PROFITABILITY OF SHIPPING AND THE ROLE OF FLEET OWNERSHIP – NORTH EUROPEAN COMPANY CASE STUDY

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FACTORS AFFECTING SHIPPING COMPANY PROFITABILITY

- Branch and Robarts (2014) identify the fleet management as one of the main areas in successful shipping management. → There has been interest in academic literature wheather to own or to charter the tonnage that a shipping company is operating (Meng and Wang, 2011; Park et al., 2018; Tapaninen, 2020; Hiekata et al., 2022).
- Maritime fleet size and mix problems (Pantuso et al., 2014; Hiekata et al., 2022)
- Shipping cycles: long-term cycles that are driven by changes in the world industry; short-term cycles due to changes in the world economy; and seasonal cycles, such as those driven by agriculture (Stopford, 2009).
- Tapaninen (2020) mentions that the correct timing of ordering, selling, and scrapping ships, as well as buying and selling used tonnage is often considered as more important than operational decisions (like selling cargo space at the right price).
- Hanjin Shipping went to bankrupt in 2016 (Shin et al., 2019), it decided to charter larger vessels to keep its position and market share. What went wrong?

- Davies (1983) studied the strategic level problem of the link between fleet size and profitability, coming to a conclusion that profits and unit costs in liner shipping are highly sensitive to the degree of capacity utilisation
- Fusillo (2004) showed that liner shipping fixed capacity brings problems as demand fluctuates.

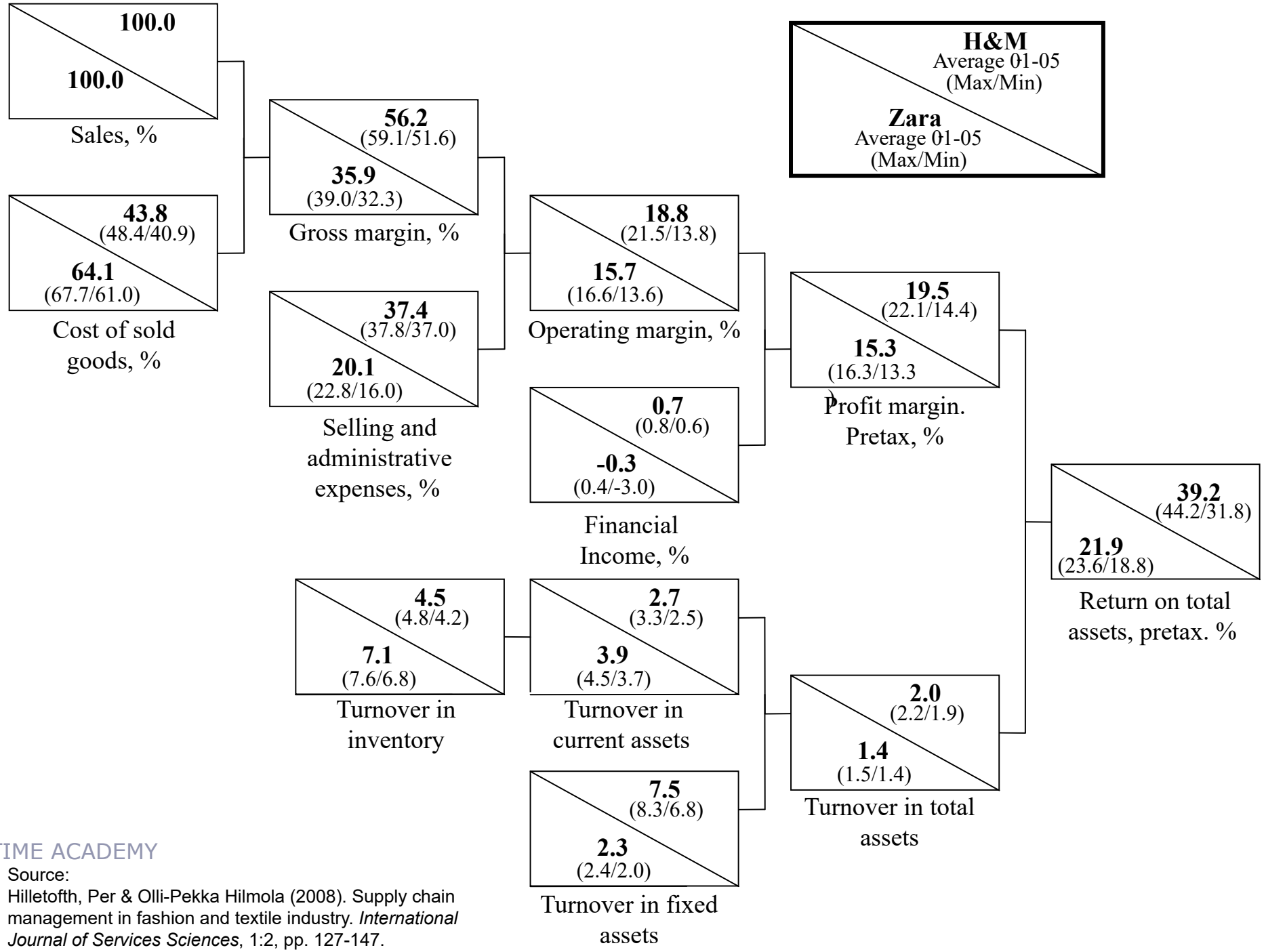
RESEARCH QUESTIONS AND RESEARCH METHODOLOGY

- How case company's sales, profit and Return on Investment (ROI, %) developed in 1994-2022?
- How financial performance developed as fleet ownership strategy changed?
- What was the role of amount of ship crew in this process?

In this longitudinal case study, we focus on a North European shipping company, anonymously named as Upsilon. The company has been (during the years under this study) within stable situation in terms of geographical focus and trade volumes, but there have been significant changes in the ownership of the vessels and the number of personnel. Study is based on the annual reports; no inside knowledge or information has been available.

