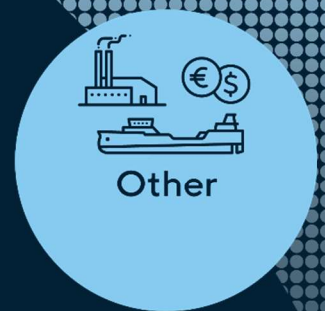


2022/2023

Nasdaq Salmon Index Robustness Assessment



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1 Summary

The characteristics of the contributors to NQSALMON with respect to the size composition, geographical spread, and different methods for sales is regarded a strength to NQSALMON. On the other hand, structural changes and consolidations in the Norwegian salmon farming industry could be a long-term challenge as more of the sales volume of fresh gutted salmon normally sold in the spot market could be subject for internal sales and processing. At the moment, there are more Norwegian exporters which could be contributors to NQSALMON. In the last robustness assessment report, it was assessed that NQSALMON's coverage of spot sales of fresh head-on gutted superior salmon exported from Norway was between 55% and 60%. Since then, the share of superior quality salmon sold from Norwegian salmon farmers has trended down¹ leading to reduced volumes of superior salmon being sold in the spot market. The coverage for 2022 is assessed within the range as in the last report.

In 2022, the total amount of Atlantic salmon exported from Norway was nearly 997 thousand tonnes². Of this, 83% went to the European markets covered by NQSALMON. This is the same share as in 2021, slightly lower than in 2020 but slightly higher than in 2019 (pre-covid).

When comparing NQSALMON with two other indices which also measure spot prices for Norwegian salmon, Fish Pool European Buyer Index and Kontali Farmers Index, a strong co-variation in prices persist. The relatively low standard deviation supports the finding that NQSALMON is a solid representation of the actual weekly European spot prices for fresh gutted superior quality Norwegian salmon, confirmed by contributors operating in the same weekly market.

Kontali Analyse conducts contributor audits regular basis on behalf of the administrator of NQSALMON, Nasdaq Copenhagen. The audits completed in 2022 found strong competence among the contributors and commitment to report correctly. Based on the calculations, assessments, and comparisons completed in this report, Kontali Analyse finds NQSALMON to be highly representative for the spot market for fresh head-on gutted superior quality salmon sold from Norway to the European market.

The index contributors show satisfactory knowledge of the reporting procedures and demonstrate detailed expertise on the internal procedures and systems to meet the reporting criteria. Some minor inconsistencies were discovered during the audits, but they were of no significant consequences to the integrity of the benchmark.

¹ <https://www.riksrevisjonen.no/globalassets/rapporter/NO-2022-2023/myndighetenes-arbeid-med-fiskehelse-og-fiskevelferd-i-havbruksnaringen.pdf>

² Both superior and ordinary quality salmon, measured in product weight.

2 Nasdaq Salmon Index

NQSALMON is a family of eleven commodity benchmarks with the index product fresh Atlantic salmon of superior quality, head on gutted (HOG), transported from Norway to Europe.

Nine of the 11 benchmarks in the NQSALMON represent nine weight classes (1-9+ kg) which mirror the product classification used by Norwegian salmon exporters and salmon producers. In addition to the nine weight classes, Nasdaq Copenhagen calculates one benchmark with the grand total across all weight classes and one benchmark with the average prices of the 3-6 kg classes weighted 30% 3-4 kg, 40% 4-5 kg, and 30% 5-6 kg. Each benchmark includes the volume weighted average prices per its weight class.

NQSALMON is calculated based on actual physical transactions where the volume and prices are reported to Nasdaq by a panel of Norwegian exporters and salmon producers with an export licence.

More information about the index can be found in the NQSALMON benchmark statement available at: <https://www.nasdaq.com/solutions/nasdaq-benchmark-administration>

The NQSALMON (weighted average all sizes) is available at: <https://salmonprice.nasdaqomxtrader.com/public/home>

NQSALMON

Product

- Fresh Atlantic Superior Salmon, head-on-gutted (HOG)
- Weight classes 1-2 kg, 2-3 kg, 3-4 kg, 4-5 kg, 5-6 kg, 6-7 kg, 7-8 kg, 8-9 kg and 9+ kg
- Exported from Norway
- Transported by truck
- FCA Oslo, standard transport fees, currencies, export fees and toll

Weekly Benchmarking (prices in NOK/kg)

- The volume weighted average prices across weight classes (Index Value)
- Volume weighted average price per weight class
- The % weight distribution per weight class
- NQSALMON benchmark 3-6kg, weighted average of 3-4 kg, 4-5 kg, and 5-6 kg. Weighted 30/40/30

3 Market Trends in 2022 and 2023

From a production growth of 7% in 2021, global supply of farmed Atlantic salmon in 2022 fell by 1%³. Strong demand was observed in many markets – especially those with rapid recovery from the covid-19 lock-down period. The Russian invasion of Ukraine caused some logistic challenges in distributing fresh salmon products from Europe to the Asian market, as the Russian airspace was closed. Another factor impacting logistics to the air freight markets was increase in fuel cost. The 2 factors combined contributed to steep rise in transportation cost to the Asian markets for European salmon and drop in sales volumes (see figure 2).

