MENON ECONOMICS

TAXATION OF AQUACULTURE IN ICELAND – FOLLOW UP REPORT

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Foreword

This report is conducted by Menon Economics on request by Fisheries Iceland (SFS). The objective is to deepen the understanding of how the recently proposed tax system reform in Iceland will affect the aquaculture industry.

The analytical framework and technical models used in this report rests extensively on an analysis we conducted in December 2023 (Menon-report 8/2024 *Taxation of Aquaculture in Iceland*). This report can be seen as an extension of the work summarized in the former report.

We are thankful to Þröstur Sæmundsson for efficient information exchange and solid advice.

The report has been quality assured by partner and head of research at Menon Economics Leo. A Grünfeld. All conclusions and interpretations are solely the responsibility of the authors.

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Table of content

Summary

In this report, we analyze the effects of a recently proposed production fee for the Icelandic aquaculture industry. The analytical framework and technical models rest extensively on Menon-report 8-2024 *Taxation of Aquaculture in Iceland*, where a similar proposal was reviewed.

Impact of the model

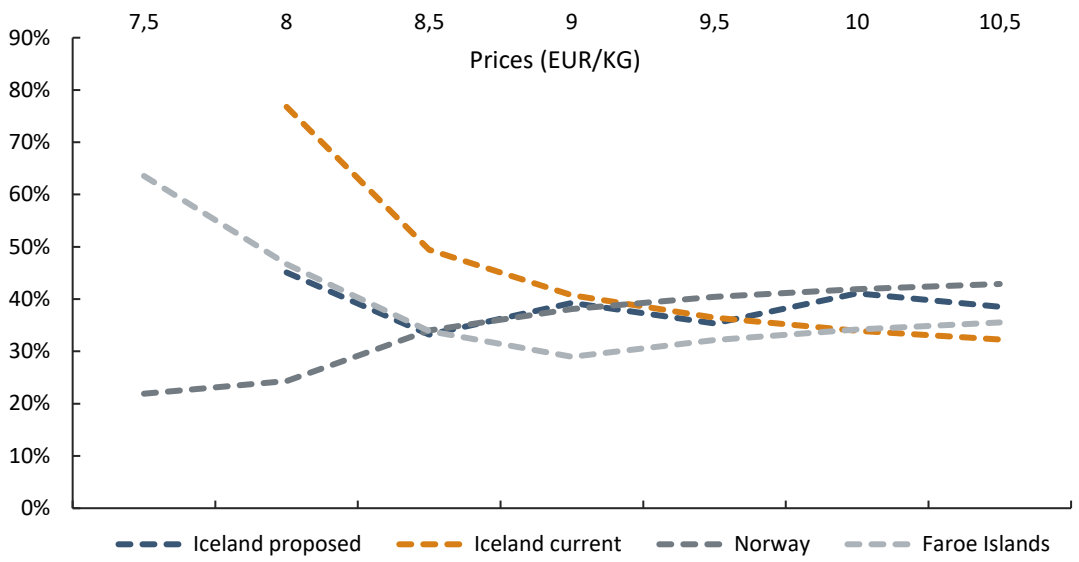
In the first section of the report, we consider the impact of the proposed model under four different cost scenarios and compare it to the current Icelandic model as well as the Norwegian and Faroese systems. In these four scenarios, the proposed model yields a somewhat lower tax rate than the current model. When compared to the Norwegian and Faroese models, the proposed model yields lower taxation in scenarios of high profitability, but a less beneficial taxation when profits are lower.

We also assess the impact of the model with a wider range of assumptions with respect to prices and costs. We pay particular consideration to the taxation and the production fee as a share of total profits. We find that the taxes paid as share profit can vary greatly with the proposed model for the individual producer, ranging from 28 % to 132 % when profits are positive, depending on the price and cost level of individual firms. A key feature of the production fee which in our view is deeply problematic is that when profits are low, the individual producer runs a risk of facing a particularly high tax rate. While the production fee will vary with the costs of the industry as a whole, the fee level does not vary with the individual firms' cost levels.

Furthermore, with the proposed tax, it is in fact worse to run low profits in a situation with high prices and high costs, compared to a situation with low profits with low prices and low costs, as the former situation implies a higher production fee. If an individual producer has a profit margin before taxes of EUR 1 per kg, the tax rate will vary between 25-77 % if costs vary between 6-9 EUR per kg. This follows from the fact that the production fee is determined by the nominal price levels and does not account for variations in costs.

Figure A illustrates variations in tax rates under different tax models given a production cost of EUR 7/kg, which is close to the current production cost level of the Icelandic producers. The figure shows that the different tax models deviate when profits are marginal (i.e. when prices are close to the production cost), but that they converge to a similar level once profits increase. With prices of EUR 10.5/kg, the current Icelandic model yields a tax rate of 32 %, while the Norwegian model yields taxes of 43 %. The proposed Icelandic system lies somewhere between these two models, at around 39 %.

Figure A: Variations in tax rates under different tax schemes given a cost of EUR 7/kg



By comparison, the Norwegian resource tax for the aquaculture industry will at the most yield a tax rate of 47 % in the sea phase. The Norwegian resource tax and the proposed Icelandic production fee are not directly comparable, but with lower profit margins, the relative tax burden of the Norwegian model is significantly lower than the Icelandic model. In particular, the Norwegian model is more beneficial when profits are negative, as the cost refund component implies that the tax authorities will take part in the losses. This is not a feature of the Icelandic production fee, which is paid regardless of actual profits.

Cost index and actual cost development

In the second section, we discuss the effects of tying the reference prices in the production fee to a cost index. The cost index aims to capture the overall cost in the industry. We find that the proposed index appears to be tuned quite well compared to the historical cost development in the Norwegian industry, but it appears to weigh wages too much. We recommend that a capital expenditure component should be included in the cost index, as we expect capital expenditure in the aquaculture industry to increase substantially in the future.

The proposed fee does not incorporate variations in costs between players

In the third section, we discuss the issue of heterogeneity in costs between players. The idea of the cost index is that the reference prices in the production fee should follow the cost development in the industry over time, and as such, have the same relative impact over time. However, when the players face the same fee irrespective of their individual production costs, the effective tax rate can vary greatly between them.

We show that costs for aquaculture producers vary greatly, both in the relatively nascent Icelandic industry, but in particular in the more mature Norwegian industry with greater heterogeneity between players. We argue that once the Icelandic industry develops, a greater variation in costs/profitability should be expected. This in turn affects the suitability of a “one size fits all” tax model.

Even with a variation in costs corresponding to what the Icelandic players have seen in recent years; the production fee provides highly different tax burdens to the players. While a company with regular profits (2022 average values) can use their surplus to manage the fee, a less profitable company (cost deviation corresponding

to the industry variance) will have to finance the production fee from its equity or a loan. Thus, the production fee will in fact weaken the less profitable firms even further relative to the more profitable firms.

Another issue with the production fee is that it can distort the firms' incentives for production. This is a problem in terms of the economics, as the social and private returns of producing a given amount of fish might no longer be aligned. The optimal production level might be higher from a social point of view, but the firm will – given the incentive effects of the fee – seek a lower production. In terms of welfare effects, this is a core problem with production fees that don't take into account the actual costs of a firm.[1] In particular, this will be an issue if the firms' costs are systematically different, where a less profitable company is more likely to alter its production.

Design of a better tax system

In the final section of the report, we briefly discuss the properties of a tax model we deem as better suited than the proposed Icelandic model. We argue that a resource rent tax is likely the most suited model, provided that extra taxes are to be levied upon the aquaculture industry.

A resource tax specifically targets an activity where the return on investment is/can be higher than normal due to natural conditions and/or regulatory constraints. In other words, where you can find a so called "resource rent". A resource tax fluctuates with profitability and does not (in theory) distort the incentives for farmers to maximize the profits from production. Thus, private and social returns are expected to be aligned and maximized. A resource tax implies high taxes when profits are large, and cost reimbursement when the company operates at a loss. This may provide support to the Icelandic industry in a growth phase where it operates at a loss.

In our view, the Norwegian model, with some significant improvements, would represent an improvement to the proposal. In particular, the model should:

- Not include a minimum deduction, as it causes distortions.
- Avoid artificial distinctions between types of permits (development permits, etc.)
- Ensure that prices and costs are as close to the companies' actual prices and costs as possible.
- Historical cost deductions proportional to the tax rate should be provided if a tax is introduced.

Above all, it is important that the tax scheme is stable over time. Volatile tax schemes are highly detrimental to future investments and can hinder future development. This is a general point and is irrespective of the chosen taxation system. The main issue with a production fee is that it is unable to account for variations in costs, and both on the Faroe Islands, and now in Iceland, the different production fee schemes have been/are proposed to be altered several times to account for "the next challenge" that shows up following the previous fix. Thus, it is difficult to maintain a stable scheme, which in turn should be expected to reduce incentives to invest in the industry.

[1] *This issue was discussed at length by the Norwegian Aquaculture Tax Commission ("Havbruksskatteutvalget") in 2019.*

1 Background

There is an ongoing debate on taxation of aquaculture in Iceland, and there have recently been proposals to alter the existing production fee. In the most recent proposal, the proposed reference prices and fee percentages are altered compared to the previous proposal, according to the table below:

Table 1-1: Proposed reference prices and corresponding fee percentages

Level/Threshold	Reference price (EUR)	Fee %
1	Below 6.91	1%
2	Between 6.91-7.91	2%
3	Between 7.91-8.91	4%
4	Between 8.91-9.91	6.5%
5	Between 9.91-10.91	8%
6	Between 10.91-11.91	10%
7	Above 11.91	11%

Significantly, the proposal now also includes a cost index which will alter the reference prices over time. The cost index is based on changes in feed prices (50 %), CPI (30 %) and a wage index (20 %). Our understanding is that this is to account for variations in costs over time. The fee is proposed to be calculated on a monthly basis (as opposed to yearly or some other frequency.