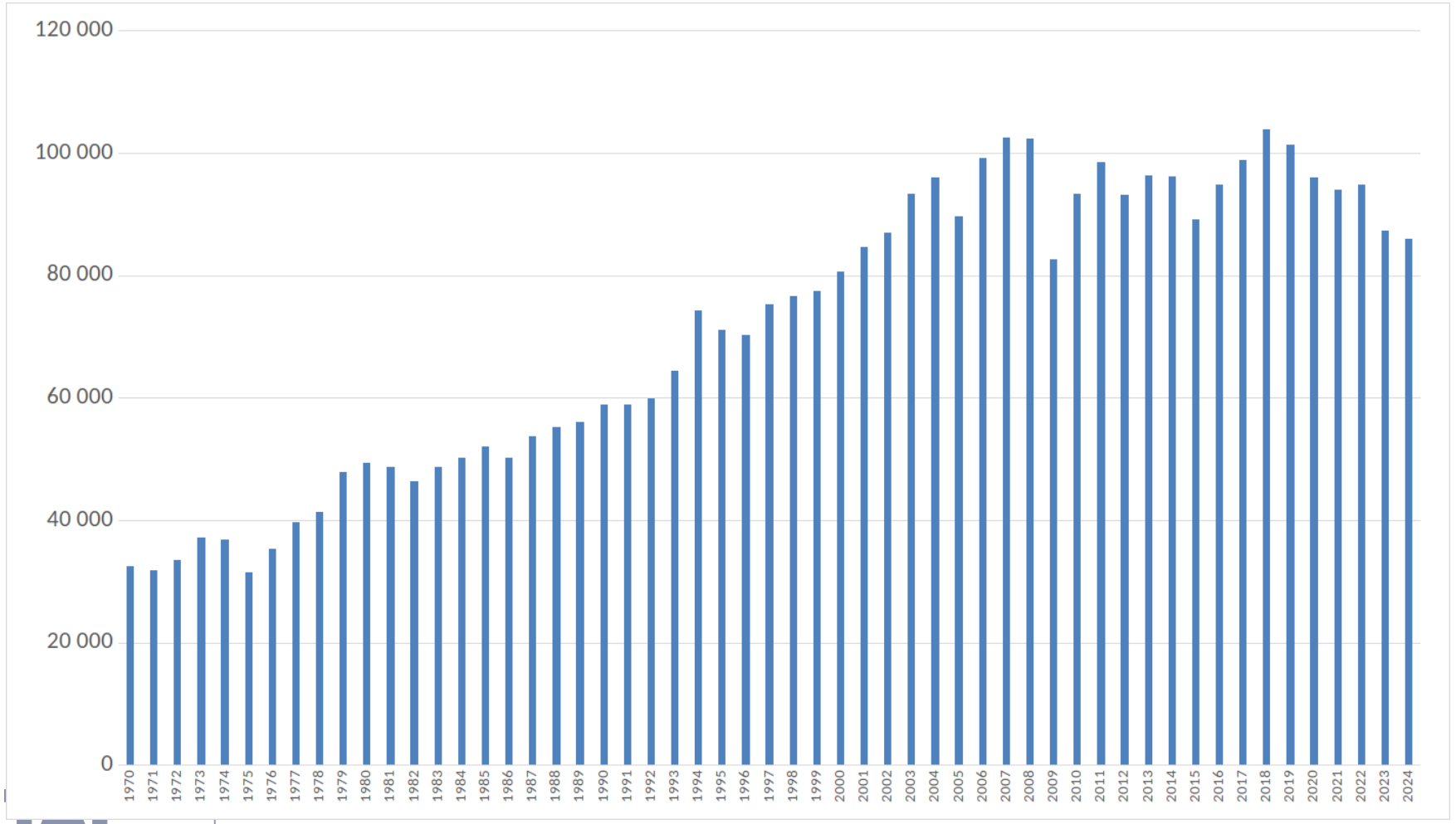
Upsilon has been one of the most successful shipping companies in Finland. It has operated last 30 years practically in the same geographical area: Finland-Germany and Finland-Sweden and some lines to North Sea (Finland-UK, The Netherlands and Belgium), same vessel types (ro-ro / ro-pax vessels) and with the same customer base. The customer base has been Finnish export of break bulk (mainly forestry products) and export and import of trucks and trailers with consumer goods and industrial raw materials. The company has not been operating in the fast growing Finland-Estonia truck traffic enabled by short sea route. Therefore, case company Upsilon has been positioned to mature markets.

ROI (DU PONT) FORMULA



Source:
Hilletofth, Per & Olli-Pekka Hilmola (2008). Supply chain management in fashion and textile industry. *International Journal of Services Sciences*, 1:2, pp. 127-147.

OVERALL SEA PORT HANDLING OF FINLAND DURING 1970-2024 ('000 TONS)