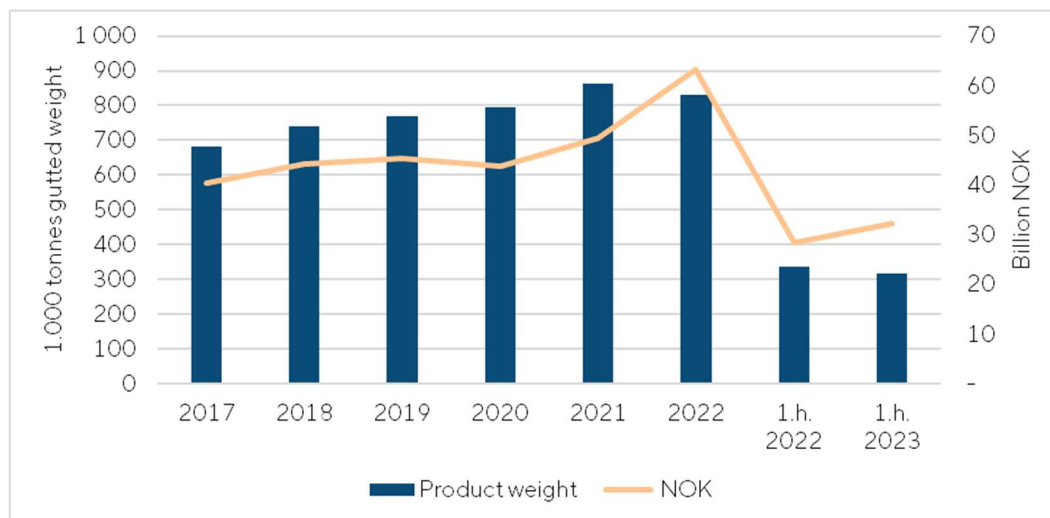
Sales of fresh whole salmon from Norway dropped by more than 4% from 2021 to 2022, while sales of the same product to the EU market dropped by approx. 3%. In the first semester sales dropped significantly (-7,5%) driven by biological and quality challenges. Consequently, spot prices for fresh gutted superior salmon rose to record high levels in periods of the first semester. Notable weakening of the Norwegian krone contributed to moderate prices the end consumer in the EU.

The same situation repeated in the 1st semester of 2023, with sales from Norway of fresh gutted salmon dropped by 5%. The reduced accessibility of salmon (also from other salmon farming countries in Europe) caused another round with high spot prices.

High inflation rates on the EU in the 2nd semester of 2022 and in the 1st semester of 2023 contributed to dampen demand on the EU market (while demand in the US remained remarkable strong). However, fall in European production of farmed Atlantic salmon in 2023 contribute to balance the market.

Finally, weakening of Norwegian Krone compared with the Euro has also contributed to balance the European market as from the 2nd quarter of 2023 and with stronger effect from the 3rd quarter. Norwegian salmon farmers have experienced record high revenues and simultaneously prices on the EU market were moderate.

Figure 1 Export trend for fresh gutted salmon from Norway to markets covered by NQSALMON

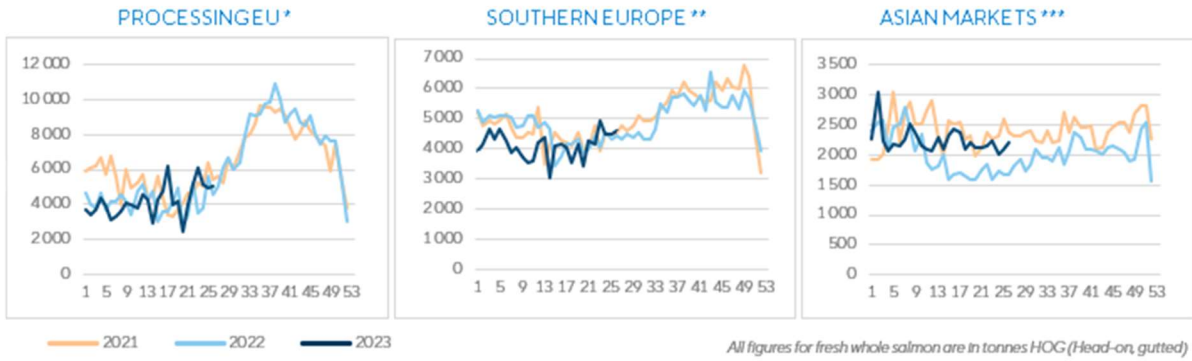


Source: Statistics Norway

Demand differs between market and seasons. Most of the sales of Norwegian fresh gutted salmon to the European market take place in the 2nd semester (where the accessibility in Europe is high) while sales to Asian markets have been strong in the first semester. On the European market there are also variations in sales patterns. Sales to markets with a significant processing industry peak in September/October (when prices are at the lowest), while sales to markets in the southern parts of Europe tends to be more stable.

