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**Norwegian investments in specialised shipping:
an exploration of the formative period, 1960-1977**

by

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Abstract

In the 1970s and 1980s, as world shipping was in crisis, some Norwegian companies coped relatively well on the basis of participation in specialised segments, for instance car transports, gas, cruise and chemical shipping. Yet, the engagement in these niches was a recent phenomenon. Around 1960 none of these market segments had been clearly defined, and the Norwegian investments in specialised vessels were very limited.

The aim of the paper is to quantify the degree of specialisation in the Norwegian fleet and increase our knowledge of the companies participating in these niches. Initially, the criteria that define the ‘niche operators’ in 1977 are discussed and the companies in question are identified. Two aspects of the companies owning such vessels – size and geographical location – will be analysed.

Introduction

One of the dominant trends in shipping over the last fifty years has been the increasing diversification of the world fleet, with purpose-built vessels encroaching on trades previously served by general cargo carriers. As neatly summed up by Stopford; “[i]n 1945 the world merchant fleet consisted of passenger ships, liners, tramps and a small number of tankers. [...] By 1975 the fleet had changed out of all recognition and all the major trades had been taken over by specialized ships.”¹ While the technological changes were indeed massive, Mayer probably goes too far when he claims that they were “comparable in scope and impact to the replacement of sails by steam[.]”² This paper explores the increased specialisation within Norwegian shipping between 1960 and 1977.

The technological transformation referred to above was characterised by two related processes. First, in the high-volume end of the transport market, crude oil tankers, fuelled by the oil trade boom, were joined by specialised dry bulk carriers in the late 1950s and 1960s. Here, size was paramount, and the maximum and average tonnage of vessels increased at a tremendous pace. Second, improvements in cargo storage and handling, rather than pure economies of scale, were the basis for a parallel process of technological progress. Some owners chose to invest in smaller specialised vessels, which made important inroads into the transport of commodities that were traded in smaller volumes. The technological shifts rested on two factors. One important factor was improvements in cargo handling and ship construction, which led to lower unit-transport costs. The other was increased demand for transport, which in itself was further exacerbated by reduced shipping costs.

The two technological processes transformed practically all segments of the shipping market. Yet, the basis for the development and, in particular, the effects on freight rates and trade, have largely been neglected in the literature. The main exception

¹ Stopford (1997:57).

² Mayer (1973:145).

is the containerisation process, which has been the subject of a number of studies.³ The aim of this paper is to increase our knowledge of the Norwegian fleet of specialised vessels and the companies that decided to invest in such tonnage. In order to do this, two extensive databases, covering the Norwegian merchant marine in 1960 and 1977, have been constructed. These data sets form the basis of the ‘macro’ part of the analysis.

The working paper consists of three parts. The first part presents the increasing specialisation in Norwegian shipping from 1960 to 1977, serving as an introduction to the structural transformation of the fleet. In the second part, the Norwegian fleet of specialised ships in 1977 is defined. Two aspects of the companies owning such vessels – size and geographical location – are analysed. Finally, after a summary of the main findings, some potential avenues for further research are sketched.

The trend towards increased specialisation

It should be emphasised that the term ‘specialisation’ does not correspond with the manner in which it is commonly used, for instance as the opposite strategy of ‘diversification’. In this paper, ‘specialisation’ refers to investments in dedicated ships targeted at specialised segments of the shipping market. Thus, a shipping company that chooses a ‘specialisation strategy’ by operating only one type of ship, will not be included in the analysis, unless these ships are serving a particular niche. Similarly, a company might diversify its portfolio by investing in ships for several segments, but if one or more of these segments are served by purpose-built tonnage, the company will be considered as ‘specialised’. Consequently, it is the type of vessel, rather than the structure of the fleet, that determines whether or not a company is identified as ‘specialised’.

³ See for instance Broeze (2002), or, for a review of three books published to laud the 50th ‘anniversary of container shipping’ in 2006, Roland (2007). As the Norwegian participation in this segment was limited, containerisation does not play an important role in this paper; see Poulsen (2007) for one Scandinavian response to the change. For an exploration of the postwar cost decline in the dry bulk market, see Kaukiainen (2006). Lorange (2005) gives a good introduction to the investment options available for shipowners at various times.