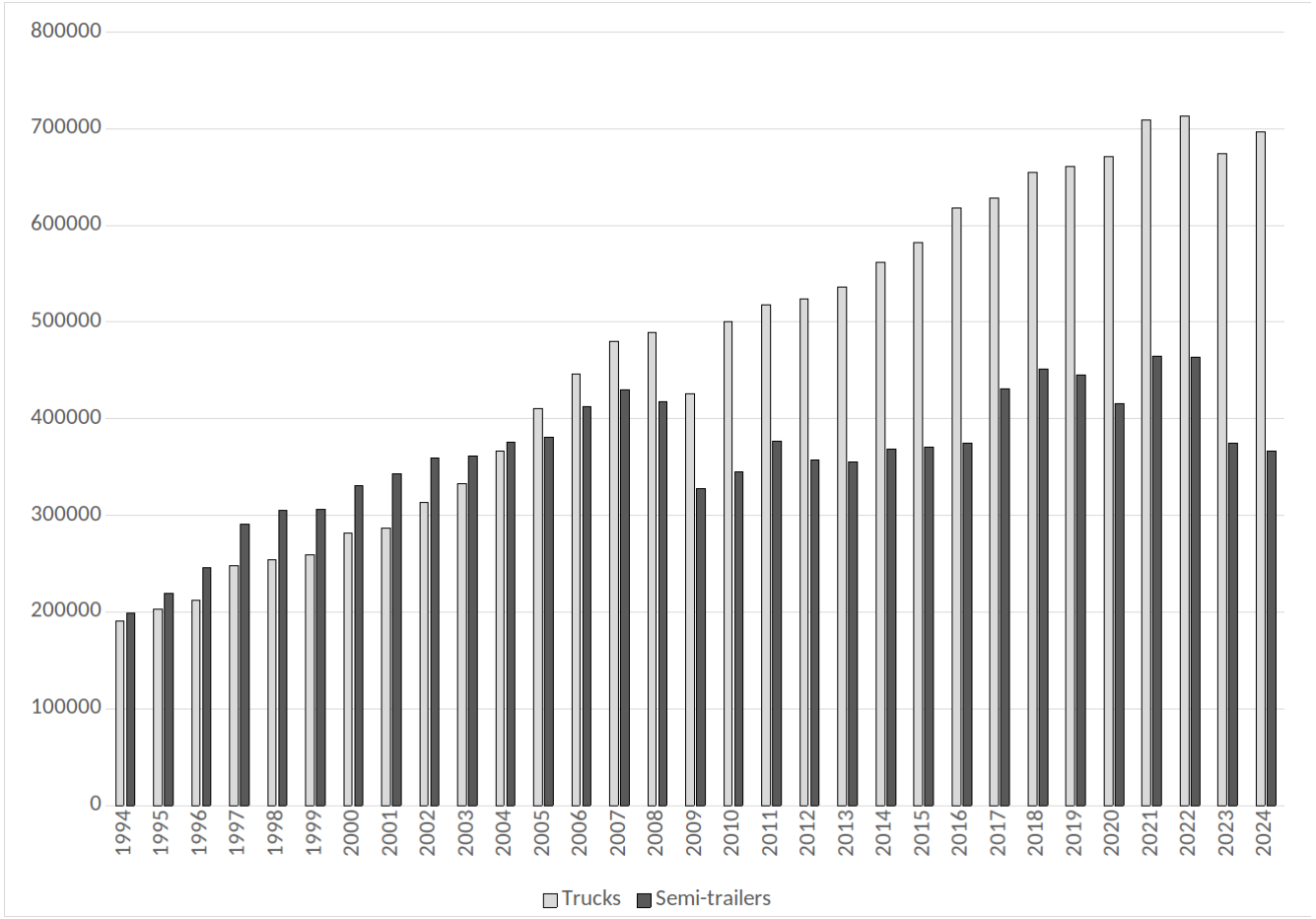


- Before Global Financial Crisis (GFC) of 2008-2009 there was an almost constant predictable increase
- After GFC, Finnish total maritime transport has not been constantly growing any more, but have rather only varied within sideways (from 82-104 mill. tons)
- After 2018 nearly constant decline (apart of 2022)
- In 2024 volumes were only slightly higher than in GFC year 2009
- Mature market without growth

Source: Tapaninen, Ulla & Olli-Pekka Hilmola (2025). Profitability of Shipping and the Role of Fleet Ownership — North European Company Case Study. In Badar et al.: Handbook of Digital Innovation, Transformation, and Sustainable Development in a Post-Pandemic Era. CRC Press: USA, Boca Raton. Chapter 14, pp. 311-329.

https://doi.org/10.1201/9781003438748-18

NUMBER OF TRUCKS WITH SEMI-TRAILERS ("TRUCKS") AND SOLELY SEMI-TRAILERS HANDLED THROUGH FINNISH SEA PORTS DURING PERIOD OF 1994-2024



- In 2021, 11.4 million tons (12%) of Finnish foreign trade was carried in containers.
- Trucks and trailers (that are the main cargo groups of case company) are carried on ro-ro or ro-pax vessels or passenger-car ferries, in total 16.6 million tons (18% of Finnish foreign trade).
- In recent two decades trucks and semi-trailers in shorter maritime routes, and particularly between Estonia and Finland, have shown consistent growth
- Otherwise market is mature and shows no long-term growth

TAL TECH

ESTONIAN MARITIME ACADEMY

Source: Tapaninen, Ulla & Olli-Pekka Hilmola (2025). Profitability of Shipping and the Role of Fleet Ownership — North European Company Case Study. In Badar et al.: Handbook of Digital Innovation, Transformation, and Sustainable Development in a Post-Pandemic Era. CRC Press: USA, Boca Raton. Chapter 14, pp. 311-329.