³ Production data from the insight portal: edge.kontali.com

Figure 2 Norwegian export volumes of fresh gutted salmon to different market segments (volume in tonnes)



Source: Kontali Weekly Salmon Outlook, published in week 26 2023.

Charts above shows exports of fresh whole salmon from Norway to selected regions.

* Processing EU consist of Poland, Denmark, and Lithuania,

**Southern Europe consist of Spain, Portugal, France, Italy, and Greece,

*** Asian Markets consist of China, Hong Kong, South-Korea, Thailand, Taiwan, Singapore, Vietnam, and Japan.

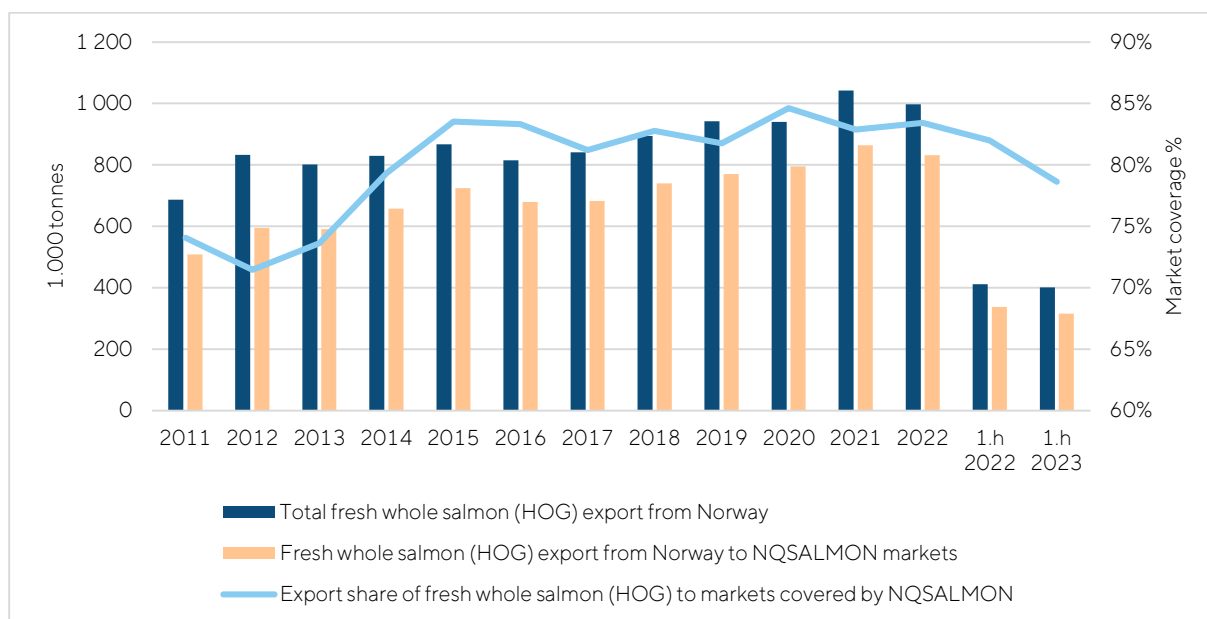
4 NQSALMON Coverage

It is estimated that NQSALMON covers 50%-60%⁴ of all spot sales.

In 2022, the total Atlantic salmon exported from Norway was nearly 1million tonnes⁵. Of this, 83% went to the European markets covered by NQSALMON (the same percentage as in 2021⁶). The coverage of NQSALMON is lower than this, as it only covers spot sales of superior quality salmon. It is estimated that roughly 30% of sales of Atlantic salmon were contracts with third party customers and integrated processing entities.

Another factor impacting on the NQSALMON coverage in 2022 is a decreasing share of superior quality salmon produced in Norway and available on the European market. In total, nearly 217 thousand tonnes were reported to NQSALMON in 2022, a decrease of 13% since 2021.

Figure 3 Exports of fresh whole Atlantic salmon from Norway



Source: Kontali Analyse based on data from Statistics Norway

⁴ Kontali estimates are based on volumes reported by SSB adjusted for share of other qualities, special qualities, contract sales, internal sales, and Nasdaq markets. The initial estimate was made based on 2020 numbers. The assessment for 2022 includes higher share of production grade salmon harvested in Norway and slightly higher share of internal sales. In total, the coverage is estimated somewhat the same, despite slightly lower volumes reported by NQSALMON.