Spurred by rapidly increasing seaborne trade during the 1950s and 1960s, Norwegian owners invested heavily in mammoth ships for commodity-based segments – dry bulk vessels, combination carriers and crude oil tankers. Within these segments, the Norwegians were among the most eager at utilising the new possibilities related to economies of scale. The main reason for this investment strategy was the cost structure of Norwegian shipping at the time. While capital – both equity and loan capital – was relatively inexpensive for Norwegian owners, the combination of an increasingly high wage level and strict manning regulations made labour relatively costly.⁴ By the early 1970s, annual crew costs for a medium-sized ships were approximately NOK one million (£ 60,000) higher than for a Greek vessel, and relative to ships crewed by Asians the difference was even larger.⁵ Moreover, this ‘wage disadvantage’ increased during the first part of the 1970s – by the mid 1970s the crew costs were more than 60 per cent higher for a Norwegian ship than for an identical ship registered in one of the open registries.⁶

The rational adaptation to this set of relative prices was to build large ships for which manning represented a relatively low proportion of total costs. An additional element of the strategy was frequent renewal of the tonnage, as new alternatives, with even larger economies of scale, became available. Most Norwegian owners chose this route. As a result, by the middle of the 1970s the average Norwegian ship was both newer and substantially larger than the average foreign ship, and the Norwegians owned a higher proportion of tankers, dry bulk and combination carriers.⁷ Such vessels served the market segments in which the economies of scale at the ship level were the most pronounced.

⁴ See Tenold (2006).

⁵ Seland (1994:212).

⁶ Stortingsmelding 23 (1975-76).

⁷ The average Norwegian ship was more than twice as large as the average foreign ship, and the average age of the Norwegian fleet was approximately two thirds of the average age of foreign ships (6.4 versus 9.5 years). Tankers, dry bulk and combination carriers made up more than ninety per cent of the Norwegian fleet, compared with less than eighty per cent of the world fleet; see Tenold (2006).

An alternative adaptation to the Norwegian cost structure was to invest in high-technology niche tonnage. For such vessels, manning per unit of tonnage was high compared with the largest ships. However, as a result of the high price of specialised ships, the proportion of labour costs to capital costs nevertheless became relatively low. By way of illustration; in the late 1960s a 10,000 dead weight ton (dwt) chemical tanker was approximately twice as expensive per ton as a conventional tanker of the same size. Compared with a 200,000 dwt tanker, the specialised vessel was six times as expensive per ton.⁸ Accordingly, the cost disadvantage could be reduced not only through economies of scale, but also through investments in expensive tonnage aimed at niche markets. The owners that opted for this latter investment strategy are the focus of this working paper.

The basis for the analysis of specialisation is two databases covering all Norwegian vessels above 5,000 gross registered tons (grt) in 1960 and 1977. The data sets are made on the basis of the registry of the Nordic fleets published annually by *Det norske Veritas*, the leading Norwegian classification society.⁹ The fact that the Norwegian merchant marine is defined as all ships larger than 5,000 grt implies that some aspects of the specialisation, typically new segments served by smaller vessels, are not taken into account.¹⁰ Nevertheless, even with this definition of the fleet, the data provide interesting insights into the structural changes. The two databases provide ‘snapshots’ of the Norwegian fleet at two different points in time, and give the following pieces of information on individual vessels: name and type of ship, tonnage (both gross registered tonnage and deadweight tonnage), port of registry and name of the managing owner.¹¹

⁸ See Thowsen & Tenold (2006:309).

⁹ Det norske Veritas (1960) and Det norske Veritas (1977). In this period, the Veritas-registry covers the Norwegian fleet very well. Subsequent use of Flags of Convenience makes the correspondence lower, but due to the strict Norwegian flag regime this was no problem in the years analysed in this paper.

¹⁰ Extending the database to include smaller ships would imply a strong increase in the number of vessels, but only a limited increase in the aggregate tonnage.

¹¹ Information on ship type forms the basis for the differentiation between specialised and non-specialised tonnage. In some instances the categories used in the Veritas registry are too broad to differentiate between general and specialised vessels, and the information has been supplemented by other sources. In addition,

The databases contain detailed information on 867 ships in 1960 and 714 ships in 1977. As a proportion of the total Norwegian tonnage, measured by grt, the databases cover 85 per cent and 98 per cent respectively in the two years. The lower coverage in 1960 reflects the fact that smaller ships – which have been excluded from the data sets – made up a larger share of the Norwegian fleet in 1960 than seventeen years later.

Tables 1 and 2 illustrate the structural changes in the period from 1960 to 1977. Three important trends stand out. First, there was a strong increase in the size of the fleet – gross tonnage almost multiplied by a factor of three. Second, the basis for this expansion was growth in the average size of ships rather than an increase in the number of vessels. Finally, the share of general cargo vessels was reduced, with a parallel increase in the proportion of specialised tonnage.

