increased complexity is a question of mobilizing related resources through combining diversification industries and increased specialisation. Agency again played a major role in creating regional capability, however, this phase also witnessed the paradox of exit of older case family firms from the scene and the entrance of the smaller entrepreneurial community-based actors as the new drivers.

The broader narrative goes like follows. During the 1960s, the shipbuilding industry, and the industries that provided the yards with engines, propellers, steering machines and other kind of equipment, developed rapidly in the region. The fishing industry, including processing, still dominated among the ocean-related activities, but industrialists and business journalists highlighted the structural changes that took place. The regional newspaper, *Sunnmørsposten*, wrote that the fishery industry should learn from the new trend in manufacturing by focusing more on automation, and cooperation within the region and with the best research centres in the country. Ola Skjåk Bræk, the CEO of the largest regional private bank, Sunnmørsbanken, warned that the fishery industry was lagging behind in terms of technology and innovation (Sunnmørsposten, 8 October 1966).

Moreover, severe challenges emerged due to downturns in important fisheries along with an international crisis in the shipbuilding industry. In 1973, oil prices dropped in a situation where South Korea and other East Asian countries took the lead in the global production of large ships, which led to a dramatic crisis for shipbuilding in Norway and other

West European countries (Brautaset & Tenold, 2008). In Norway, the government met the crises by strengthening the Keynesian economic policy. Regarding fishery, an active state that increased state subsidies combined with relaxed regulation had a positive effect by promoting substantial modernisation of the fishing fleet in these years, stimulating innovative combinations of technologies.

For example, a new combined net and trawl vessel was constructed, which allowed the expansion of pelagic fisheries into several species hitherto not utilised. In the 1980s, relaxed regulations also facilitated a major modernisation of the fleet of factory trawlers in the region, and the ship types, together with innovations in automatic longline fishing vessels, became a global export success. From the late 1930s, moreover, several supporting institutions and organisations grew around the maritime complex, and this infrastructure was a vital force in promoting regional cooperation and thus counteracting downturns in the 1970s (Berge, 2006c). In fact, this was an essential mechanism of clustering within a socio-economic framework of regional institutional thickening.

Regarding shipbuilding, government policy also had a negative effect, since it prolonged the crisis and ignored the fact that the crisis was an expression of structural problems. Around 1980, industrial policy changed, and liberal principles replaced the Keynesian principles. A trend beginning in the 1960th accelerated by this time, giving the county of Møre and Romsdal with Sunnmøre as the core district, dominance in Norwegian shipbuilding. In 1966, the county accounted for about eight per cent of employment in Norwegian shipbuilding industry, in 1980 15 per cent and from the 1990s to stabilize at about 35 per cent. The surviving, but blooming shipbuilding industry in Sunnmøre, was almost exclusively located in small rural communities (Berge, 2006c). The industry was very flexible in relation to various vessel markets. It retained previous markets as repair, construction of fishing and merchant vessels, but the yards also managed to transform into

building oil service vessels as Norway had entered the oil and gas industry after the Ekofisk field in the North Sea was announced as profitable in December 1969 (Ryggvik, 2015).

Among the selected family firms, different strategies were undertaken to meet this shock. One strategy was to enter the new industry by developing, building and contracting vessels to serve the oil fields in the North Sea. The technological and knowledge challenges in building deep sea fishing vessels and OSVs for the rough North Sea are much of the same and thus related (Berge, 2006a). In 1972, the shipyard Voldnes Skipsverft, established in 1962 to counteract the effects of the herring crisis, launched the first OSV built in Norway, “Rig Pilot” (Eldøy, Farstad, Rørhus, & Fure, 2008). Voldnes was at that time the largest firm in the region (Sunnmørsposten, 28 November 1973). Voldnes built the vessel for Lars Uksnøy, a local fisherman and shipowner; Lars Aage Eldøy, with the consultancy firm Fiskarstrand, constructed the vessel together with Oddbjørn Farstad at Skipskonsult. The designers had experience of constructing advanced trawlers, and the first supply ship was a modified trawler. Several suppliers in the region delivered equipment such as winches, propellers, gears, steering engines and electronics.

In this case, microhistory data illustrates larger regional restructuring. Actors took the specialisation strategy a major step forward, while still combining it with diverse related activities. Several local yards followed up this first supply vessel with parallel production of fishing and supply vessels, but also repair, ferries and cargo ships. Close linkages between fisheries, especially deep-sea fishing, and shipbuilding had emerged as a major force before the crisis hit the shipyards in the 1970s (Berge, 2006c, p. 332.). When some ship-owners entered the petroleum era in the late 1970s, they maintained this interactive knowledge transfer. The designers who constructed the first OSVs in the region had in mind a deep-sea fishing vessel operating in stormy weather.