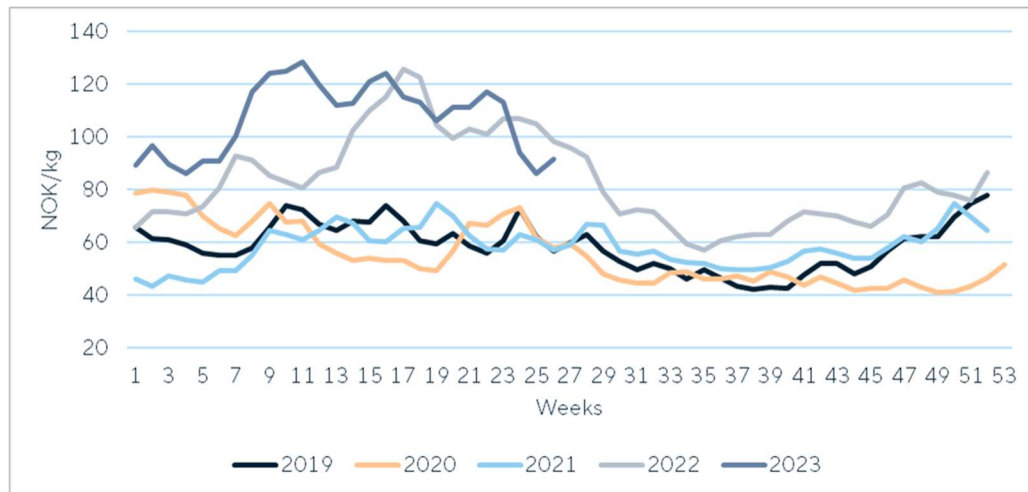
⁵ Both superior and ordinary quality

⁶ In the previous report it was stated that 946 000 tonnes of fresh gutted salmon (HOG) were exported from Norway and 83% went to the EU market. The volume and percentage applied for the January to November period of 2021.

Spot prices for fresh superior Norwegian salmon (3-6kg) trended on record high level in the first half of 2022 and continued relatively high in the 2nd half. Main drivers behind the trend were fall in Atlantic salmon production in Europe in 2022 and strong market demand following removal of covid-19 measures in European countries.

Spot prices in the first half of 2023 followed a similar trend as in 2022, however, prices trended on a higher level. Weak Norwegian Krone contributed strongly to the high price level – in combination with lower supply volumes to the European market.

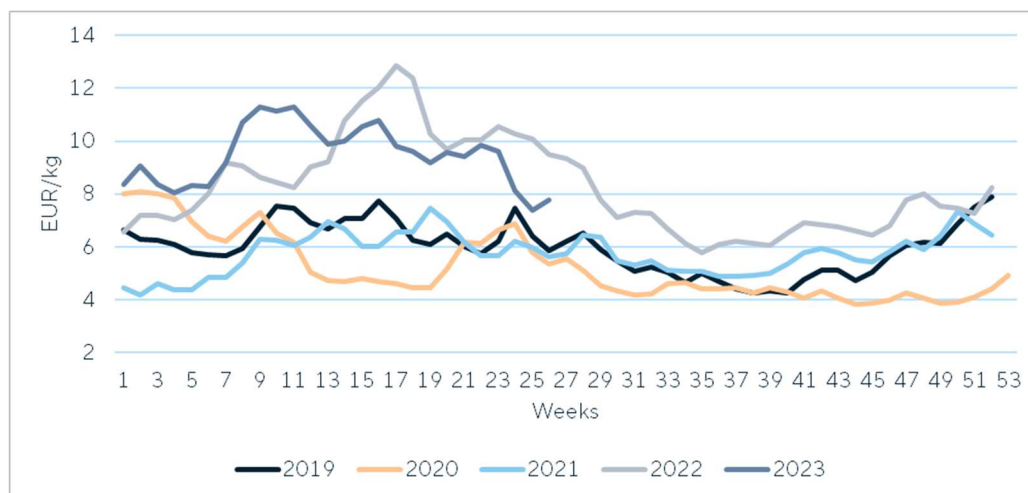
Figure 4 Prices reported by NQSALMON; 3-6 kg in NOK/kg



Source: NQSALMON

Measured in Euro, spot prices trended lower in the 2nd quarter of 2023 compared with the same quarter in 2022.

Figure 5 Prices reported by NQSALMON; 3-6 kg in EUR/kg



4.1 Contributors

NQSALMON panel contributors consist of large and medium-sized salmon exporters. The criteria for becoming a contributor are holding a valid export licence as well as a minimum annual sales volume of 5.000 tonnes of salmon. The panel of contributors consists of both exporters and exporting producers with different sales volumes, geographical distribution, market focus, company structure, contract shares, and sales policies/strategies.