Table 1. The Norwegian fleet by ship types, 1960¹²

Type	Tonnage (grt)	Number	% of fleet	% of number
Tankers	5,913,661	473	65.0	54.6
Dry bulk carriers	616,829	55	6.8	6.3
Combination carriers	145,276	9	1.6	1.0
General cargo	2,355,025	325	25.9	37.5
Specialised ships	63,744	5	0.7	0.6
Total	9,094,535	867	100	100

Table 2. The Norwegian fleet by ship types, 1977¹³

Type	Tonnage (grt)	Number	% of fleet	% of number
Tankers	14,680,843	203	54.3	28.4
Dry bulk carriers	5,318,911	199	19.7	27.9
Combination carriers	3,791,710	58	14.0	8.1
General cargo	1,054,715	122	3.9	17.1
Specialised ships	2,204,853	132	8.2	18.5
Total	27,051,032	714	100	100

four pieces of information have been included in the data sets, but not been used in the current analysis. These are type of propulsion, previous names and year and country of build.

¹² Based on the purpose-built databases of information from the Veritas-registry.

¹³ Based on the purpose-built databases of information from the Veritas-registry.

None of the three trends presented above were exclusive to Norway. With regard to fleet growth, the Norwegian fleet expanded more slowly than the world merchant marine – annual compound growth rates were 5.5 and 6.7 per cent respectively. A more substantial deviation was the pronounced increase in average size. While the average Norwegian vessel was almost 150 per cent larger in 1977 than in 1960, the comparable figure for the average foreign ship was slightly less than sixty per cent.¹⁴ This reflects the dominant Norwegian strategy of rapid renewal of tonnage in order to reap economies of scale. Finally, although it is hard to find detailed aggregate data for the growth of specialised tonnage at the international level, the substantial market shares that Norwegian owners obtained in several of the specialised segments make it possible to infer that the Norwegian expansion within these new niches was particularly rapid.

¹⁴ Calculations on the basis of Table 1 in Lloyd's (1960) and Lloyd's (1977). The growth rates in the text refer to the full Norwegian fleet, and therefore differ from the ones that calculations based on Table 1 and Table 2 would give. See the note to Table 3 for an explanation.

Figure 1. Norwegian shares of world fleet and some segments, per cent, 1977¹⁵

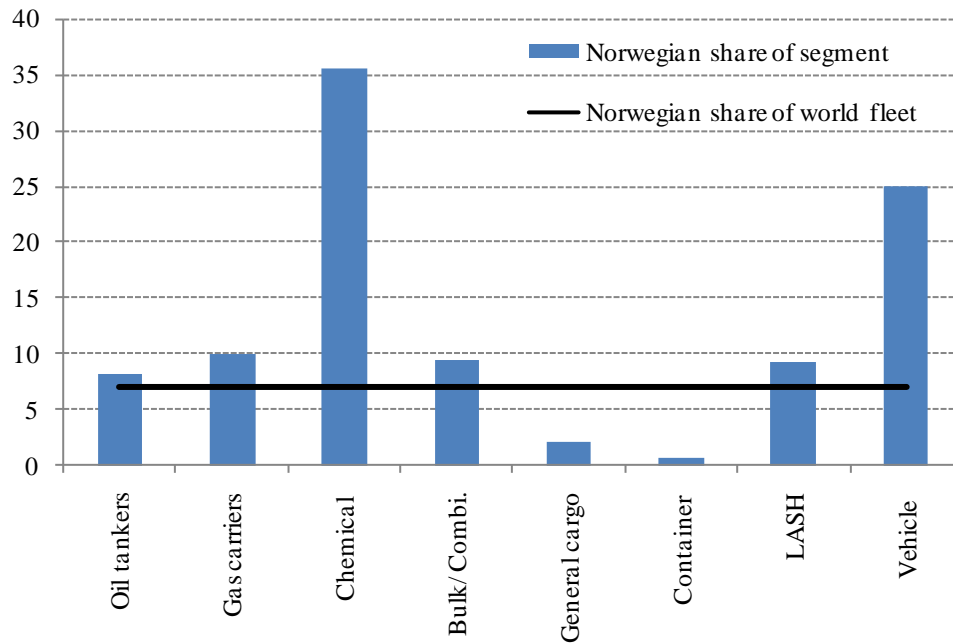


Figure 1, based on Lloyd's *Statistical Tables*, illustrates that the Norwegians by 1977 were disproportionately represented in a number of shipping segments. The aforementioned focus on tankers and bulk carriers is, however, not as pronounced as the Norwegian presence in some of the new niches. Although not as detailed as the data that will be used in the subsequent analysis, Figure 1 indicates the substantial Norwegian investments in some of the specialised ship types, as well as the low proportion of general cargo and container tonnage. The limited volume of general cargo tonnage in the Norwegian fleet reflects the substantial sales of such vessels, which became more and more difficult to operate at a profit given the Norwegian cost structure.¹⁶ The meagre investments in container ships were primarily a result of the limited – and declining – Norwegian participation within liner shipping.

Tables 1 and 2 clearly demonstrated the increase in the proportion of the fleet made up by specialised vessels. The fact that specialised ships made up a larger share of

¹⁵ Computed from Table 2 in Lloyd's (1977). The term "LASH" refers to a "Lighter Aboard Ship", a type of ship with cargoes stowed in unitised lighters.