In this report we look into the properties of this model. In particular, we focus on how it is able to account for differences in costs between players within a year. The analytical framework and technical models in the remainder of the report rests extensively on Menon-report 8-2024 Taxation of Aquaculture in Iceland, where a similar proposal was reviewed. This report can thus be seen as an extension of the previous report.

Text box 1-1: On the frequency of production fee payments

We do not assess the frequency of the calculation of the fee in depth in the report. We note that this would mainly be an administrative burden. Compared with a scenario where the fee is calculated on a yearly basis, one should expect a larger mismatch between the monthly fee levels and the producers costs, as we expect prices to fluctuate more within a year than costs. We expand on the issues that a mismatch between individual costs and reference prices/corresponding fee levels can lead to later in the report.

We expect that the industry and probably the tax authorities would be better off if the fee is calculated with a lower frequency. It is hard to calculate costs on a running basis. As long as production values are reported continuously throughout the year, there are in our view no strong arguments for the production fee to be calculated and paid every month. It is administratively less cumbersome to do this in conjunction with the yearly tax assessments. We have previously been informed that frequency of payments recently was an issue of contention on the Faroe Islands. As a compromise, they currently calculate the fee once every 6 months.

2 Impact of the model

In this chapter we assess the impact of the proposed model when compared to the current Icelandic model and the Norwegian and Faroese systems. In chapter 2.3, we focus on how the relative tax rates will vary with variations in prices and costs within the proposed system.

The assessment is focused on the proposed fee levels but does not consider the intertemporal properties of the proposed model, where reference prices are adjusted according to a cost index. We discuss this property more closely in chapters 3 and 4.

2.1 Four scenarios for comparison with other countries

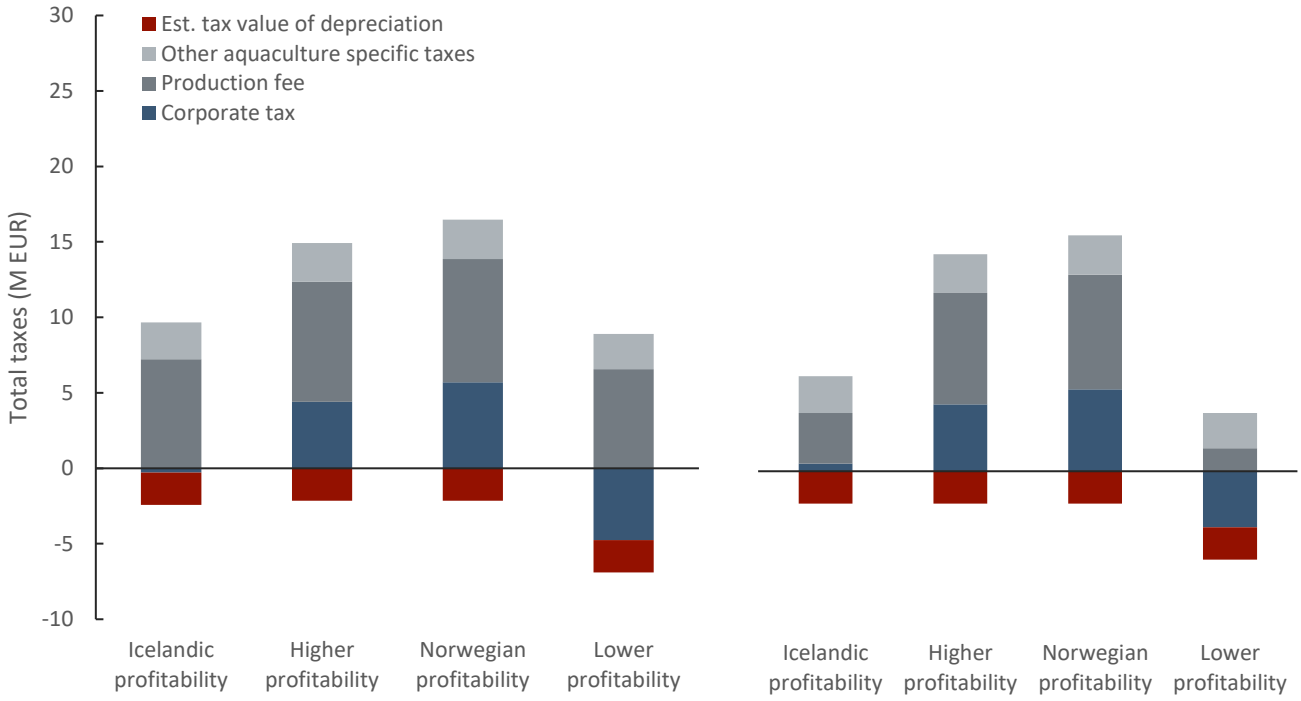
The scenarios mirror the scenarios evaluated in Menon-publication 8/2024. We model production at a constant level of 20 000 tons HOG[2], which is somewhat higher than the current production level of the Icelandic producers, but close to the required production in the coming years given the forecast in the BCG report. The value of the real capital used for the production is assumed to be EUR 45 million in all scenarios. The assumptions on prices and costs are as follows:

- The baseline case is for a generic Icelandic producer with 2022 results and yields an average price of EUR 8.4 per kg and at a production cost of EUR 7.45 per kg (OPEX + capital depreciation) before taxes and fees. The value of the real capital used for the production is assumed to be EUR 25 million.
- The first scenario is one where profitability increases slightly: we model an increase in prices of 10 % and decrease in costs of 5 %. This leads to a price and operating expenditure of respectively EUR 9,24 and 7,1 per kg.
- The second scenario is one where the profitability increases to a level comparable with the Norwegian producers. We model this as a case where the prices and costs are EUR 9,5 and 7,1 per kg, which gives a margin of profits around 25 %.
- The third scenario is one where the profitability falls from current levels. We model this as a decrease in prices by 10 % and an increase in costs by 5 %, yielding prices and costs of 7,64 and 7,84 respectively.

The figure below shows the tax breakdown under the 4 scenarios given the current and proposed tax model.

[2] *Head on, gutted*

Figure 2-1: Tax breakdown under the 4 scenarios with the current model (left) and the proposed model (right)



For the given scenarios, the proposed model yields a lower taxation than the current model. The effect is small in the cases of higher profitability, while the taxation is significantly lower in the cases of low profitability. This is due to the fact that the current model yields a fee of 4.3 % in all cases, while the proposed model yields a fee of just 1 % in the lower profitability scenarios.

The table below lists the differences between the current and the proposed system for the Icelandic profitability scenario in numerical values. Note that this example is based on the properties of the typical Icelandic producer in 2022, which has similar costs and prices as in the Icelandic profitability scenario, but the production volume is lower (11 200 tons) and the value of the real capital is considered to be around EUR 25 million.

Table 2-1: Comparison of tax models under the current and proposed systems, given the scenario of Icelandic profitability

Results	Current system	Proposed system
Sales income	94 080 000	94 080 000
Production costs	83 440 000	83 440 000
Profit before taxes and other fees	4 690 000	4690000
Corporate tax	- 145 120	287 648
Resource tax	-	-
Production fee	4 045 440	1 881 600
Other aquaculture specific taxes	1 370 159	1 370 159
Est. tax value of depreciation	- 1 190 000	- 1 190 000
Total taxes and fees	**4 080 480**	**2 349 408**
Net profit after taxes and fees	**609 520**	**2 340 592**
Taxes and fees as share of profit	87 %	50 %

Share of taxes and fees		
Corporate tax	-4 %	12 %
Production fee	99 %	80 %
Other aquaculture specific taxes	34 %	58 %
Est. tax value of depreciation	-29 %	-51 %
	100 %	100 %

A significant change from the previously proposed model (which is not shown here, we refer instead to Menon-report 8/2024) is that the production fee is considered a deductible fee from the corporate tax. This has a large impact on the effective tax rate.

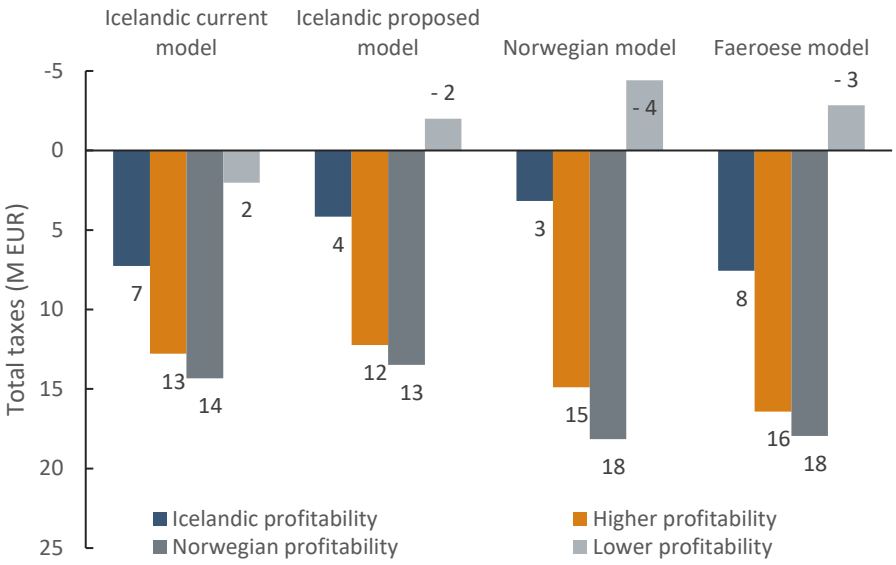
2.2 Comparison with other countries

In our previous report, we presented the tax systems of Norway and the Faroe Islands. Here we compare the results of the proposed model under the 4 scenarios with the current Icelandic model as well as the Norwegian and Faroese systems. We refer to the previous report for a full account of the Norwegian and Faroese models.