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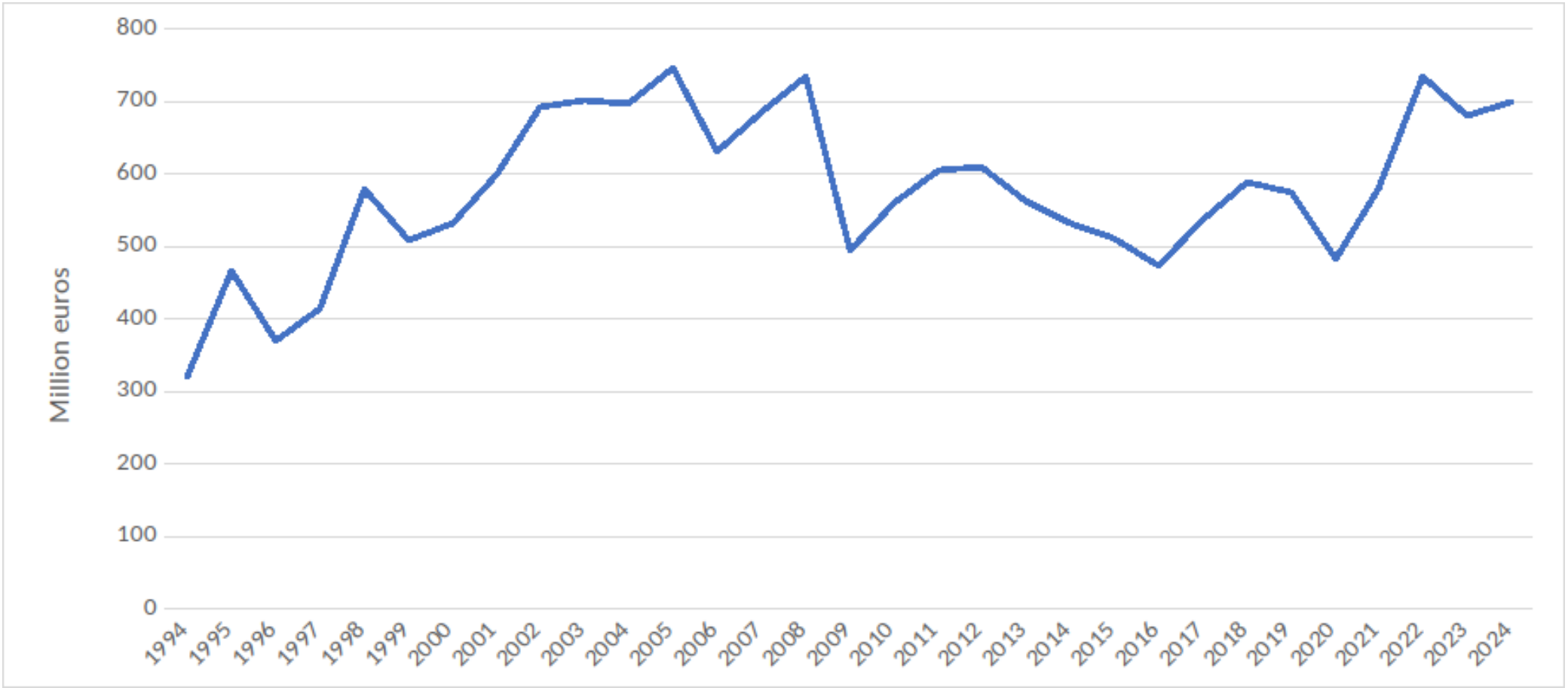
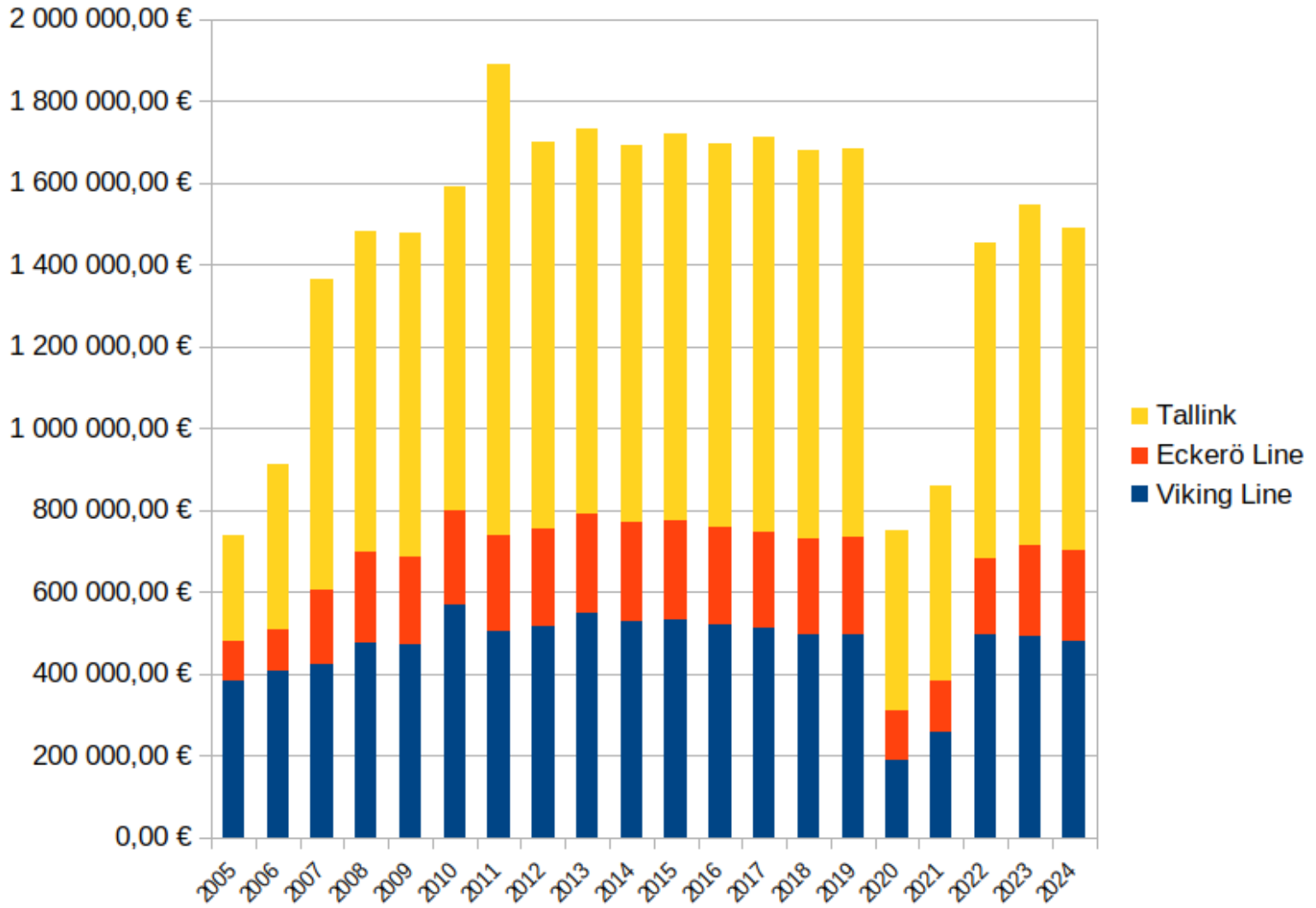
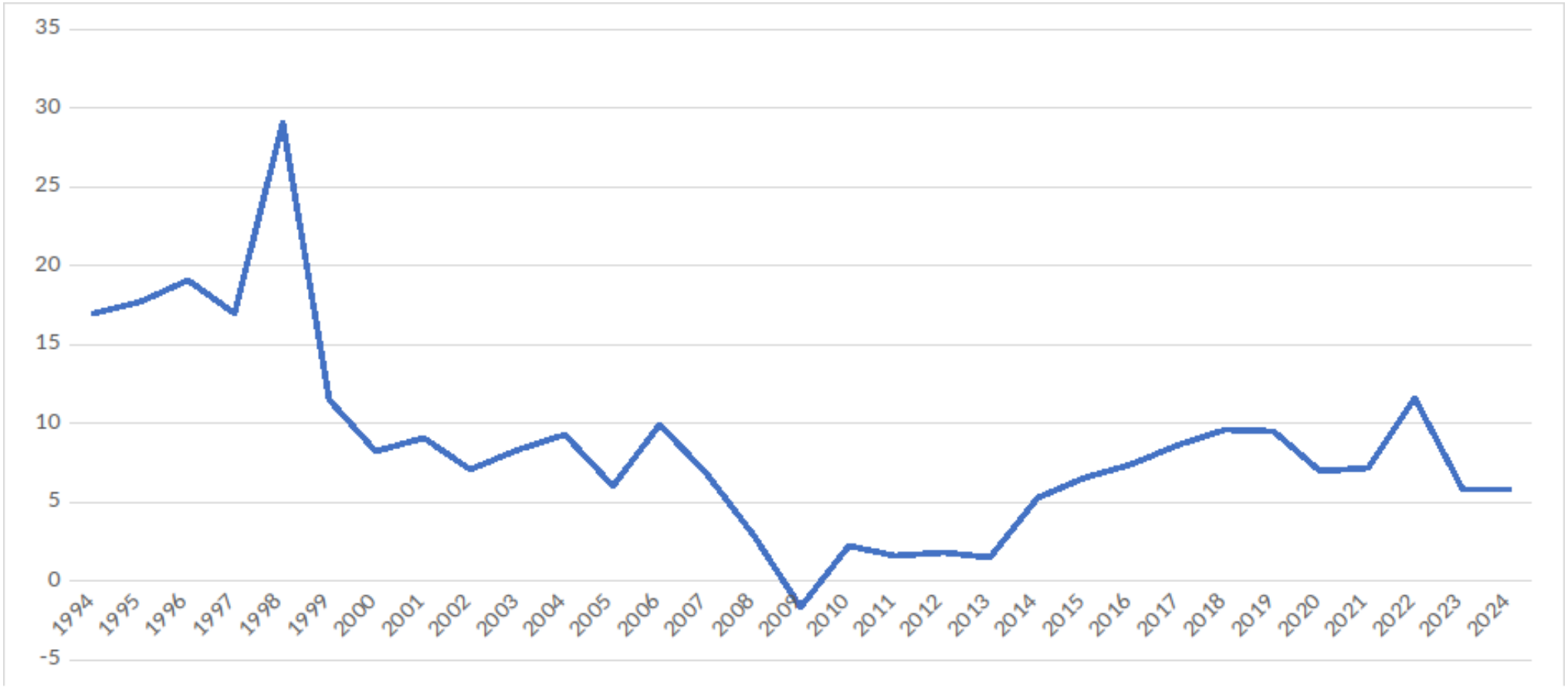
ANNUAL SALES OF CASE COMPANY DURING YEARS 1994-2024