Collective agency again played a paramount role in regional transformation and clustering. In addition to changes in the shipbuilding industry, some family firms entered the activity of owning and running OSVs, including some newcomers. One such family was the Sævik family from Remøya, a small island with 341 inhabitants in 2015, and part of Herøy municipality with Fosnavåg at the centre (8,972 inhabitants in 2015). As a young man in the 1960s, Per Sævik went into the fisheries like his father, uncle and grandfather, who all owned their own fishing boats. In fact, his father, Arthur, was a pioneer who made profits from herrings and was active in international industrial fisheries outside Iceland, as well as mackerel sharks outside Newfoundland. Like his father, Per Sævik became a pioneer. He took the family business into the offshore age, and he became a member of the Parliament as well as the president of national business associations both within the fisheries and for ship-owners (Bøe, 2010).

Per Sævik acquired his first fishing vessel in 1975 but sold it in 1979: he thought his boat was not modern according to new vessel standards. The capelin fisheries failed, and instead of investing in a modern fishing boat, Sævik went into the offshore industry, ordering a vessel from a regional shipyard, Ulstein Verft. He established a limited partnership, KS Sævik Supply AS, together with his brothers, some neighbours and the owner of the shipyard. However, timing was bad due to the overproduction of new vessels. They made no profit until the late 1980s, when they sold the vessel with profit and Per Sævik could start to expand by acquiring more offshore vessels. By 1995, he had acquired six offshore vessels.

Another strategy to meet the crisis was to invest in industries that supplied the shipyards with equipment. Parallel to the transformation of the yards from primarily producing fishing vessels to OSVs, the equipment producers followed the shipping companies and the yards into the OSV sector. Especially in Herøy, a centre for deep-sea fishing, entrepreneurs converted trawlers into OSVs. Moreover, they ordered new vessels

from local yards. Expansion of the supplying industries contributed to strengthening both vertical and horizontal integration in the region through acquisitions and mergers and through cooperation among firms (Sunnmørsposten, 9 February 1976).

A third strategy was to invest in fishing. As the newspaper *Sunnmørsposten* reported (15 November 1975), fishery was still the main artery of all activities in the region. The fishermen had been wise when they had to make radical changes in the 1960s. Instead of listening to experts who claimed that processing frozen fillets was the only way to go in the future, they had a strong belief in the traditional export of salted and dried fish. In addition, they invested in modern specialised fishing vessels within the pelagic sector. A successful fishery emerged, and new species became valuable in meal production in the fish processing industry. While exports of fish meal and fish oil declined, Norwegian actors within fisheries diversified into a blooming fish farming industry (salmon) where such products made up a decisive part of the salmon fodder (Berge, 2006a).

One family that participated in this transformation, like the aforementioned Sævik family, was the Remøy family from Remøya, Herøy (Aam, 2015). In 1977, four Remøy brothers acquired a fishing vessel, 'Jan Mayen', for fishing shrimps around Greenland. They were all in their twenties. Their father was a fishing captain but did not possess his own ship. A neighbour who had established Remøy Havfiske in the 1960s inspired the brothers. The new ship was partly financed by another neighbour, Petter Sævik, who was Åge Remøy's father-in-law. In 1986, one of the brothers split from the others and continued as an independent owner of a fishing vessel. The following year, the other three brothers diversified by acquiring their first OSV, which was sold after six months with a profit of 15 million NOK.

Our oldest case firms were at this historical conjuncture less embedded in the growing community-based environment and had instead been hang up in the centralized town-based development path. This eventually made space for an exit strategy as Koppernæs (into car dealing and iron ware retail), Holm (into property) and Brødr. Aarsæther (bankrupt in 1989) withdrew from ocean-related activities. In 2005 Voldnes had sold out all ocean related activities, only a property development company remained. Koppernæs re-entered the maritime complex in 2000, but in a marginalised form.

Globalisation from the 1990s

During the 1990s, the region became gradually more interwoven in the new global economy. It opened for international expansion, especially for OSV activities, when new global offshore activities emerged in areas such as Singapore, Rio de Janeiro and the coast of China. Globalisation also meant that foreign actors became more interested in investing in the region due to its high competence and global reputation (Amdam & Bjarnar, 2015).