The figure below shows the total taxes[3] under the different taxation systems. It shows that the proposed model yields a somewhat lower taxation than the current model in all 4 scenarios. When compared to the Norwegian and Faroese models, the model yields lower taxation in scenarios of high profitability, but a less beneficial taxation when profits are lower. This follows from the fact that the Icelandic model does not vary with costs in our static examples.

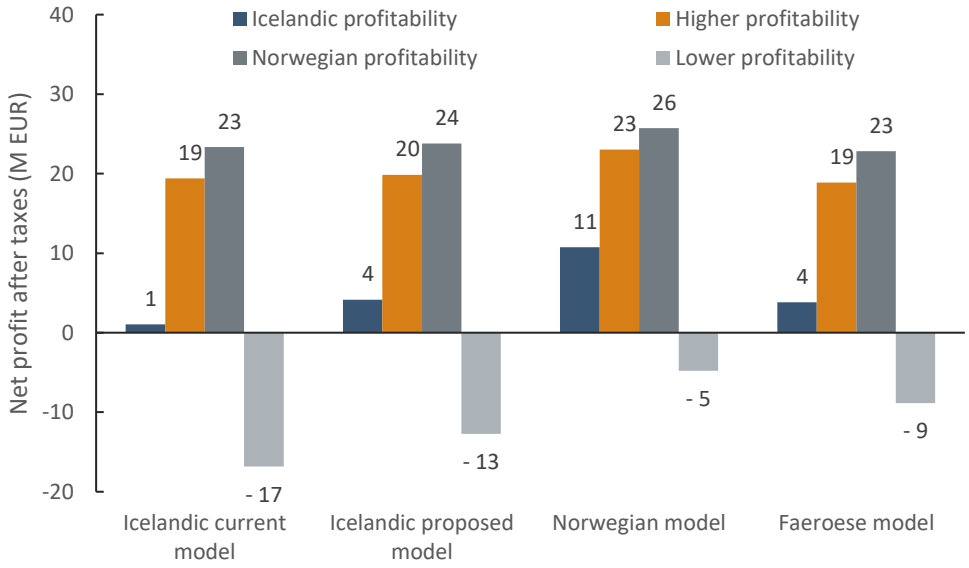
[3] *The total taxes include an estimation of all firm specific taxes. For the Icelandic models, this includes the production fee, corporate tax, environmental tax and harbour fee. The estimated tax value of depreciation is deducted. Taxes on owners, i.e. wealth and dividend taxes, are exempt.*

Figure 2-2: Total taxes under the different taxation systems



The figure below shows the net profits after taxes and fees under the different systems. The proposed model performs better for the firms than the current model, but under the scenarios of lower profitability, the Norwegian and Faroese models will be preferable to the firms.

Figure 2-3: Net profits after taxes and fees under the different taxation systems



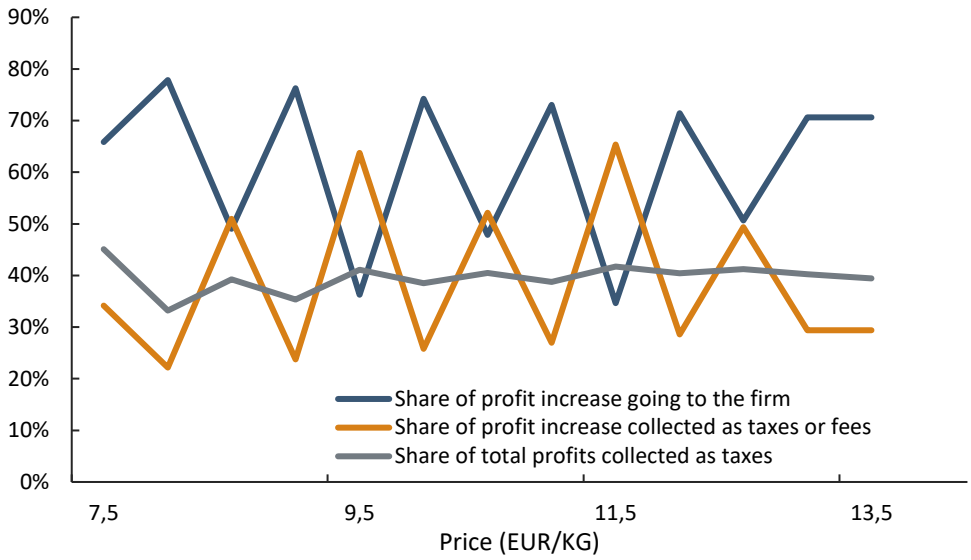
2.3 How does the taxation vary with price increments?

When considering the effects of a new tax or production fee, a key question is how profits are split between the firm and the tax authorities. In this sub chapter we look more closely at how the proposed model affects distribution of profits.

2.3.1 Marginal tax income of a given price increase

In the figure below we show how profits are split between earnings for the firm and taxes and fees for a given cost level, 7 EUR/kg.

Figure 2-4: Split of profits for a given cost level (7 EUR/kg)



The grey line illustrates the split of total profits as prices go up. In this example, using costs of EUR 7/kg, the taxes and fees as a share of total profits varies between 33-45 %, and stabilizes at a level of about 40 %.[4] As the prices increase, this share varies as the production fee increases when passing the different thresholds. This is more clearly shown by the blue and orange lines, which illustrates the split of a given increase in profits for a given price increase (in increments of EUR 0,5/kg) between earnings for the firm and taxes and fees.

In our example, with a given cost structure, profits before taxes and fees will increase with prices at a linear rate. As the production is 20 000 tons, every price increase of EUR 0.5/kg increases profits before taxes by EUR 10 million. Whenever the price crosses a fee threshold, it increases the fee of all the fish that is produced. Thus, the share of profits collected as taxes/fees does not increase at a stable rate.

For example, when prices climb from EUR 8.5/kg to EUR 9/kg, the fee increases from 4 % to 6.5 % for all the produced fish. This alone increases the total production fee from EUR 3.4 million to EUR 7.2 million. Adding other taxes and fees, the total tax increase amounts to around EUR 5 million, meaning that 50 % of the increased profits from the price increase is collected as taxes and fees. When the prices go from EUR 9/kg to EUR 9.5/kg, no new threshold is crossed, and the increase in production fee is simply a function of the increased value of the fish sold. Thus, total taxes and fees only increase by around EUR 2.4 million, or 24 % of the increase in profits before taxes and fees. When prices increase to EUR 10/kg, another threshold is crossed, and the share of increase in profits collected as taxes and fees is 64 %. This pattern continues until the prices reach the final threshold, where new price increments lead to profits split as 70 % to the firm, and 30 % as taxes and fees.

[4] *We note again that we focus on the taxation of the firm. Taxation of dividends and other taxations of owners are not included in this figure.*

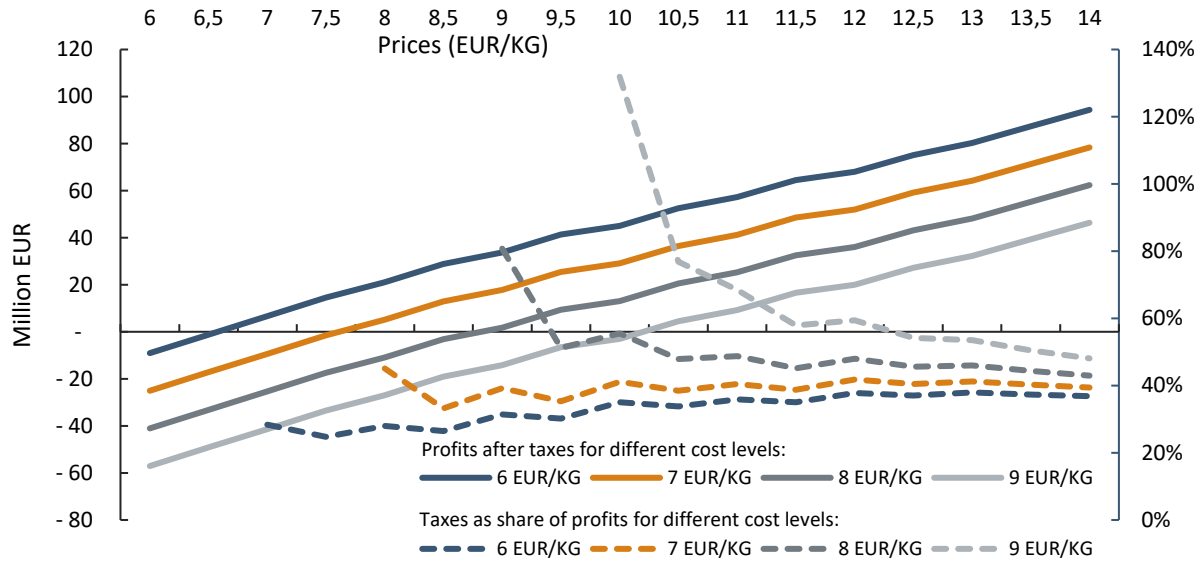
2.3.2 Taxation with variations in prices and costs

In this sub chapter, we study how the total taxation and in particular the production fee varies as a share of profits, depending on the individual producer costs and prices. While the reference prices over time will be adjusted by an index that seeks to capture the industry wide cost developments, for an individual company what matters for their tax burden is their actual cost levels. Even if the index succeeds in capturing the industry wide cost development, an individual player may have costs that deviate significantly from the industry average and as such get a taxation that also deviates from the industry average.

To highlight this, we consider four scenarios with different production costs (i.e. operating expenditures, capital costs are kept constant). We illustrate how profits and tax rates as share of profits vary with increasing salmon prices. The tax rates have a less sensible pattern when profits are negative. They are more informative once profits are positive. Therefore, we focus the analysis on the cases where profits are positive, and the tax rates are more intuitive to interpret.

Figure 2-5 shows how, for four different cost levels, profits after taxes and taxes as a share of profits varies. The solid lines show the profits after taxes (left axis), while the dashed lines show the taxes as share of profits (right axis).