As per May 15, 2023, there were 11 contributors to NQSALMON represent integrated companies, farmers, and pure exporters, which is a representative mix of all segments of Norwegian salmon exporters⁷. In sum, the export volume from the contributors covers 50–60% of total Norwegian fresh export, making NQSALMON representative in terms of sales volume. More contributors to the panel of exporters may improve the overall credibility but is expected to have limited effect on the actual benchmark values.

⁷ NQSALMON Benchmark statement as per May 15, 2023

5 Control Indexes and Statistics

A powerful quality verification and external control procedure for NQSALMON is to use similar indexes/benchmarks for control of correlation. Two such benchmarks are:

1. Fish Pool Buyers Index
2. Kontali Farmers index

Both indices measure the identical spot prices for the 3–6 kg salmon as is done by NQSALMON 3–6. The 3–6 kg is the industry sizes fitting all processor machinery (filets, smoking, ready meals etc).

These benchmarks give us valuable inputs of the correctness of the final result in our benchmark assessment:

1. Same targeted price
2. Two additional independent administrators with their own control procedures
3. Limited overlap of price sources/contributors

In addition, an analysis of correlation with the official toll statistics made public through Statistics Norway (SSB) and the Norwegian Seafood Council (NSC) is done. Although SSB and NSC also reports the export of fresh salmon, there are several data differences to be considered in the analysis.

5.1 Fish Pool European Buyer Index

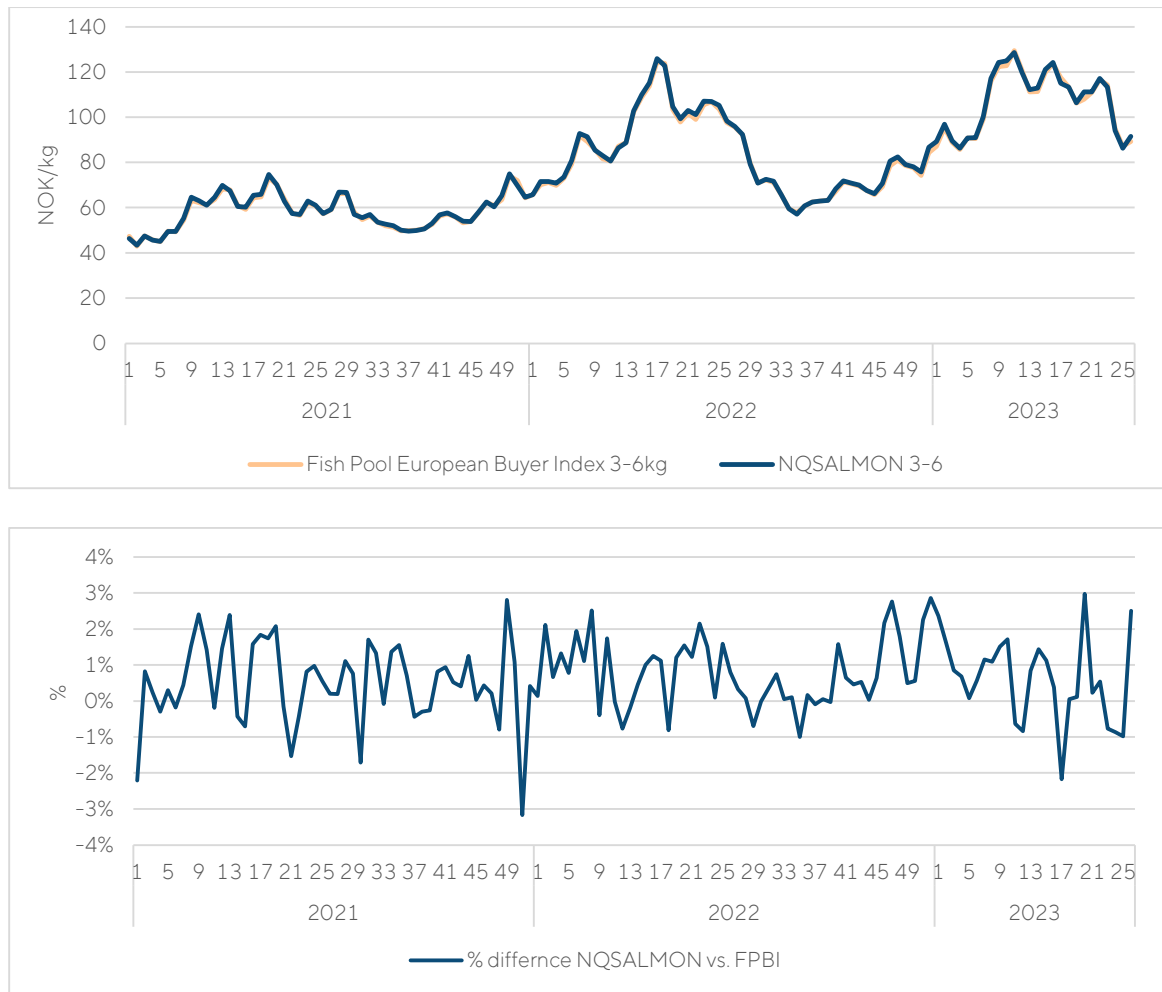
Oslo Børs (the Oslo Stock Exchange) calculates an index based on input data from approximately 20 European buyers. The index serves as a KPI tool for buyers in different countries.