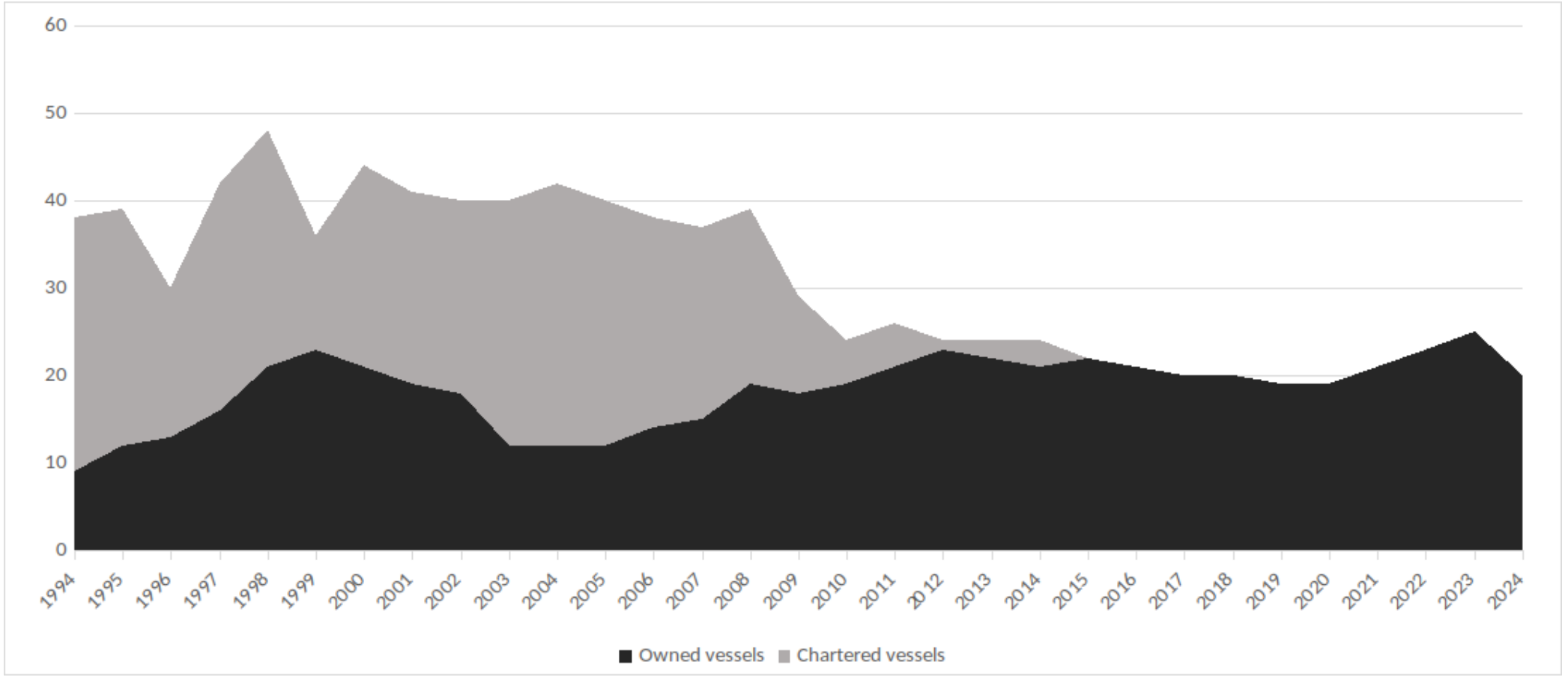
ANNUAL SALES DEVELOPMENT OF SOME FINNISH CONNECTED ROPAX COMPANIES (FOR COMPARISON)