The years around 2000 represented a breakthrough in the globalisation process. In 1999, the British firm Vickers acquired most of Ulstein: at that time, it was the region's largest firm in the design and production of OSVs. It was resold to Rolls Royce shortly after. In 2002, the shipyards experienced a crisis stemming from an overly strong Norwegian currency, combined with wage increases and reduced state support. Competitiveness declined, and they lost market share to shipyards in Asia and Eastern Europe. Employment fell from 5,500 to 3,800 in 2002, and the industry was pushed to internationalise to new markets (Amdam & Bjarnar, 2015). However, what characterised the region from 2000 to 2010 was a process of strong internationalisation of many firms within the OSV industry, including suppliers and ship-owners.

In the 1990s there were excellent offshore opportunities and bad times in the fishery industry, the opposite of the mid-1980s when the Remøy brothers had made their first

investments in offshore. Now they sold most of their fishing vessels and acquired shares in Sævik Supply and set up an investment company, Investa, where they lost most of their money. They invested in fisheries again by acquiring a vessel for cod fishery and one for fishing outside New Zealand. However, they mostly invested in new offshore vessels (Aam, 2015).

The brothers, living in the same local community, but often in conflict, became pioneering entrepreneurs and owners of two different offshore companies, Åge of Rem Offshore in 1998, and Stig of Olympic from 1996. In 2005, Åge Remøy possessed six OSVs. The same year Rem Offshore was listed on the Oslo Stock Exchange. The Remøy story illustrates one pattern in the reaction to globalisation in the region, and that was to move resources from fishery to offshore-related activities. In the 1980s, substantial investments were made in modernising the fishery fleet. During 1995–1998, fishing vessels accounted for 40 per cent of the ship consultants' portfolio, but only 17 per cent in 2001–2003. In the same period, offshore supply vessels accounted for over 73 per cent of the consultants' assignments. This illustrates the change from fishery to offshore industry as the leading industry in the region (Berge, 2006c).

While the Remøy case illustrates how actors moved between owning a fishing vessel and an OSV, others also invested in the production of OSVs, like the Sævik family (Bøe, 2010). The following underlines how globalisation was met by smaller locally embedded actors. In the late 1990s, the Sævik family, like other local investors, experienced a period of expansion and huge profitability. In 1996, the company acquired 12 ships from Viking Supply; it merged the different companies into one and went to the Oslo Stock Exchange. Due to a lack of control of the company (15.45 per cent of the shares), the family could not resist a takeover, and the firm was sold to a Houston-based company, Trico Marine. The sale was very profitable, but in order to reduce risks, Per Sævik wanted to diversify when

investing. One result of this investment strategy was a new offshore company, Havila Shipping, listed in 1997 with 19 per cent family control. In 2002, the French company Bourbon gained control of Havila, and Sævik again sold his shares but kept the brand and ten of the vessels. In 2003, he established a new Havila Shipping AS which, in addition to owning and operating OSVs, included some fishing vessels. The new company also internationalised by investing in three vessels in Iceland.

Another result of the diversification strategy was investment in shipbuilding. In the late 1990s, Per Sævik acquired Simek, a shipyard in Flekkefjord, south in Norway, which built vessels for customers like A.P. Møller–Maersk, and Hyllestad from Kværner (Bøe, 2010). The diversification strategy, and the combination of experiences from different ocean-related industries, gave the family flexibility to manoeuvre when business cycles changed.

Reduced investment in the fishing industry combined with new investment in the maritime offshore industry and foreign direct investments (FDI) were the typical patterns characterising the region's reaction to globalisation. The transition from fishing to offshore shipping operations was considering knowledge, technology and relations with shipyards, ship designers and equipment manufacturing related. On other socio-economic variables, the transition represented bigger steps, such as in financing. In the first half of the 1980s, many fishing boat owners financed their expansion into offshore shipping through limited partnerships (KS-schemes). This form of financing was completely new, and it became a catastrophe for many local ship owners. Later growth is largely financed through the stock exchange. We may ask if the several hostile acquisitions following the stock exchange listing was a consequence of a development into activities that were too unrelated at these points.

Conclusion

The development of the Sunnmøre region in the period from 1920 to 2010 is a good example of what economic geography denotes a resilient region according to its ability to recover from external shocks. The region was in this period dominated by industries that were related to ocean resources, and throughout most of the period, the fishery, processing, supply and equipment industries for shipyards and the OSV industry were dominant in Norway compared to other regions. Through several shocks, not only did the region recover, but new industries based on ocean resources also emerged or achieved a more central position in the regional economy.