Figure 2-5: Variations in profits after taxes and taxes as share of profits for different cost levels



When the firms are break-even before taxes, i.e. when the profits before taxes are 0, the taxes as a share of profits vary greatly.

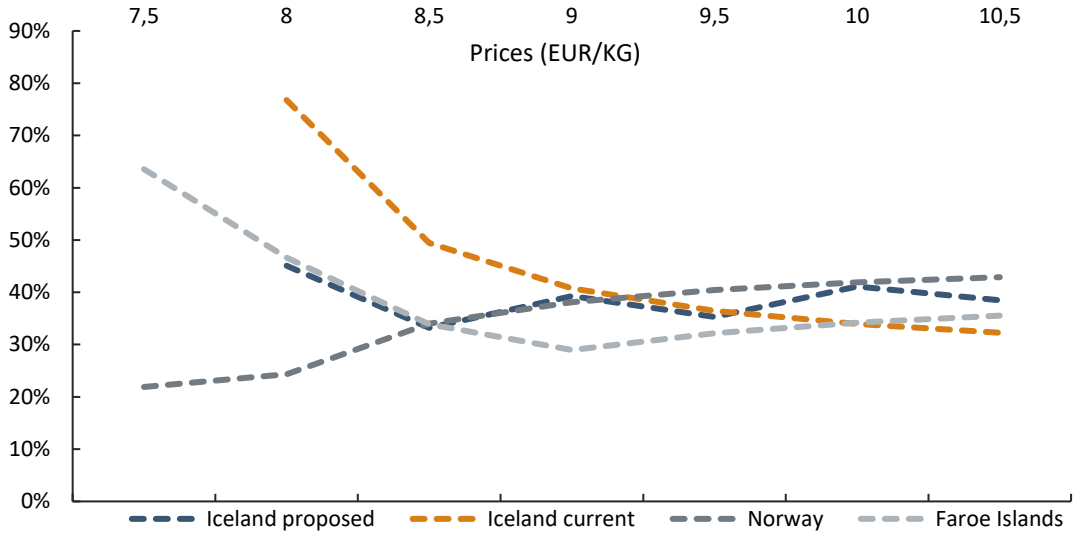
- In the low-cost scenario of EUR 6 per kg, profits are break even around EUR 6,5-7 per kg, and the tax rate as a share of profit is around 28 %. As profits increase and the production fee goes up, the relative tax share gradually increases to close to 40 % when prices reach EUR 14 per kg.
- In the scenario with costs of EUR 7 per kg, taxes as share of profits start at 45 %, and oscillate around 40 %, ending up at about 43 %.
- When costs increase to EUR 8 per kg, taxes as a share of profits start at 80 % and gradually drop, also reaching 43 %.

- When costs are EUR 9 per kg, the taxes in fact exceed profits when the company – before taxes – is break-even profitable. The tax rate with prices of EUR 10 per kg becomes 130 % but dropping sharply and ending up around 48 % when prices are EUR 14 per kg.

The figure illustrates that tax rates can vary greatly depending on the individual producer's cost levels. It also shows that the tax rate can be particularly sensitive when profits are marginal. This is because the impact of the production fee, which does not vary with profitability, can be particularly cumbersome at these levels. This variation in tax rates is all a function of the production fee which depends strictly on the nominal prices. While reference prices are regulated by an industry wide index over time, an individual producer with higher-than-normal costs in a given year can face a significantly higher tax rate.

The figure below illustrates the variations in tax rates for different prices under the tax schemes of Iceland (current and proposed system), Norway and Faroe Islands.

Figure 2-6: Variations in tax rates under different tax schemes given a cost of EUR 7/kg



The figure illustrates that the taxation varies a lot between the different systems when prices are low, where the Norwegian system fares better (this largely follows due to the relatively high minimum deduction), while the current Icelandic system fares somewhat worse than the proposed Icelandic and the Faroese system. As profits increase, the models even out. With prices of EUR 10.5/kg, the current Icelandic model yields a tax rate of 32 %, while the Norwegian model yields taxes of 43 %. The proposed Icelandic system lies somewhere between these two models, at around 39 %.

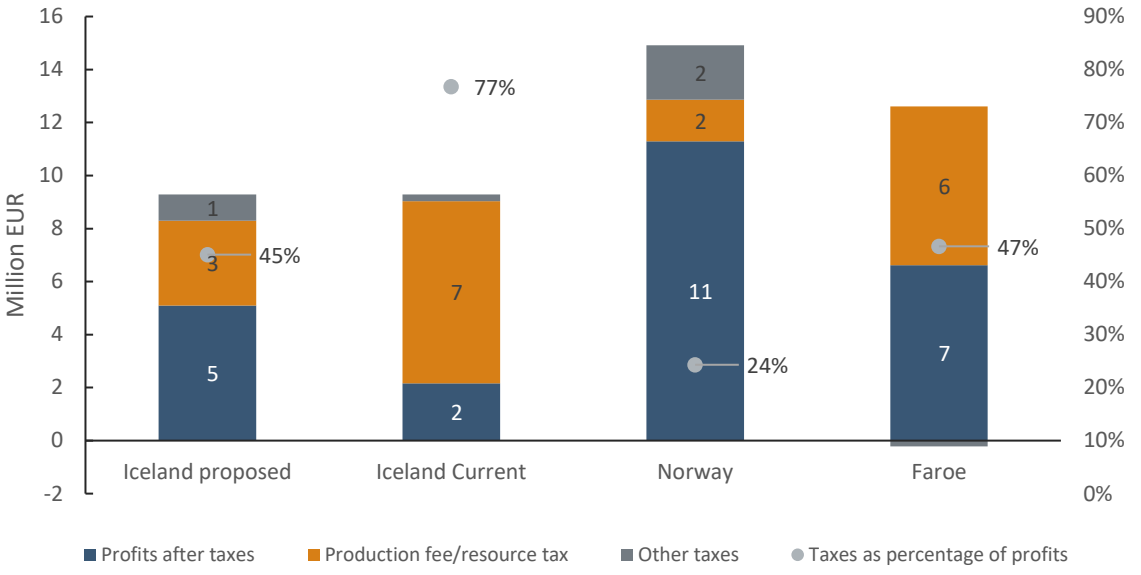
Figures 2-7, 2-8 and 2-9 "zoom in" on the part of figure 2-6 where prices are EUR 8/kg, 9/kg and 10/kg respectively. The figures show the split of profits before taxes as:

- Profits after taxes
- Production fee/resource tax
- Other taxes

These are shown as stacked colums. The figures also show the taxes as percentage of profits represented by a dot. Note that the profits before taxes will vary between countries. This is because the tax value of the

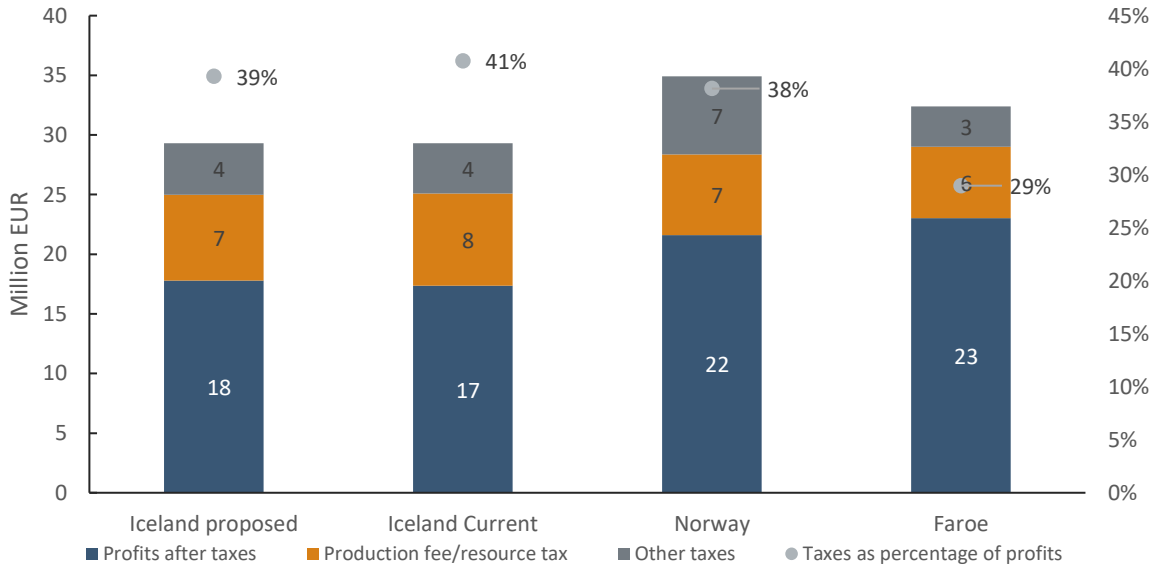
depreciation of the capital is included when calculating the profits, and depreciation rules vary between the countries.