¹⁶ For an introduction to the postwar development of general cargo shipping in Norway, see Bakka (2002).

the number of vessels than of the tonnage is explicable by the fact that the exponential growth in vessel size primarily occurred in non-specialised segments. This is also evident from Table 3, which shows the 1960-77 growth in tonnage, number and average size of the various ship types. The term “Growth factor” refers to the ratio between the 1977- and 1960-figures; a growth factor of two indicates a doubling of the tonnage, number or size between 1960 and 1977.

Table 3. Growth factor: tonnage, number of ships and average size, 1960-1977¹⁷

Type	Gross tonnage	Number of vessels	Average size
Tankers	2.48	0.43	5.78
Dry bulk carriers	8.62	3.62	2.38
Combination carriers	26.10	6.44	4.05
General cargo	0.45	0.38	1.19
Specialised ships	34.59	26.40	1.31
Tonnage in database	2.97	0.82	3.61
Total Norwegian fleet*	2.48	1.00	2.47
World fleet*	3.03	1.87	1.62

The data in Table 3 indicate that different forces were at play in the various market segments. The end result was a structural transformation of the fleet. The growth in average size was lowest for the general cargo vessels, and clearly insufficient to neutralise the decline in the number of such ships. With regard to vessel size growth, the tanker development is the most spectacular. In spite of the fact that the number of tankers was more than halved, the aggregate tanker tonnage increased by almost 150 per cent over the period. In the case of the specialised ships, the increase in average size had only modest effects. Here, the growth in the sheer number of ships was undoubtedly the most important factor behind the rapid expansion. For dry bulk and combination carriers the picture is less clear, with growth in the number of such vessels playing a slightly more

¹⁷ Based on the purpose-built databases of information from the Veritas-registry and, for the lines marked with asterisks, Lloyd’s (1960) and Lloyd’s (1977). The deviations between the growth factors for the database tonnage and for the total Norwegian fleet reflect the fact that expansion was more rapid, and to a larger extent based on growth in size, for ships above 5,000 grt than for ships below this threshold.

important role than size increases. The comparison of the data for the total Norwegian and world fleets illustrate the more rapid rate of expansion internationally and the relatively strong increase in average size in Norway.

Specialisation 1977

The number of specialised ships in the databases increased from five in 1960 to more than 130 in 1977. Moreover, in 1960 only two of the vessel types that we define as ‘specialised’ – cruise/ passenger vessels and gas tankers – were present in the Norwegian fleet.¹⁸ Indeed, most of the specialised vessels that were added in the years up to 1977 were ship types that had not even existed in 1960. Until the introduction of the new purpose-built tonnage, their cargoes had usually been transported in general cargo carriers. For instance, around 1960 cars were loaded by cranes onto general cargo ships and most chemicals were transported in carboys or steel drums on conventional vessels. By 1977 dedicated vehicle carriers had taken over the majority of the car transports, while an increasing number and volume of chemicals were carried in bulk in parcel tankers.

The introduction of new technologies went hand-in-hand with increasing volumes and reduced unit freight costs – two self-reinforcing effects. In many instances trade growth paved the way for new ship types. Simultaneously, the increased efficiency and the reduced unit transport costs associated with the new technology further stimulated trade. This combination of new technological opportunities and increased demand enabled the introduction of specialised tonnage in a number of niches. Table 4 details the composition of the Norwegian fleet of specialised vessels in 1977.

¹⁸ Although the 1960 Norwegian fleet included some ships with the ability to carry chemicals in bulk, I have chosen not to register these as specialised vessels. The vessels were either converted crude oil tankers or very small ships. They should be seen as predecessors to the purpose-built ‘chemical tankers’ that subsequently came to dominate the market, and which are included in this analysis. The lack of sophistication means that the chemical tankers of 1960 had more in common with the ‘non-specialised’ oil products tankers of the 1970s than with the chemical tankers of the 1970s.

Table 4. The specialised Norwegian fleet by ship types, 1977¹⁹

Type	Tonnage (grt)	Number	Share of fleet	Share of number
Car carriers	160,696	15	0.6	2.1
Chemical tankers	686,008	44	2.5	6.2
Container vessels	68,316	3	0.3	0.4
Cruise vessels	278,066	18	1.0	2.5
Gas tankers	359,898	23	1.3	3.2
LASH	73,731	2	0.3	0.3
Open hatch	506,403	24	1.9	3.4
Ro-Ro	71,735	3	0.3	0.4
Total	2,204,853	132	8.2	18.5

The 132 ships in Table 4 were owned by 37 different companies. This implies that almost a quarter of the 158 Norwegian shipping companies included in the data set in 1977 had invested in specialised tonnage. However, there were distinct differences in the propensity to invest in specialised tonnage, both with regard to company size and geographical location.