Historical studies demand contextualized and dynamic concepts of related variety and resilience. We have demonstrated how technological frontiers, for example, moves over time, how new companies and industries emerge and others die out, and how the relationship between industries changes. Accordingly, following key regional actors over time and through shifting contexts could produce a less static concept of related variety than seems to be dominating in current economic geography literature.

In all periods following shocks, some key family firms in the region made decisions that brought the firms into related activities. In our cases, related activities had a gravitational effect on firms when they searched for alternative activities in response to shocks. Related activities were attractive due to their geographical closeness and similarities in terms of resources, and they represent a repertoire of possible reactions to shocks. Being present in related activities does not only made knowledge transfer easier but make the reallocation of financial resources less risky within the framework of the family. Hence, we contribute to the theoretical elaboration on the distinction between related and unrelated variety (Boschma, 2017; Kuusk & Martynovich, 2018) by introducing a social-cultural factor related to the region's tradition in exploiting natural resources as a criteria for defining the degree of relatedness. The move from fishing of herring to cod was a small step according to the

official categorisation of industries. On the other hand, to move from fishery to building OSVs was a big step according to industrial classification. However, regarding networks, knowledge and technology, these two extreme examples of steps into related activities was close in this regional context. The results of applying this way of defining the degree of relatedness address the need for including socio-cultural factors in elaborating generalized theories on related variety.

Second, we contribute theoretically to the call for bringing the role of agency into regional resilience studies (Boschma et al., 2017; Bristow & Healy, 2014). The study shows that the family firms were agencies that made an impact on the regional development by making choices between alternatives within a landscape of related activities. We are aware that the positions of the six families within the regional economy changed over time. However, due to the strength of family ownership in the region and the centrality of the six chosen cases, we suggest that the micro-governance of family firms had a strong impact on the development of regional resilience.

Among the six family firms we have studied, there are several examples of unique company-specific events. Brødr. Aarsæther did not manage the challenges in the 1980s. The Holm family sold out and used the profit for new international investments and cultural projects. Voldnes also changed from the largest firm in the region in the 1960s to a small property company in the early twenty-first century. As a general trend, however, the behaviour of the six family firms reflects a specific regional development of resilience. In some case, like Koppernæs' decision to import automotive, the new activities were unrelated, and in other cases, the choices led to higher degree of specialization. However, these choices did not challenge the family firms' horizon of choosing within the space of related variety. Next time they experienced a shock, they gravitated back to the alternative of activities that were related to the exploitation of ocean resources. We regard this practice as socio-culturally

embedded. In our case family firms acted as collective agency; in other contexts, it could for example have been strong business networks.

Table 1. Family firms and their reaction to external shocks

Year	Shock	Brødr. Aarsæther	Koppernæs	Holm	Voldnes	Sævik	Remøy
Background of the founder		Owner of sloop	Clerk at a fish export firm	Cooper	Fishing	Fishing	Fishing
Year of establishment and first activity		1877: Cod liver oil production	1884: Trading fish	1887: Cod liver oil production	1917: Trading fish / processing	1975: Fishing vessel	1977: Fishing vessel
1920s–early 1930s	Several international and national economic crises	Diversification within processing and geographically	Diversification into processing of fish	Into science-based processing (vitamins) and pharmaceutical industry	Diversification into processing and geographically		
Late 1950s and 1960s	Herring crisis	Diversification into fishery	Dismantling part of the production unit and moving it to Peru	No major changes: stagnation	Into fishery and shipbuilding		
1973–1980s	International oil crisis and national and regional restructuring of shipbuilding industry; several regulatory and resource shocks in pelagic and white fish sectors	No major changes	Out of fishery into retailing of cars for some years	1971: Most activities merged with Br. Aarsæther and continued as a property company	Production of the first OSV in Norway	1975: From fishermen to investing in vessels 1980: From fish to OSV vessel	1977: From fishermen to investing in vessels 1986: Added OSV vessel
1990-2000s	Globalisation	1989: Bankruptcy	Diversification into maritime industry		2005: Into property	1998: Added shipyard 2002: Restructuring	1990s: From fishery to OSV, and back to fishery

Based on (Aam, 2015; Bøe, 2010; Eldøy et al., 2008; E. S. Ellefsen, 1967; O. M. Ellefsen, 2009; Koppernæs, 1959; Skorgevik, 2015; Vollan & Heli, 1977).

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Notes

¹ The information from newspapers has been collected from *Sunnmørsposten*'s archive in Ålesund and the National Library's newspaper database at www.nb.no/samlingen/aviser/