Figure 2-7: Breakdown of profits before taxes and tax rates given costs of EUR 7/kg and prices of EUR 8/kg



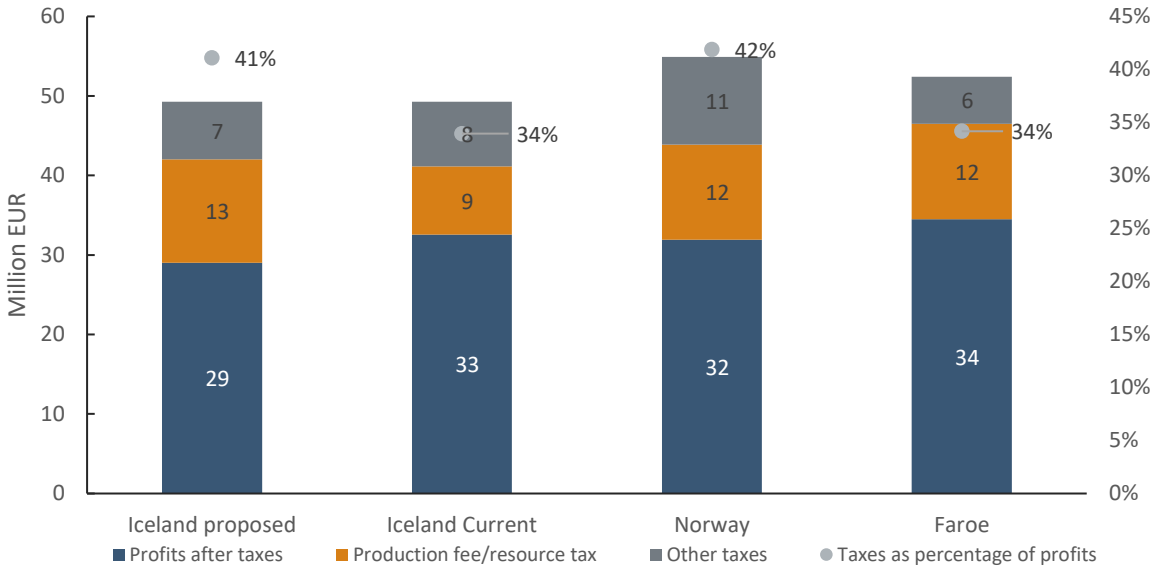
When profits are relatively marginal, the tax rates of the different models yield very different results. In particular, the relative importance of the production fee/resource tax fluctuates a lot.

Figure 2-8: Breakdown of profits before taxes and tax rates given costs of EUR 7/kg and prices of EUR 9/kg



When profits are somewhat higher, the outcome of the different models evens out. With prices of EUR 9/kg, the tax rates of the Faroese model is lower (29 % of profits), while the other models are similar, ranging between 38 – 41 % of profits.

Figure 2-9: Breakdown of profits before taxes and tax rates given costs of EUR 7/kg and prices of EUR 10/kg



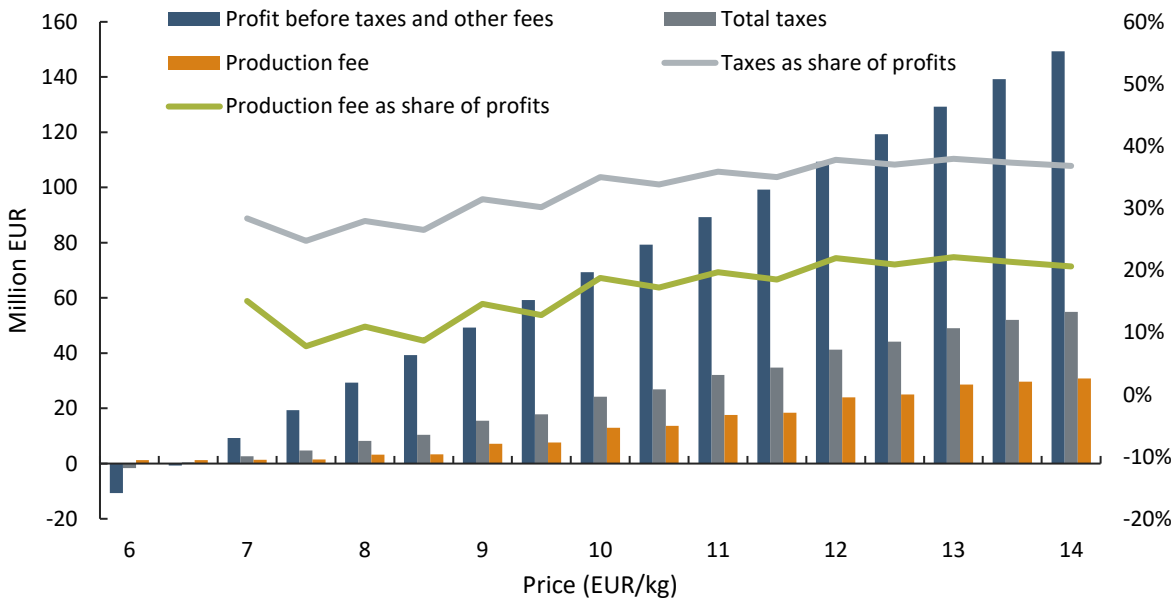
As prices increase to EUR 10/kg, the profits rise and the tax rates even out further. The current Icelandic system and the Faroese system yield tax rates of 34 % in this case, while the proposed Icelandic system and the Norwegian system yield tax rates of 41 and 42 %, respectively.

2.3.3 Further details on variation in taxation under different cost and price scenarios

In the following figures, we delve deeper into the details of the four different cost cases and highlight the importance of the proposed production fee. The bars in the figures represent profits before taxes, total taxes (which includes harbour and environmental fees) and production fee in nominal terms (left axis), while the lines show the taxes as share of profits and the production fee as share of profits (right axis).

In Figure 2-10, we show how profits, taxes and tax rates vary with prices given a production cost of EUR 6/kg.

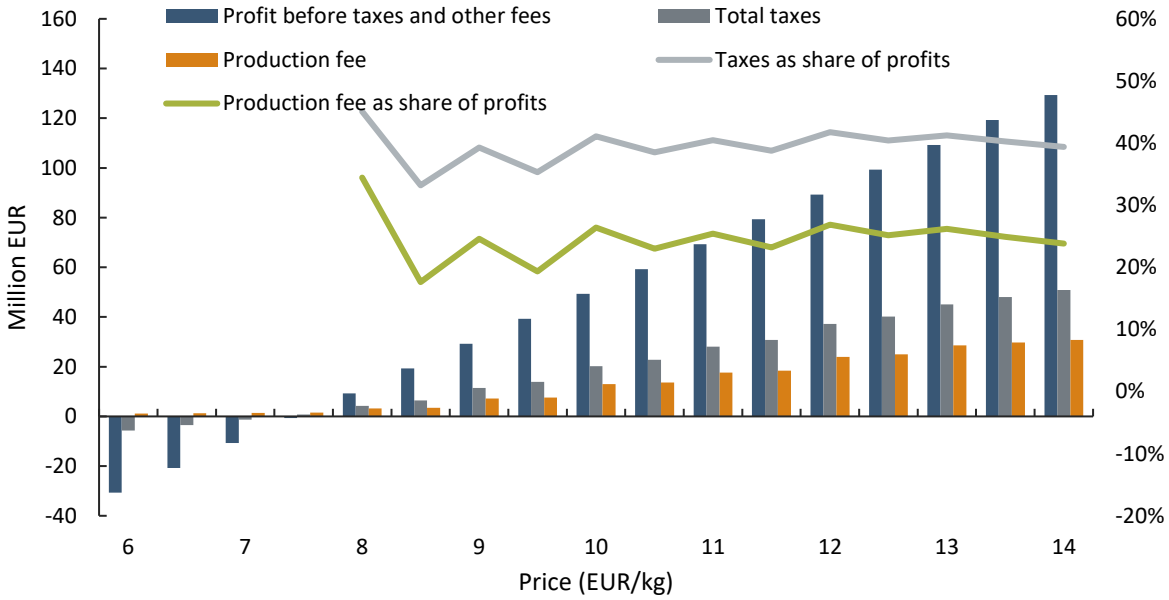
Figure 2-10: Profits, taxes and tax rates for an individual producer with a production cost of EUR 6/KG



The figure shows that profits are positive with costs of EUR 6/kg once the prices reach EUR 7/kg (the costs denote operating expenditure, but there are also capital costs to account for, which explains why profits are not positive until the price is significantly higher than the costs). The taxes as a share of profit start off at 28 %, while the production fee is at 15 %. As prices go up, profits increase, but so does the production fee rates. The total taxes reach a level of 38 % when prices reach EUR 12/kg, while the production fee as a share of profits reaches its peak at the same price level, corresponding to around 22 % of the total profits.

Figure 2-11 shows profits, taxes and tax rates with a production cost of EUR 7/kg.

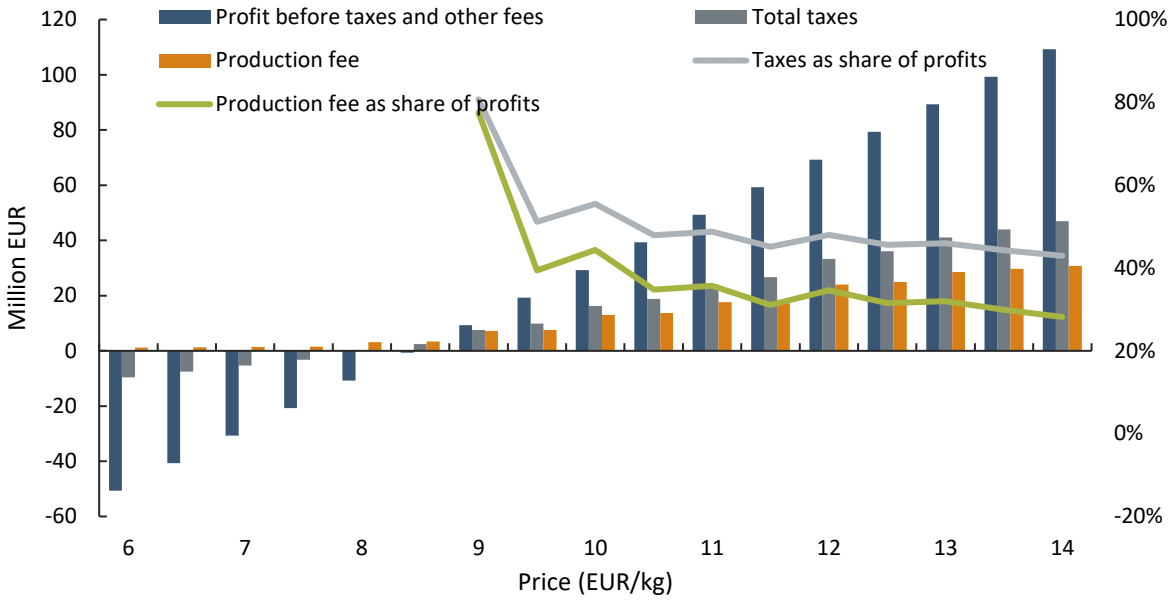
Figure 2-11: Profits, taxes and tax rates for an individual producer with a production cost of EUR 7/KG



In this case profits are positive when prices are around EUR 8/kg. The total taxes and production fee as a share of profits reaches their peak when profits are low, corresponding to about 45 and 34 % of total profits respectively. As prices and profits increase, these rates fall somewhat, averaging around 40 and 25 % respectively. With this cost level, the total tax rate hovers around the same level as prices and profits go up, as the production fee makes up a relatively larger share of the profits compared to the example with lower cost levels.