The Fish Pool European Buyers Index (FPEBI) is not a benchmark operated under BMR, and it have no external audit. Post BMR implementation, the FPEBI is not a part of the Fishpool Index (FPI), the underlying index for derivatives trading. FPEBI uses more or less identical reporting procedures as Nasdaq. FPEBI serves as a KPI service towards European salmon buyers and as a QA⁸ benchmark for FPI.

FPEBI is a weekly index for spot price for fresh gutted (HOG) superior salmon 3–6kg delivered FCA Oslo.

⁸ QA=quality assurance

Figure 6 NQSALMON 3-6 kg vs. Fish Pool European Buyer Index 3-6kg by price (top) and percent of difference in price with NQSALMON 3-6 kg as reference (bottom).



Source: Fish Pool and Nasdaq

The average difference between the two benchmarks in 2021 was 0,49%. In 2022., the average difference increased to 0,79%, while in the first semester of 2023 the difference was reduced to 0,6%. On average, NQSALMON showed slightly higher prices than FPEBI.

There are 2 characteristics that explain most of the differences between the benchmarks:

1. FX calculation
 - a. NQSALMON use a FX rate adjusted to the time of the actual sales being made, 40% on Friday prior to invoicing week and 60% the average of Monday-Thursday in the invoicing week
 - b. FPEBI use an average of Monday-Friday in the invoicing week
2. Panellists/contributors
 - a. NQSALMON contributors are 11 exporters selling to large and small/niche clients and cover the total price range of salmon sold from Norway to Europe
 - b. FPEBI contributors are mainly large processors that continuously purchase large volumes, often full loads (whole trucks). As such, the FPEBI has a conscious bias towards the largest purchasing countries.

The differences in FX calculations means the NQSALMON will react earlier to shifts in FX rates. The outliers between the two benchmarks can be explained by the FX differences.

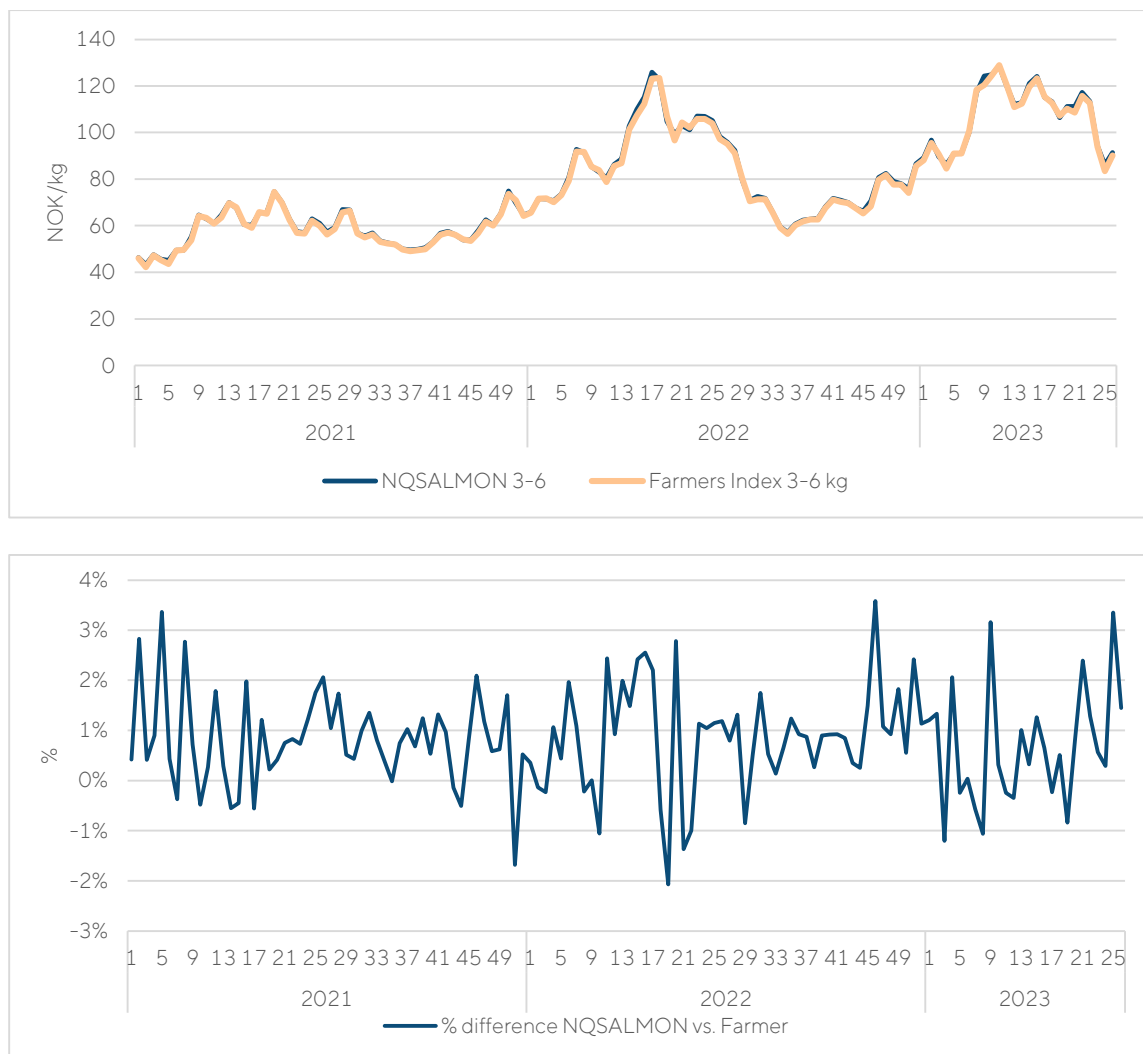
The FPEBI bias towards full load invoices will normally result in lower prices. Although part-loads generally generate more profit, they reflect a smaller part of the export.