Specialisation by company size

Figure 2 shows that large companies were more likely than smaller companies to invest in specialised ships. Exactly half of Norway's twenty largest shipping companies had invested in such ships, compared with ten per cent of the twenty smallest companies included in the data set. This can partly be explained by the increased diversification possibilities of larger companies, and it is evident that the investments in many cases were speculative 'pilot balloons'. Larger companies had sufficient financial clout to devote some resources to new and unknown activities, while their main investments were still geared towards 'business as usual'.

¹⁹ Based on the purpose-built databases of information from the Veritas-registry, with the share of fleet and number in per cent. The term "Ro-Ro" refers to roll-on roll-off vessels.

Figure 2. Investments in specialised tonnage by rank (based on total fleet size), 1977²⁰

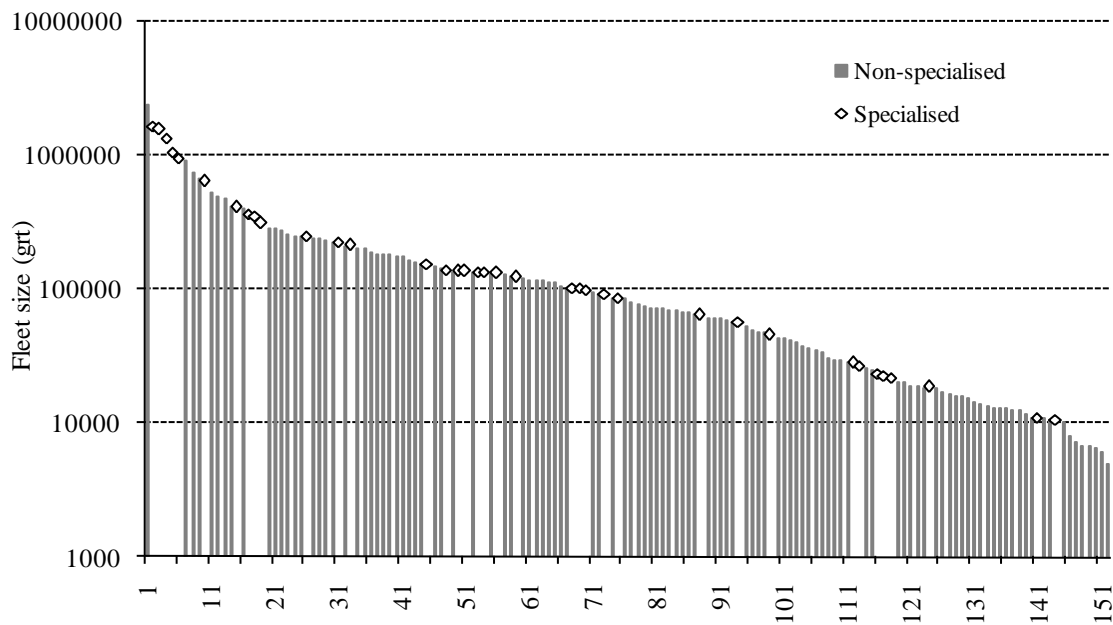


Table 5 shows that while more than half of the companies with fleets larger than 300,000 grt had invested in specialised tonnage, less than ten per cent of the companies with fleets smaller than 20,000 grt had done so. However, the degree of ‘dedication’ to the specialised segment decreases as the companies become larger. Column 5 – “Average specialisation ratio” – looks only at the owners that had invested in specialised tonnage, and shows the average percentage of such ships in their fleets.²¹ Column 6 – “Specialised vessels (% of fleet)” – refers to the specialised ships’ proportion of *all* tonnage owned by *all* companies included in the size range.

²⁰ Based on the purpose-built databases of information from the Veritas-registry. The companies have been ranked according to size, but a logarithmic scale has been chosen in order to give a more clear presentation.

²¹ This is an unweighted average of the specialisation ratios, implying that there is no differentiation between smaller and larger companies. However, given the fact that the categories are grouped according to size, this does not make much of a difference.