Figure 2-12 shows profits, taxes and tax rates with a production cost of EUR 8/kg.

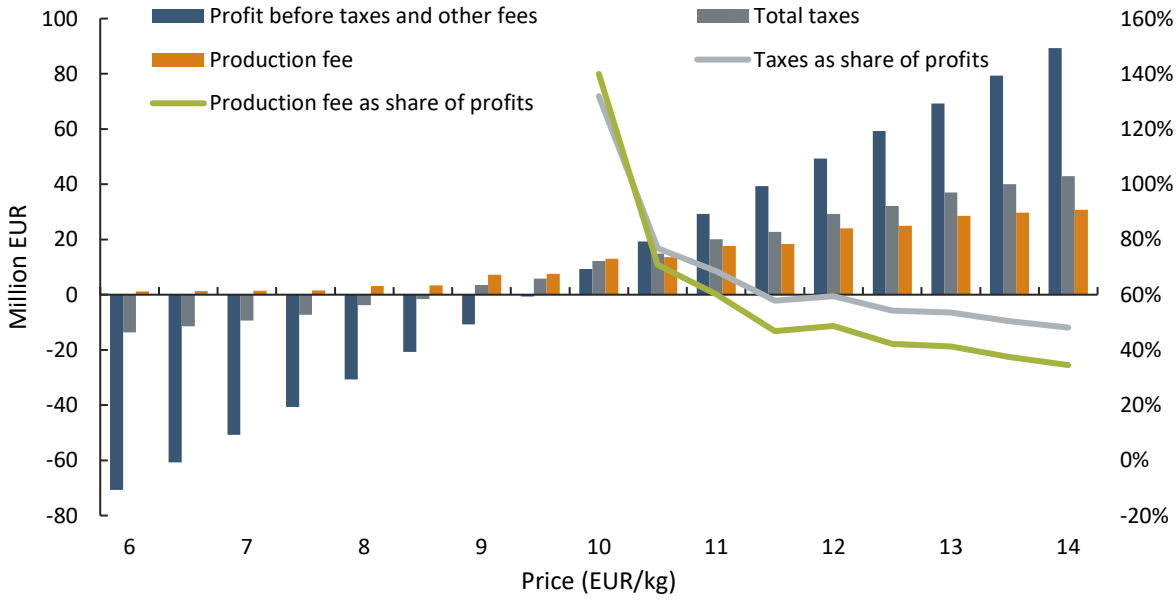
Figure 2-12: Profits, taxes and tax rates for an individual producer with a production cost of EUR 8/KG



In this example, a similar pattern emerges. Profits are positive once prices reach EUR 9/kg, but the high prices also entail a high production fee. The total taxes as a share of profits and the production fee are around the same level; around 80 %. In other words, the production fee makes up almost all the taxation of the industry at this cost- and price level. As prices and profits before taxes increase, the relative importance of the production fee and taxes decreases. Initially the relative taxation drops quite sharply, but then more gradually. With sufficiently high prices, the taxes and production fee as a share of profits end up around 43 and 28 % respectively, marginally higher than in the example of costs of EUR 7/kg.

Figure 2-13 shows profits, taxes and tax rates with a production cost of EUR 9/kg.

Figure 2-13: Profits, taxes and tax rates for an individual producer with a production cost of EUR 9/KG



Again, the trend described in the former examples repeats itself. As prices reach EUR 10/kg, the firm generates a profit before taxes. However, at this cost level, the taxes and production fee as a share of profits are exceptionally high, actually exceeding the nominal profits. This is because with this cost level, profits are quite low even with prices of EUR 10/kg. The production fee is in fact higher than the total taxes, as the corporate taxation in fact will be negative (i.e. allowing for future tax deductions). The total taxes and production fee measured as share of profits are respectively 132 % and 140 % in this example. As prices increase, the tax share drops even more sharply than in the previous example but remain at higher levels. When prices reach EUR 11/kg, the total taxes and production fee as share of profits are 68 % and 60 % respectively. When prices are EUR 14/kg, the rates 48 % and 34 % respectively.

2.3.4 Summary

As the figures in chapter 2.3.2 and 2.3.3 show, the total tax rate is quite sensitive to the firms' actual costs:

- When production costs are very low, at EUR 6/kg, the total tax rate (including the production fee) ranges between 28-37 % of profits, and the production fee is between 15-21 % of the total profits, and the relative taxation increases with prices (and thus profits).
- When production costs are EUR 7/kg, the corresponding figures are 39-45 % and 24-35 % respectively, but the tax rate fluctuates more.
- With production costs of EUR 8/kg, the corresponding figures are 43-81 % and 28-78 % respectively. In this case, the tax rate decreases with prices and profits, but remain at a higher level than in the previous examples.
- With production costs of EUR 9/kg, the corresponding figures are 48-132 % and 34-140 % respectively. Again, the tax rate decreases with prices and profits, but remain at a higher level than in the previous examples.

These fluctuating results may seem counter intuitive. Why is not the total taxation developing at a similar rate with respect to increasing prices, regardless of the costs? The result follows from the fact that the production fee depends on nominal prices rather than profit margins. All else equal, an Icelandic producer would prefer a profit based on low costs and low prices to a profit based on high cots and correspondingly higher prices, as the production fee increases with the nominal prices. In other words, the relative burden of the production fee is higher when costs are higher. The production fee is in this sense not well suited to deal with variations in costs.

What the four preceding figures also illustrate is that there is little symmetry in the proposed system. When profits are low/negative, the corporate taxation is negative (i.e., current losses can be subtracted from future surpluses), while the production fee in fact increases the firm's total taxation, although at a lower rate if prices are low.

Furthermore, with the proposed tax, it is in fact worse to run low profits in a situation with high prices and high costs, compared to a situation with low profits with low prices and low costs, as the former situation implies a higher production fee. With a profit margin before taxes of around EUR 1000 per ton salmon, i.e. EUR 1 per kg, the total taxation with these four cost levels will be 25, 33, 51 and 77 % respectively.[5]

It can be claimed that the proposal to include a cost index will account for this. To some extent, that is true, as the thresholds will develop in accordance with the cost index. For the industry as a whole, this means that the

[5] *This profit margin is reached when prices are EUR 7.5, 8.5, 9.5 and 10.5 per kg respectively.*

taxation will develop as costs change, provided that the index captures the cost changes accurately. However, production costs and thus the taxation should in fact be expected to vary between companies. We expand upon this in chapter 4.

2.4 Comparison with Norwegian model

In chapter 2.3, we've shown that the taxation compared to profit levels can vary greatly with the proposed model, ranging from 28 % to 132 % (when profits are positive), depending on the price and cost levels. It is interesting to see how this compares to taxation in Norway.

The Norwegian aquaculture resource tax will yield a tax rate of 47 % in the sea phase (corporate taxation of 22 % + resource tax of 25 %), not considering the Norwegian production fee (which is fully deductible from the resource tax, but which will be paid in full when no resource tax is paid) and the minimum deduction (a pre-tax deduction of profits of about EUR 7 million). In particular, the minimum deduction affects the total taxation for smaller producers as it allows for significant profits before the resource tax comes into effect.

If we focus on the extended value chain, i.e. not just the sea phase, where the resource tax is applicable, the total tax rate is somewhat reduced, as the relative importance of the resource tax is reduced. For a firm that is specialized in the sea phase and purchases all its inputs and transportation/processing services, this does not affect the tax rate, but for a firm which is involved in other activities, the tax rate will be lowered. As 2023 is the first tax year where the resource rent tax is applied, and taxes for 2023 are not finalized yet, it is not yet certain how strong this effect is. However, a company like MOWI, which to a large extent also have activites in the other parts of the value chain, report that they expect the "effective resource rent tax" to be in the range of 10 %. We have not been able to decipher what this term covers, but we note that, according to the Q4 report of MOWI, the resource rent tax costs for 2023 are expected to be around EUR 54 million (excluding one off effects of the implementation of the tax), while their other Norwegian taxes are around EUR 159 million. This implies that the resource tax of their Norwegian activity for 2023 is around 25 % of their total taxation, as opposed to 53 % for a company fully specialized in the sea phase (25 %/(25 % + 22%)).

The Norwegian resource tax and the proposed production fee are not directly comparable, but with lower profit margins, the relative tax burden of the Norwegian model appears to be lower. Another key difference between the Icelandic and Norwegian model is that the Norwegian model is more beneficial when profits are negative, as the cost refund component implies that the tax authorities will take part in the losses. This is not a feature of the Icelandic production fee, which is paid regardless of actual profits.

3 Cost index and actual cost development

In this chapter we discuss the properties of the proposed cost index which can alter the reference prices in the Icelandic production fee. First, we view the index composition in light of historical cost developments. Then we consider whether it captures potential future cost developments to a sufficient degree.