These systematic differences between NQSALMON and FPEBI is likely to explain much of the difference of 0,79% and 0,60%.

5.2 Kontali Farmer Index

Kontali Analyse AS offers a KPI service to Norwegian farmers selling salmon through the network of exporters. Kontali reports prices received at packing stations and produces an independent weekly index. The panel consist of farmers of different size and geographical distribution. The Farmers Index is not a benchmark under BMR and is not subject to an external audit.

Figure 7 NQSALMON 3-6 kg vs. Farmers Index 3-6kg by price (top) and percent of difference in price with NQSALMON 3-6 kg as reference (bottom).



Source: Kontali Analyse

The average difference between the two benchmarks was 0,81%. In 2022 the average difference was 0,86, while in the first semester of 2023 the average difference was reduced to 0,66% NQSALMON being slightly higher in the beginning of the period. A contributing factor to the reduced average difference in the first semester of 2023 is different adjustments for freight cost for transportation in Norway as from January 1st, 2023.

NQSALMON and Kontali Farmers Index measure the same market, and the correlation and price difference eliminate any suspicion of manipulation in either one of them. The argument is supported by the fact that the contributor panels have limited overlap.

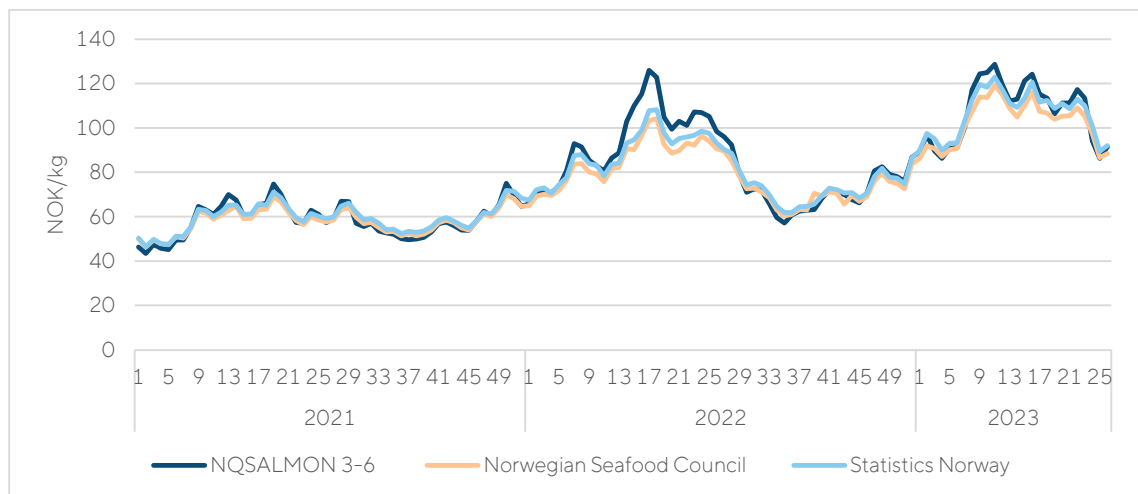
5.3 Statistics Norway and Norwegian Seafood Council

The weekly export statistics from Statistics Norway (SSB) and from the Norwegian Seafood Council (NSC) are price indicators often used by analysts in analysing market trends. Weekly export statistics from SSB consist of average export price for fresh whole salmon to all markets, while weekly export statistics from NSC (in this context) consist of average export price for fresh whole salmon with the same geographical scope (markets) as NQSALMON. The prices are accurate reflection of the total exported volumes and values of Norwegian salmon, however neither are benchmarks under BMR.