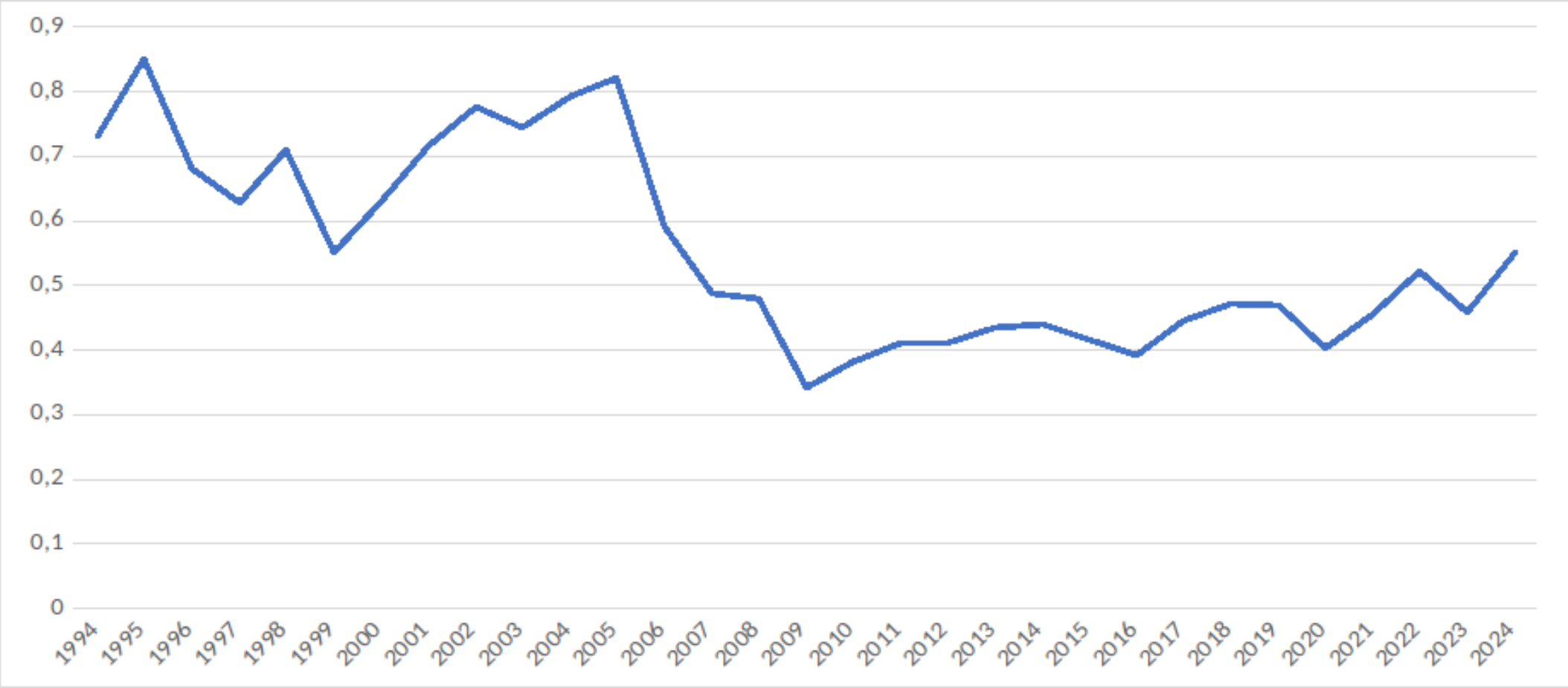
RETURN ON INVESTMENT (ROI-%) DEVELOPMENT OF CASE COMPANY DURING YEARS 1994-2024



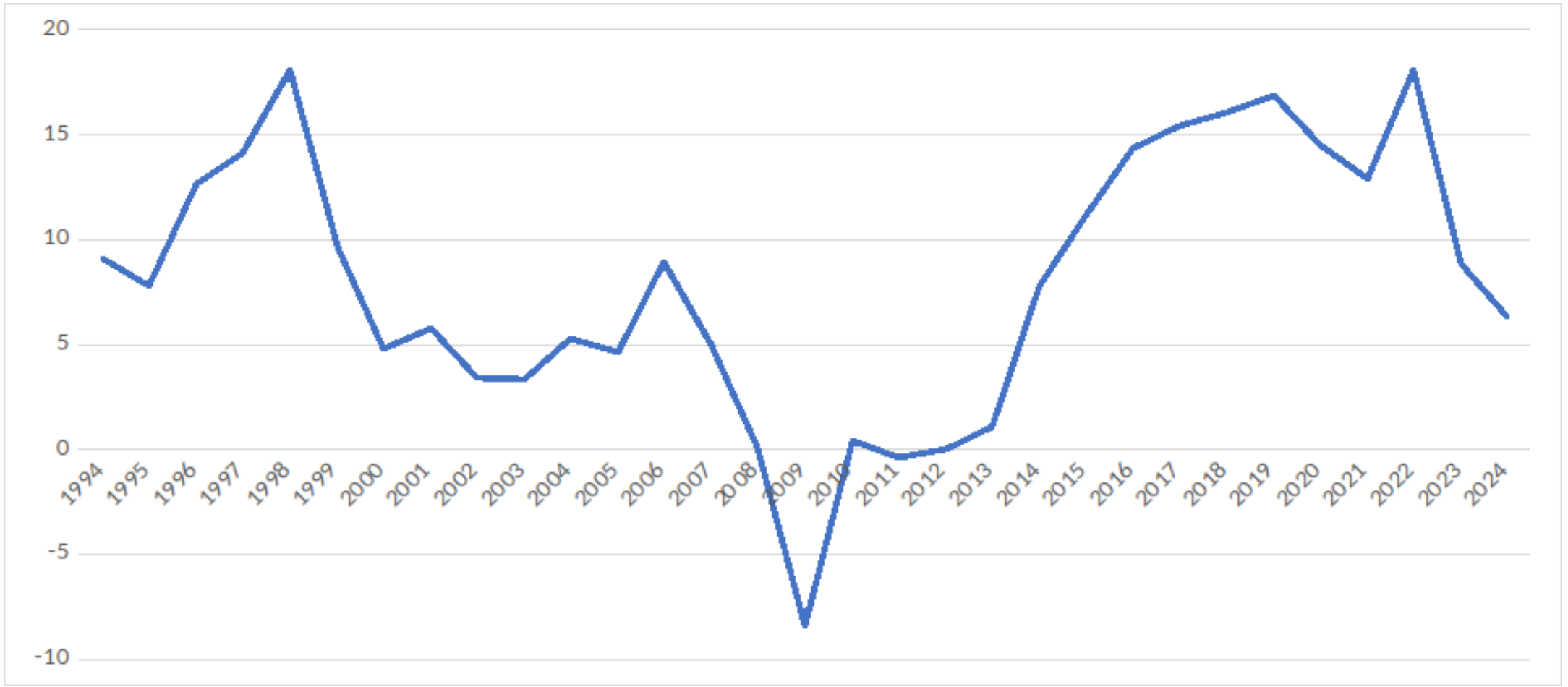
NUMBER AND OWNERSHIP OF VESSELS IN CASE COMPANY'S FLEET DURING YEARS 1994-2022 (RO-RO/RO-PAX VESSELS ONLY IN THIS CHART)