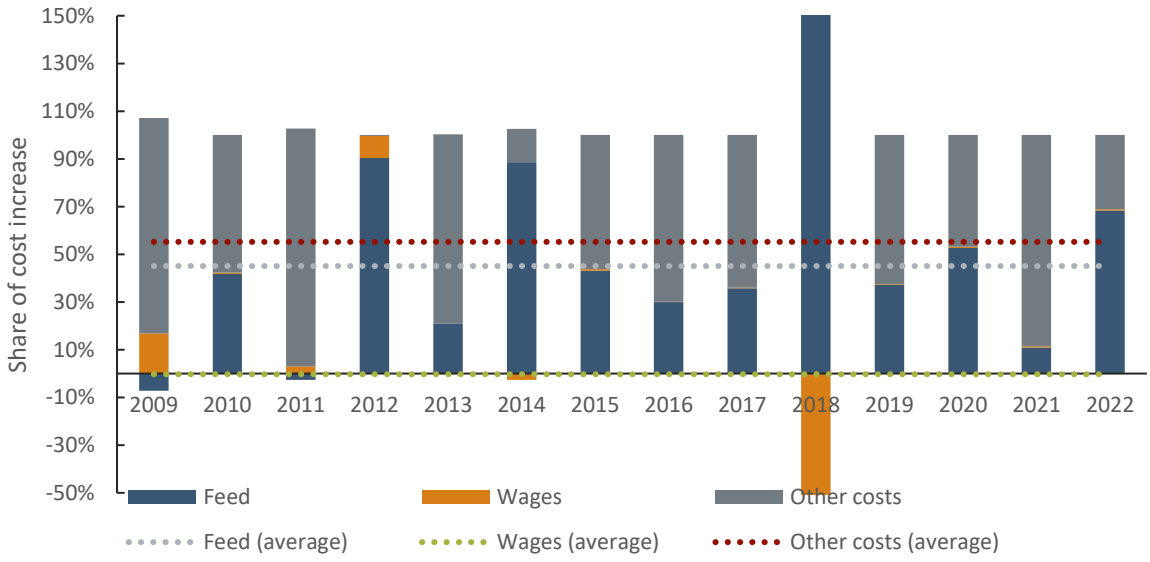
3.1 Index composition viewed in a historical light

A key property of the new model is that the price thresholds will increase over time according to an index. The cost index is based on changes in feed prices (50 %), CPI (30 %) and a wage index (20 %).

In our previous report, we were critical to the properties of the then proposed model which did not account for variations in profits driven by changes in costs (as is the case with the current Icelandic model). It can be argued that a model where price thresholds vary with a cost index, allows for the model to account for variations in costs, and thus makes it less cumbersome when profits are low.

A key question is then to what extent the cost index is able to account for variations in costs over time. If the index does not match cost developments, the relative impact of the production fee will change over time. The figure below illustrates how the yearly cost increase is split between feed, wages and other costs in the Norwegian Industry from 2009-2022.

Figure 3-1: Share of cost increments attributed to 3 different factors for Norwegian producers.* Source: The Norwegian Directorate of Fisheries



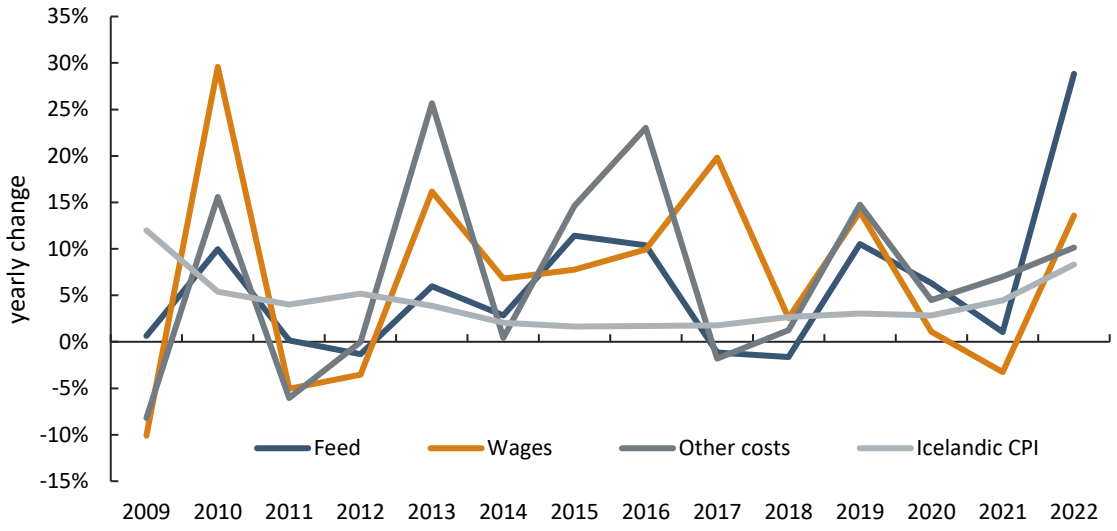
**Because the nominal cost increase from 2017 to 2018 was relatively low, the impact of the individual cost components to the total that year was correspondingly high. In this particular year, measured in absolute terms, the change in feed, wages and other costs was respectively about 50, 5 and 45 %.*

The figure shows that feed, wages and other factors on average contribute to 45, 0 and 55 % of the cost increases for Norwegian producers over the years 2009-2022 (calculated as the total for the entire period). This factor is by no means stable, however. In particular, the contributions of feed and other costs can vary greatly from year

to year. If the Icelandic cost developments follow a similar pattern to the Norwegian industry over the past 15 years, the index seems to weigh wages too high.

It should be noted that "other costs" by no means must be analogous with developments in the CPI. The figure below shows the yearly changes in feed, wages and other costs for the Norwegian aquaculture industry, as well as the Icelandic CPI.

Figure 3-2: Yearly changes in feed, wages and other costs for the Norwegian aquaculture industry and the Icelandic CPI. Sources: The Norwegian Directorate of Fisheries and Statistics Iceland



The table below lists the correlation coefficients between the series in the figure above. This parameter expresses to what extent the variables vary similarly during this period.

Table 3-1: Correlation coefficients between different cost components for the Norwegian aquaculture industry and the Icelandic CPI 2008-2022. Sources: The Norwegian Directorate of Fisheries and Statistics Iceland

	Feed	Wages	Other costs	Icelandic CPI
Feed	1,00			
Wages	0,45	1,00		
Other costs	0,53	0,61	1,00	
Icelandic CPI	0,18	-0,30	-0,32	1,00

It is no surprise that the Icelandic CPI is not particularly correlated with the other variables, as the Norwegian and Icelandic markets differ on many levels. It should however be noted that the correlation coefficient between feed and the other three parameters is quite low. Considering that feed is such an important part of the total costs of the industry, and more importantly that it has contributed so highly to cost increases in recent years, it is important to include feed to a sufficient degree in the model.

3.2 Future cost developments and index composition

A key question for the proposed cost index, is whether it will accurately capture future developments in the industry's cost. In particular, a key question is whether capital costs are included to a sufficient degree.

While it is impossible to be certain, there are strong indications that capital costs in the aquaculture industry will increase in the near future. There are two main drivers for this expectation:

- Technological developments in various farming technology
    - The aquaculture industry is developing at technologically a rapid pace, and production technology with higher capital costs is becoming more and more important.
- Political expectations raise capital requirements for the industry.
    - In the Norwegian discourse, there is a continuous pressure for the industry to produce more sustainably and with higher notoriety (e.g. with better control of escapees, reduced emissions and so forth). This is reflected in the regulatory development, which continues to raise environmental requirements that the industry faces.
    - We expect these same drivers to affect the Icelandic industry in the future too, as this to some extent is a function of the opportunities offered by the technological development.

We thus recommend that including a capital expenditure component in the cost index should be considered, going forward. In practice, this is probably most efficiently done by calculating the companies' capital costs plus depreciations. The cost of capital is calculated by assessing the value of the capital (i.e. debt and equity), multiplied by an interest rate that reflects the price of acquiring this capital.[6]

[6] *In practice, this means calculating the weighted average cost of capital (WACC) of the aquaculture companies.*

4 Tax efficiency with variations in costs

The proposed taxation model, which we understand to be based on some average cost across all aquaculture companies in Iceland, raises concerns regarding its adaptability and equity. It's important to recognize that while sale prices within the industry do not vary as much, operational costs can vary a lot more. These costs are variable and can differ from one aquaculture firm to another, a factor that can influence the impact of a uniform tax model. For instance, should an aquaculture farm experience an outbreak of disease resulting in substantial fish loss, this model could disproportionately impact the affected company.

The production fee is thus a “one size fits all” model. A key question then becomes whether the costs between players in fact are similar both within a year and across years. Variations in costs can lead to systematically higher taxation of players with relatively low profitability and could lead to inefficient behaviour and a national welfare loss.

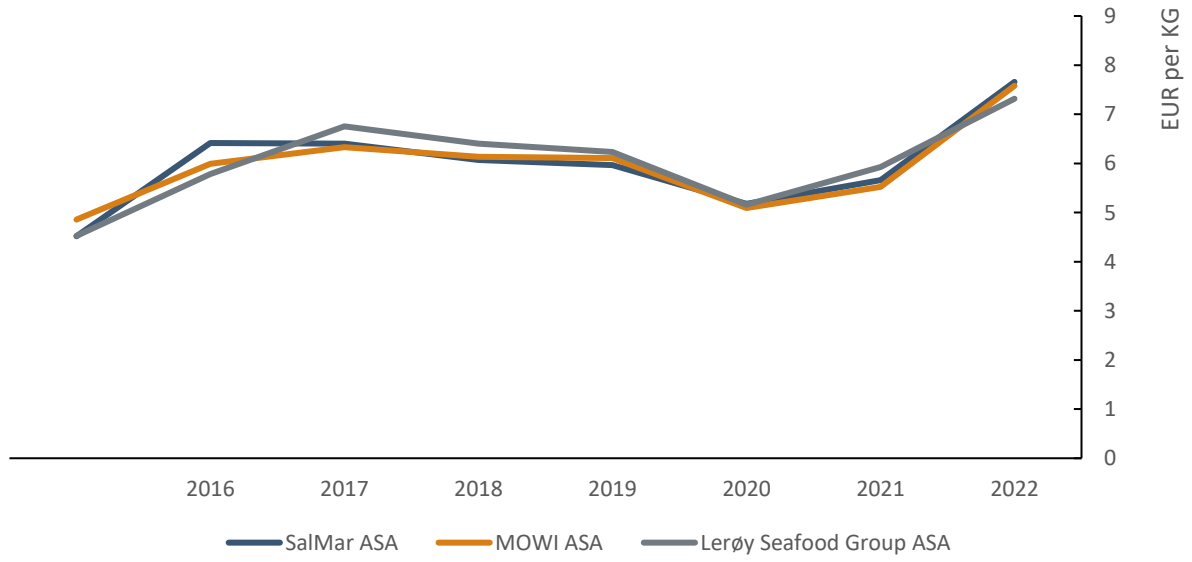
In this chapter we look at variations in costs and profit margins for different aquaculture companies. As the Icelandic industry is less mature, will we also look at variations in profits and costs for Norwegian aquaculture companies.