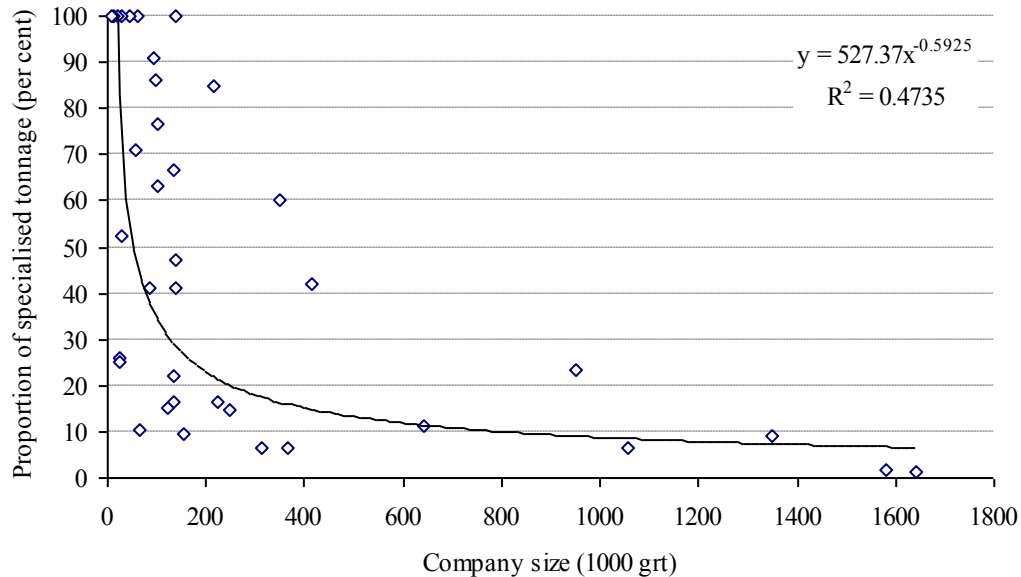
Table 5. Differences in specialisation, based on size, 1977²²

Fleet size (1000 grt)	[i] Sum companies	[ii] Spec. companies	[ii]/[i] (%)	Average spec. ratio	Spec. vessels (% of fleet)
0-20	32	3	9.4	100	6.43
20-50	24	6	25.0	68	17.8
50-100	27	5	18.5	67.9	15.8
100-150	23	9	39.1	49.3	19.6
150-300	27	4	14.8	32	4.6
300+	19	10	52.6	11.1	6.1
Total	152	37			

Despite the explicable trend towards a lower share of niche ships in large specialised companies than in small companies, there were considerable variations. Figure 3 shows the share of specialised tonnage in the companies' fleets on the y-axis, and the size of the companies, measured by the size of their total fleets in 1000 grt, on the x-axis.

²² Based on the purpose-built databases of information from the Veritas-registry. Column [i] refers to the number of companies with fleets within the size range, while [ii] refers to the number of companies within the size range that had invested in specialised ships.

Figure 3. Specialisation ratio and company size, 1977²³



Rather than linking the choice of a specialisation strategy to the size of the companies in 1977, the analysis could have been based on the size of the companies in 1960. Again, exactly half of the twenty largest companies went on to buy specialised ships. However, there was very little investment among the smaller companies. If we divided the population of shipping companies in two, more than a quarter of the companies in the top half in 1960 went on to invest in niche tonnage, compared with around six per cent of the companies in the bottom half.²⁴ Ten of the specialised companies in 1977 were newcomers, ie companies that had not existed in 1960. This gives a ‘newcomer’-rate of 27 per cent among the niche companies, only marginally different from the 30 per cent

²³ Based on the purpose-built databases of information from the Veritas-registry.

²⁴ A similar exercise on the 1977-fleet would give 34 per cent and 14 per cent, respectively. The difference between the aggregate proportions in the two years (15 per cent versus 24 per cent) can be explained by the investments of the specialised companies that did not exist in 1960.

‘newcomer’-rate among all companies. There is thus no indication that newcomers were more or less likely than the established companies to invest in niche tonnage.²⁵