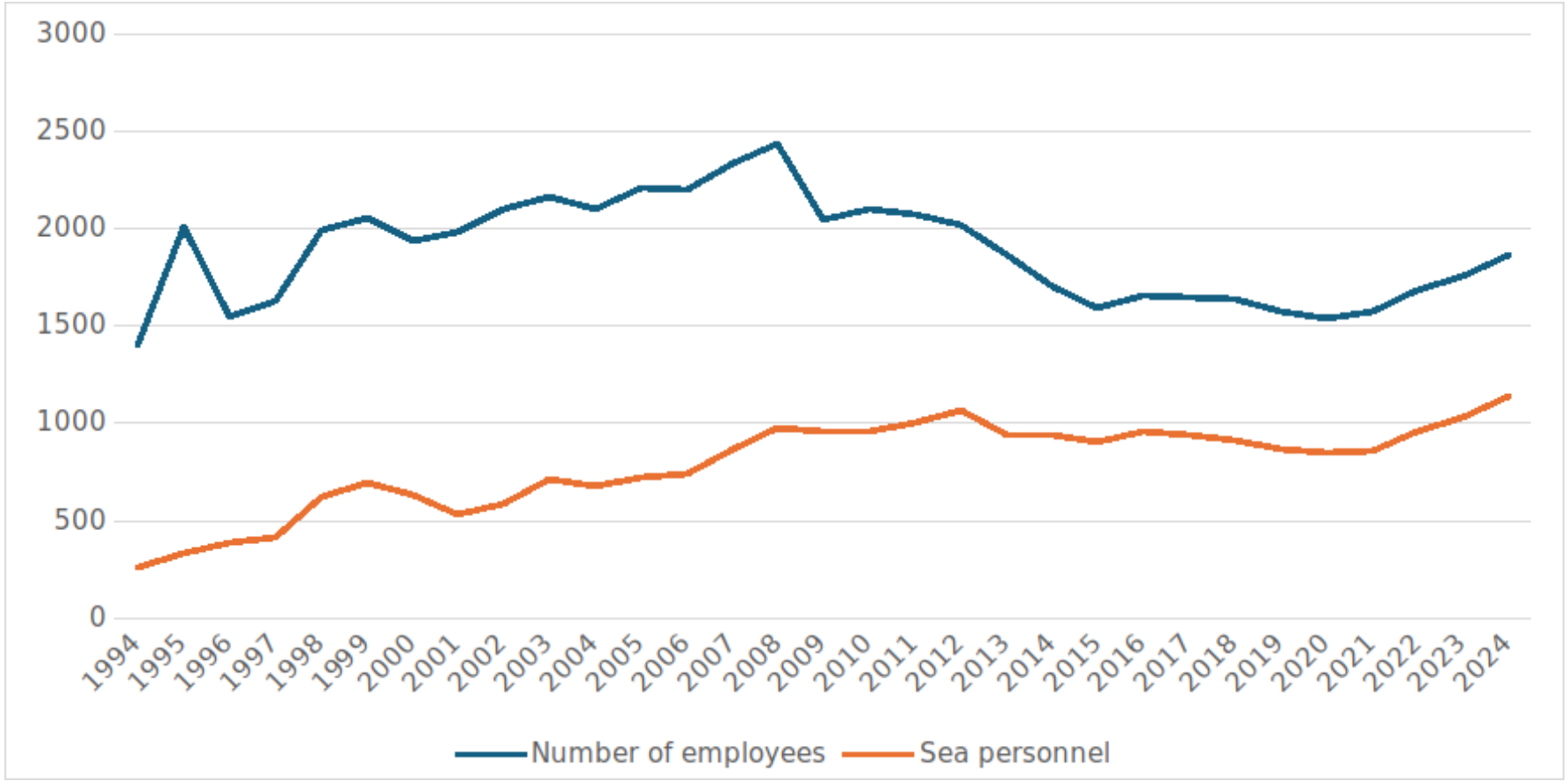
ASSET TURNS OF CASE COMPANY (SALES/ASSETS) DURING YEARS 1994-2024



NET PROFIT-LOSS (%) OF CASE COMPANY DURING YEARS 1994-2024



NUMBER OF EMPLOYEES AND SEA PERSONNEL OF CASE COMPANY DURING YEARS 1994-2024



REGRESSION MODEL: DRIVERS OF PROFITABILITY (ROI, %), DATA ENDS TO 2022

Regression Statistics	
Multiple R	0,7728
R Square	0,5972
Adjusted R Square	0,5489
Standard Error	4,2715
Observations	29

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	676,3876	225,4625	12,3568	3,76137E-05
Residual	25	456,1503	18,2460		
Total	28	1132,5379			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	22,6788	7,5005	3,0237	0,006
Number of employees	-0,0175	0,0035	-4,9395	4,36E-05
Owned vessels	0,6311	0,3149	2,0041	0,056
Chartered vessels	0,5916	0,1201	4,9245	4,53E-05

REGRESSION MODEL: ROI, %, SOME TRIALS

	Intercept	Number of employees	Owned vessels	Chartered vessels	ROI (act)	ROI (reg)	Number of employees	Owned vessels	Chartered vessels
	22,6788021270107	-0,0175085567123612	0,631135342131477	0,591571688550051					
1994		1402	9	29	17	20,97	-24,547	5,680	17,156
1995		2009	12	27	17,7	11,05	-35,175	7,574	15,972
1996		1550	13	17	19,1	13,80	-27,138	8,205	10,057
1997		1628	16	26	17	19,65	-28,504	10,098	15,381
1998		1992	21	27	29,1	17,03	-34,877	13,254	15,972
1999		2055	23	13	11,5	8,91	-35,980	14,516	7,690
2000		1937	21	23	8,2	15,62	-33,914	13,254	13,606
2001		1981	19	22	9,1	13,00	-34,684	11,992	13,015
2002		2096	18	22	7,1	10,36	-36,698	11,360	13,015
2003		2161	12	28	8,3	8,98	-37,836	7,574	16,564
2004		2101	12	30	9,3	11,21	-36,785	7,574	17,747
2005		2212	12	28	6	8,09	-38,729	7,574	16,564
2006		2196	14	24	9,9	7,26	-38,449	8,836	14,198
2007		2335	15	22	6,9	4,28	-40,882	9,467	13,015
2008		2436	19	20	2,9	3,85	-42,651	11,992	11,831
2009		2050	18	11	-1,7	4,65	-35,893	11,360	6,507

REGRESSION MODEL: ROI, %, SOME TRIALS (CONT.)