The price data has characteristics that limit its quality as a precise assessment of the actual spot prices in the market for a given week. The reason being that the SSB and NCS export data includes all export of fresh whole salmon, regardless of the quality and certification, of when the price was negotiated, and the share of contract sales which at times can be significant.

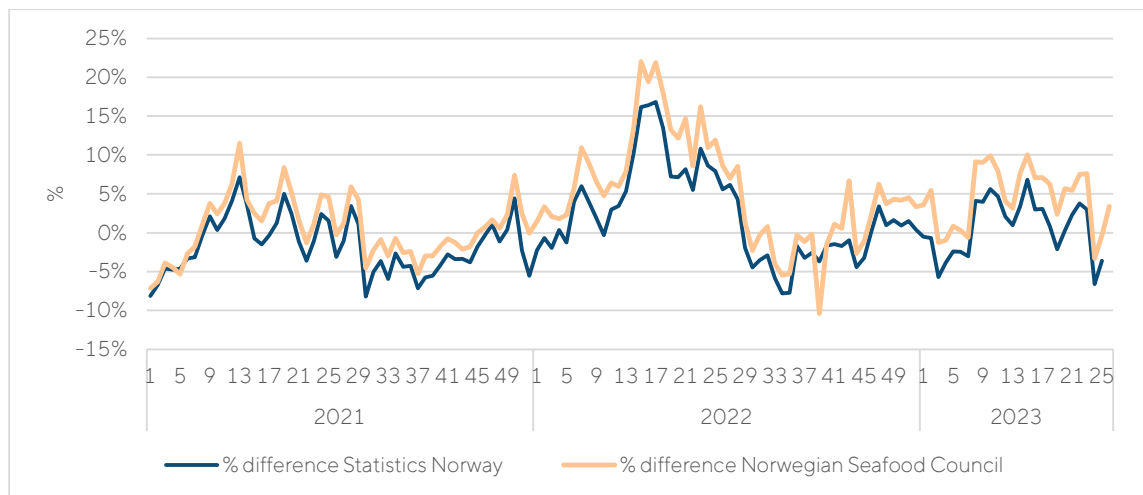
Approximately 30% of the salmon exported from Norway is contract sales. This affects the market in the way that in a downwards trending market, the SSB price tends to be higher than the actual weekly spot price in NQSALMON, and vice versa. As salmon prices are volatile, the effect will in periods be substantial. The export statistics from the NSC is a less powerful benchmark for market participants that link their business to spot prices. Hedging based on these prices will include substantial financial risks.

Figure 8 NQSALMON 3-6 kg vs. SSB export of fresh whole salmon* and NSC export of fresh whole salmon**



Source: NQSALMON, NSC, and SSB
 * average export price for fresh whole salmon to all markets
 ** average export price for fresh whole salmon to NQSALMON markets

Figure 9 Percent of difference in price with NQSALMON 3-6 kg as reference (right).



Source: NQSALMON, NSC, and SSB

In trending periods, SSB and NSC will differ from NQSALMON due to the contracts included in SSB and NSC:

1. Falling market: SSB will be higher than NQSALMON due to contracts done at higher prices than in current spot market.
2. Rising market: SSB will be lower than NQSALMON due to contracts done at lower prices than in current spot market

6 Audits, Controls, and Compliance

Kontali Analyse has since 2014 been contracted as the auditor of contributors to the NQSALMON.

In 2022 and 2023 (up to November 2023) 10 contributor audits were conducted.

Contributor audits consisted of three parts:

1. System audits which checked the procedures for identifying and eliminating contract sales, identifying sales to integrated companies, and handling of credit notes.
2. Standard parameter audits which controlled the foreign exchange rates, the deduction/addition of transportation costs, the deduction of customs clearing, products included in the reporting, the weight class categorisation, and the destination markets.
3. Random audits that cover controls of methods, routines, and procedures related to reporting.

The index contributors show satisfactory knowledge of the reporting procedures and demonstrate detailed expertise on the internal procedures and systems to meet the reporting criteria. Some minor inconsistencies were discovered during the audits, but they were of no significant consequences to the integrity of the benchmark. Most inconsistencies were of technical nature.

In 2020, Kontali Analyse was appointed as external auditor of the administrator of Nasdaq Salmon Index on the compliance with the European Benchmark Regulation (BMR).

In 2022, the BMR audit scope was the quality of NQSALMON. In 2023, the scope was procedure for complaints handling and data control and assessments made by assessors and administrator. Both audits concluded that the procedures and control mechanisms were well designed for ensuring quality and integrity of the benchmark calculations and the integrity of the reporting process.