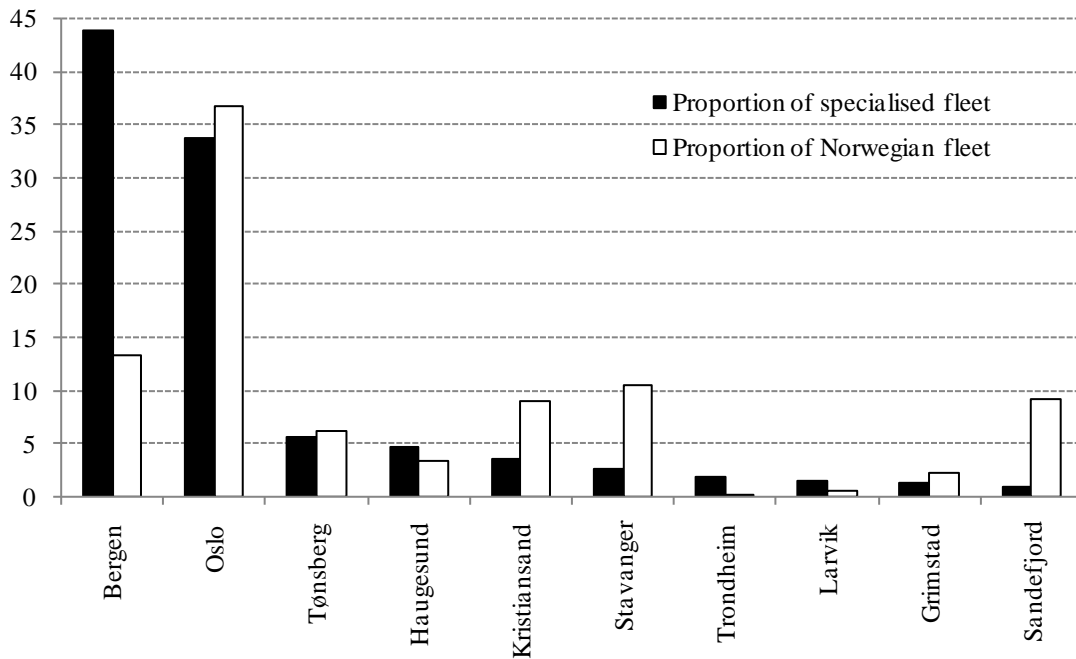
Geographical differences

Some intuitive reasons for the high share of specialised tonnage in the Norwegian fleet relative to the rest of the world were sketched in the first part of the working paper. However, the analysis based on the data sets also reveals substantial geographical variations in the degree of specialisation within Norway. In particular, one Norwegian shipping centre – Bergen – stands out, with a substantial proportion of the specialised vessels in the fleet. Given that Norwegian owners faced the same price of inputs, differences in labour and capital costs cannot explain the relatively high degree of specialisation in Bergen.

In 1977 companies in 21 different Norwegian cities owned tonnage warranting inclusion in the full data set. However, only nine of these cities harboured companies that had invested in specialised tonnage. Figure 4 shows the substantial differences between the various cities’ shares of the aggregate fleet and their shares of the specialised fleet.

²⁵ However, several of the newcomer companies had fairly close links to existing companies, for instance as a result of ownership or family connections. The possibility that some existing owners chose separate companies as their point of entry into specialised shipping should therefore be investigated more closely.

Figure 4. Shares of specialised and total fleets, by city, per cent, 1977²⁶



In four of the cities the proportion of specialised tonnage was higher than the proportion of the Norwegian fleet. Two instances – Larvik and Trondheim – were relatively small ports, where one or two companies choosing a specialisation strategy could make much of a difference. In Trondheim, the only registered shipping company had invested in a chemical tanker and a cruise vessel, as well as twelve smaller ‘traditional’ ships. The fact that Trondheim’s share of the specialised fleet is higher than the share of the aggregate fleet, is therefore the direct result of the strategies of this owner. Similarly, two of Larvik’s four shipowners had chosen a specialisation strategy; one owned two chemical tankers and the other a passenger vessel. In the case of Haugesund, four out of five specialised vessels were owned by the company Christian Haaland. However, the four ships – two gas tankers and two chemical tankers – were investments that had originally been made in co-operation with the Odfjell group, a company based in Bergen, the city with by far the highest specialisation ratio. Although it has been known that Bergen

²⁶ Based on the purpose-built databases of information from the Veritas-registry.

shipowners were pioneers within a number of specialised shipping segments, the scale of their specialisation, as is evident from Figure 4, may be characterised as surprisingly large.

A comparison of the pattern of specialisation shows that the Bergen shipowners played particularly important roles within two specialised segments; chemical tankers and open hatch bulk shipping. Table 6 shows that their main competitors, the Oslo owners, were characterised by investments in several niche segments, without the concentration evident in the case of Bergen. The Bergen owners had confined their investments to four niches – with two clearly dominating – while the Oslo investments were more thinly spread across six different segments.

Table 6. Specialised fleets, by segment and city, 1000 grt, 1977²⁷

	Car	Chemical	Container	Cruise	Gas	LASH	OHBC	Ro-Ro	# of niches
Bergen		478		22	35		433		4
Grimstad	31								1
Haugesund		36			53		14		3
Kristiansand					6	74			2
Larvik		28		7					2
Oslo	130	126	16	207	207		59		6
Sandefjord				20					1
Stavanger					58				1
Trondheim		19		22					2
Tønsberg			52					72	2
# of cities	2	5	2	5	5	1	3	1	
# of companies	5	12	2	10	11	1	6	1	

Two elements contribute to explaining why the Bergen fleet had a higher proportion of specialised ships than the Oslo fleet. First, the share of the shipping companies that invested in niche tonnage was substantially higher than in Bergen than in the capital. In Bergen 43 per cent of the shipping companies included in the data set had invested in specialised tonnage, compared with 24 per cent in the case of Oslo.²⁸ Second, the average

²⁷ Based on the purpose-built databases of information from the Veritas-registry

²⁸ This implies that the share of Oslo shipowners opting for specialisation was practically identical to the overall Norwegian share.

proportion of specialised tonnage among the companies that had chosen such a strategy was higher. Specialised ships made up on average 66 per cent of the specialised companies' tonnage in Bergen, versus 40 per cent in Oslo.²⁹

Future research

This brief introduction to specialisation within Norwegian shipping has had three aims. The first aim was to quantify the extent of specialisation in the Norwegian fleet in the pioneering period from 1960 to 1977. The second purpose was to identify patterns of specialisation, for instance with regard to the size of the companies involved or differences of a geographical nature. Finally, this preliminary investigation of specialisation should point to some future avenues of research.