	Intercept	Number of employees	Owned vessels	Chartered vessels	ROI (act)	ROI (reg)	Number of employees	Owned vessels	Chartered vessels
	22,6788021270107	-0,0175085567123612	0,631135342131477	0,591571688550051					
2010		2096	19	5	2,2	0,93	-36,698	11,992	2,958
2011		2076	21	5	1,6	2,54	-36,348	13,254	2,958
2012		2023	23	1	1,8	2,37	-35,420	14,516	0,592
2013		1861	22	2	1,5	5,16	-32,583	13,885	1,183
2014		1701	21	3	5,3	7,93	-29,782	13,254	1,775
2015		1597	22	0	6,5	8,60	-27,961	13,885	0,000
2016		1653	21	0	7,4	6,99	-28,942	13,254	0,000
2017		1651	20	0	8,7	6,39	-28,907	12,623	0,000
2018		1637	20	0	9,6	6,64	-28,662	12,623	0,000
2019		1576	19	0	9,5	7,08	-27,593	11,992	0,000
2020		1534	19	0	7	7,81	-26,858	11,992	0,000
2021		1576	21	0	7,2	8,34	-27,593	13,254	0,000
2022		1679	23	0	11,6	7,80	-29,397	14,516	0,000
2023		1752	25	0	5,8	7,78	-30,675	15,778	0,000
2024		1867	20	0	5,8	2,61	-32,688	12,623	0,000

REGRESSION MODEL: PROFIT-LOSS MARGIN (%), DATA ENDS TO 2022

Regression Statistics	
Multiple R	0,6866
R Square	0,4714
Adjusted R Square	0,4080
Standard Error	5,1248
Observations	29

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	585,5928	195,1976	7,4322	0,0010
Residual	25	656,5948	26,2638		
Total	28	1242,1876			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	33,1863	8,9988	3,6879	0,0011
Number of employees	-0,0190	0,0043	-4,4788	0,0001
Owned vessels	0,4488	0,3778	1,1880	0,2460
Chartered vessels	0,2035	0,1441	1,4119	0,1703

REGRESSION MODEL: PROFIT-LOSS MARGIN (%), SOME TRIALS

	Intercept	Number of employees
	33,186325538	-0,019046881188831
2010		2096
2011		2076
2012		2023
2013		1861
2014		1701
2015		1597
2016		1653
2017		1651
2018		1637
2019		1576
2020		1534
2021		1576
2022		1679
2023		1752
2024		1867

Margin (act)	Margin (reg)	Number of employees
0,40	-6,74	-39,922
-0,40	-6,35	-39,541
0,00	-5,35	-38,532
1,10	-2,26	-35,446
7,80	0,79	-32,399
11,10	2,77	-30,418
14,40	1,70	-31,484
15,40	1,74	-31,446
16,10	2,01	-31,180
16,90	3,17	-30,018
14,50	3,97	-29,218
12,90	3,17	-30,018
18,10	1,21	-31,980
8,85	-0,18	-33,370
6,38	-2,37	-35,561

REGRESSION MODEL: ASSET TURNS, DATA ENDS TO 2022

Regression Statistics	
Multiple R	0,8899
R Square	0,7919
Adjusted R Square	0,7758
Standard Error	0,0733
Observations	29

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0,5311	0,2656	49,4569	1,37631E-09
Residual	26	0,1396	0,0054		
Total	28	0,6707			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0,6902	0,0907	7,6137	4,42E-08
Chartered vessels	0,0070	0,0017	4,0463	0,0004
Sea personnel	-0,0003	0,0001	-3,1523	0,0041

REGRESSION MODEL: ASSET TURNS, SOME TRIALS

	Intercept	Chartered ves	Sea personnel
	0,6902155421	0,0070010301	-0,000292893
2010		5	954
2011		5	1004
2012		1	1066
2013		2	943
2014		3	942
2015		0	899
2016		0	957
2017		0	944
2018		0	916
2019		0	869
2020		0	849
2021		0	858
2022		0	959
2023		0	1028
2024		0	1142

Asset turns (act)	Asset turns (reg)	Chartered vessels	Sea personnel
0,38	0,45	0,035	-0,279
0,41	0,43	0,035	-0,294
0,41	0,38	0,007	-0,312
0,43	0,43	0,014	-0,276
0,44	0,44	0,021	-0,276
0,42	0,43	0,000	-0,263
0,39	0,41	0,000	-0,280
0,44	0,41	0,000	-0,276
0,47	0,42	0,000	-0,268
0,47	0,44	0,000	-0,255
0,40	0,44	0,000	-0,249
0,46	0,44	0,000	-0,251
0,52	0,41	0,000	-0,281
0,46	0,39	0,000	-0,301
0,55	0,36	0,000	-0,334

CONCLUSIONS

- While answering research questions, first we notice that the company's sales has varied during the years 1994-2022 between 321 million euros to 746 million euros (being clearly mature market and no long-term growth since 2003-4). However, the difference in profit was between -8.4% to 18.1% and ROI-% between -1.7% to 29.1%. This comparison shows us, that the variation in profit and losses is not only dependent on sales of marine traffic, but also on other issues.

- It could be seen, that when the ownership strategy of the company changed from chartering to fully owning the vessels, also the financial situation improved considerably (but with time delay). Owning vessels seems to be associated with mature markets.

- The number of employees (sea personnel) in the company has remained constant level since 2008. It should be noted, that here are only the employees under the company's own payroll. The seafarers that worked in the chartered vessels were not always included in this figure – depending on the terms of chartering. This information was not available.

- In regression models it was found out that statistically significant drivers for higher ROI-% were both the number of employees (lower the number, better the ROI) and the number of chartered vessels (higher the amount, better the ROI). Number of owned vessels was nearly statistically significant & positive driver.

CONCLUSIONS (CONT.)

- Regression analysis supports the idea that vessel ownership strategy needs to be clear – it could either be solely owned vessels or in a model, where charters play a significant role. However, this argument would require more analysis with several companies to have statistical value.

- This case adds value to the present state of literature, how the company own/charter decision can be a major significant issue in its profitability, and not that of only arising from selling of old fleet to the second-hand markets (Meng and Wang, 2011; Park et al., 2018).

- This study, in its parts, supports the findings of Ghaderi (2019) and Kretschmann et al. (2017) that short-sea shipping operators can benefit from cost reductions by reducing personnel, if the vessels are under the control of the company itself.

- Study shows how dependent shipping companies are on investment decisions made on the right time. In particular, this is important now, when the shipping companies are facing difficult times, when tightening environmental regulations change the business environment and force companies to make new types of investment decisions (see e.g., Tapaninen and Palu, 2022 and Laasma et al., 2022).