With regard to the first aim, it is evident that the trend towards increased specialisation was very distinct in the case of the Norwegian fleet. Based on the growth of tonnage and number of ships, the specialised segments expanded much more rapidly than the established commodity-type segments. Furthermore, although detailed data on specialisation at the international level is not available, the existence of Norwegian first-movers and the disproportionately high Norwegian participation within many niches suggest that this development occurred relatively early in Norway. One explanation of this might be that the development towards increased specialisation had a Vernon product cycle-pattern, with entrepreneurs based in high labour-cost maritime nations such as Norway playing a particularly important role in the early phase.³⁰

The analysis of specialisation and company size showed what one would expect; larger shipping companies had a higher propensity to invest in specialised tonnage, but the proportion of niche ships in their fleets was in general relatively small. Although the data indicated that newcomers were as likely to invest in niche tonnage as established

²⁹ This is the average of the specialisation shares for individual companies, so smaller companies with full specialisation become more important than larger companies with limited specialisation. If we weigh the data, and look at the specialised tonnage as proportion of all tonnage owned by specialised companies, the Bergen share is 32 per cent, compared with 21 per cent in the case of Oslo.

³⁰ See Tenold (2009) for a discussion of this concept.

companies were, the relationship between newly-established companies and innovations could be explored further.

The evidence of substantial regional disparities in the degree of specialisation invites a number of challenging questions. First, to which extent was there cooperation – for instance through joint investments or pool tonnage – among the companies that specialised? Second, how did the relationship between shipowners and auxiliary entities, for instance brokers, charterers, yards or ship equipment producers, affect this development? The quantitative data, on which this paper is based, does not enable an answer of this question. However, anecdotal evidence from certain segments indicates that such forces were indeed at play, and this is another avenue that is undoubtedly relevant for future research.

Bibliography

- Bakka, Dag jr (2002) *Tramp – norsk trampfart 1945-85* (Bergen, 2002).
- Broeze, Frank (2002) “The globalization of the oceans: containerisation from the 1950s to the present,” *Research in Maritime History No. 23*, (St. John’s, 2002).
- Det norske Veritas (1977), *Register of Norwegian, Swedish, Danish, Finnish and Icelandic ships and of other ships classed with Det norske Veritas* (Oslo, 1977).
- Det norske Veritas (1960), *Register over norske, svenske, danske, finske og islandske skip* (Oslo, 1960).
- H.P. Drewry (1982), “Changes in ‘Neo-Bulk’ Trade, Transport and Handling, *An Economic Study*, No. 99, (London, 1982).
- Kaukiainen, Yrjö (2006) “Journey Costs, Terminal Costs and Ocean Tramp Freights: How the Price of Distance Declined from the 1870s to 2000,” *International Journal of Maritime History*, Vol. XVIII, No. 2 (2006), 17-64.
- Lloyd’s (1960) *Statistical Tables*, (London, 1960).
- Lloyd’s (1977) *Statistical Tables*, (London, 1977).
- Lorange, Peter (2005) *Shipping Company Strategies*, (Oxford, 2005).
- Mayer, Harold M. (1973) “Some geographic aspects of technological change in maritime transportation,” *Economic Geography*, Vol. 49(2), 1973, 145-155.
- Poulsen, René Taudal (2007) “Liner Shipping and Technological Innovation: Ostasiat and the Container Revolution, 1963-75,” *Scandinavian Economic History Review*, Vol. 55(2), 2007, 83-100.
- Roland, Alex (2007) “Containers and causality,” *Technology and culture*, Vol. 48(2), 2007, 386-392.
- Seland, Johan (1994) *Norsk skipsfart år for år*, (Bergen, 1994).
- Stopford, Martin (1997) *Maritime Economics* (London, 1988; 2nd ed., London, 1997).
- Stortingsmelding 23 (1975-76) “Om sjøfolkene forhold og skipsfartens plass i samfunnet”.
- Thowsen, Atle & Stig Tenold (2006) *Odfjell – The history of a shipping company* (Bergen, 2006).

Tenold, Stig (2006) "Tankers in Trouble – Norwegian Shipping and the Crisis of the 1970s and 1980s," *Research in Maritime History No. 32*, (St. John's, 2006).

Tenold, Stig (2009) "Specialisation strategies in Norwegian shipping – a Vernon product cycle approach", forthcoming as SNF Working Paper 20/09 (Bergen, 2009).