4.1 Price variation is relatively low in the aquaculture industry

In this chapter we focus on variations in costs and profit margins, as an efficient tax should be able to account for these variations. A key point is that prices in the aquaculture industry is relatively homogeneous between players.

In Figure 4-1 we demonstrate the price variation for three of the listed Norwegian aquaculture companies. It is evident that the companies achieve highly similar prices for their harvested salmon. We have calculated the sale price per kilo by dividing revenue by the yearly harvest for each company.

Figure 4-1: Sale price per kilogram of gutted salmon for SalMar ASA, MOWI ASA and Lerøy Seafood Group ASA. Source: Yearly reports from SalMar ASA, MOWI ASA, Lerøy Seafood Group ASA; Bank of Norway; fishpool.eu and Menon Economics.



In Table 4-1 we have provided additional statistics on sales prices. Note that the variance is very low relative to the average price in the industry. This provides strong evidence for prices being relatively homogenous between players over the course of a year. Thus, the variation in profits can to a large extent be deduced by looking at variation in costs.

Table 4-1: Yearly average, median, standard deviation, and variance for sale price per kilogram of gutted salmon for the Salmar, Mowi and Lerøy. Source: Yearly reports Salmar, Mowi, Lerøy, Bank of Norway, Nasdaq Salmon Index and Menon Economics.

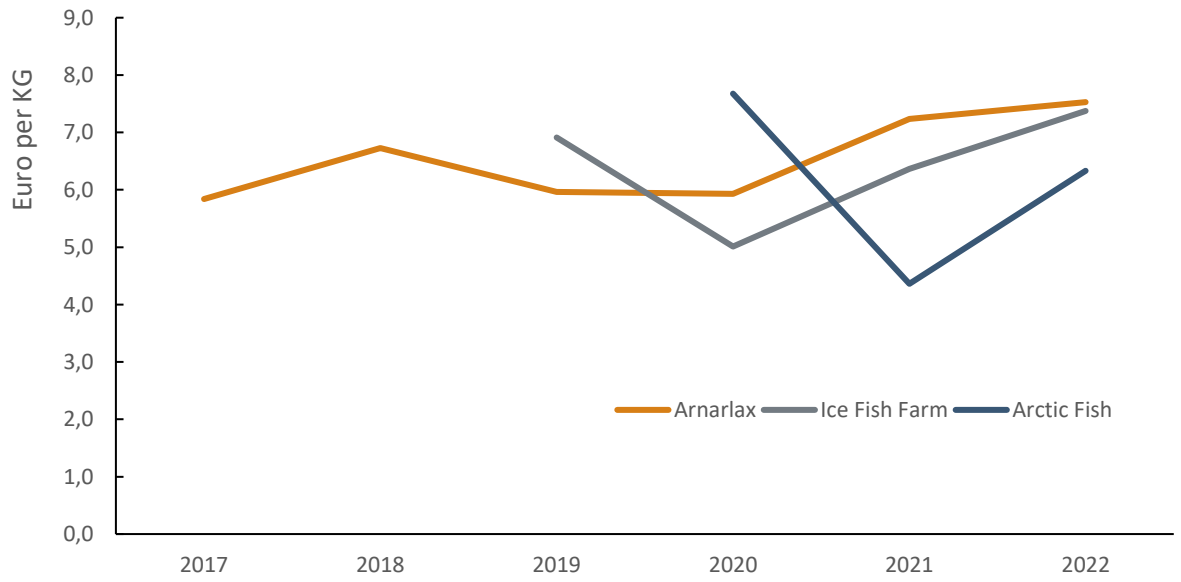
	2022	2021	2020	2019	2018	2017	2016	2015
Average	7,52	5,70	5,14	6,10	6,20	6,49	6,06	4,63
Median	7,58	5,66	5,16	6,11	6,13	6,40	5,99	4,53
Standard deviation	0,15	0,17	0,04	0,11	0,14	0,18	0,26	0,16
Variance	0,02	0,03	0,00	0,01	0,02	0,03	0,07	0,03

4.2 Variations in costs between Icelandic producers

To identify the variations in costs between Icelandic producers, we will examine the current three main players in the aquaculture industry, Arnarlax, Ice Fish Farm and Arctic Fish.[7]

We will start by looking at the companies operating expenses per kilogram of harvested salmon. This is shown in the figure below for the years 2017 until 2022 for Arnarlax, 2019 to 2022 for Ice fish farm, and 2020 until 2022 for Arctic Fish. The figure shows that the costs for the Icelandic firms vary.

Figure 4-2: Operating expenses per kilogram of harvested salmon. Source: Yearly reports from Arnarlax, Ice Fish Farm & Arctic Fish.



[7] There are also other aquaculture players, such as Háafell and Hábrún/Ís47, but they are not included in the analysis due to data availability.

The table below lists average costs and variations for the companies based on the same data. The variance, which expresses the normal variation around the average, moves around 0,2 to 1,5. It should be noted that given the series short length and the low amount of players, these metrics are from a statistical point of view not very significant. However, a clear takeaway is that the costs between the players in fact will vary, which indicates that a fixed fee which does not account for the variation will hit the players very differently in any given year.

Table 4-2: Yearly average, and variance for the Icelandic aquaculture population

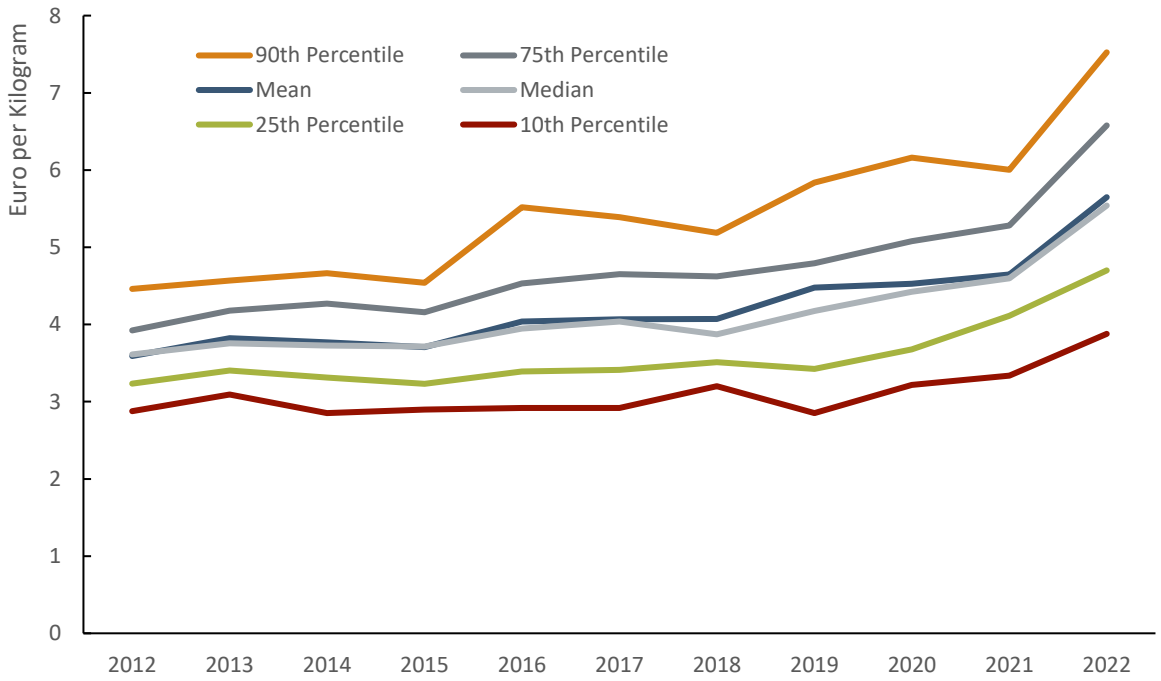
Metric	2019	2020	2021	2022
Average	6,4	6,2	6,0	7,1
Variance	0,2	1,2	1,4	0,3

4.3 Variations in costs in Norway

As the history of the aquaculture in Iceland is relatively short, time series data is limited. We will therefore utilize historical data from the Norwegian aquaculture sector to demonstrate the variance and discrepancies of costs in the sector. First, we will start by looking at the yearly operating margin for the whole Norwegian aquaculture population, consisting of around 20 unique companies of various size.

Figure 4-3 shows the variation in operating costs for the Norwegian aquaculture sector from 2003 to 2022, sorted in percentiles. The signifies that the company that was in the 90th percentile of costs each year, can be in the 10th percentile for the next.

Figure 4-3: Costs per kg (round weight) for Norwegian producers. Adjusted for inflation with 2023 as base year. Source: Norwegian Directorate of Fisheries, Norges Bank, Statistics Norway, Menon Economics



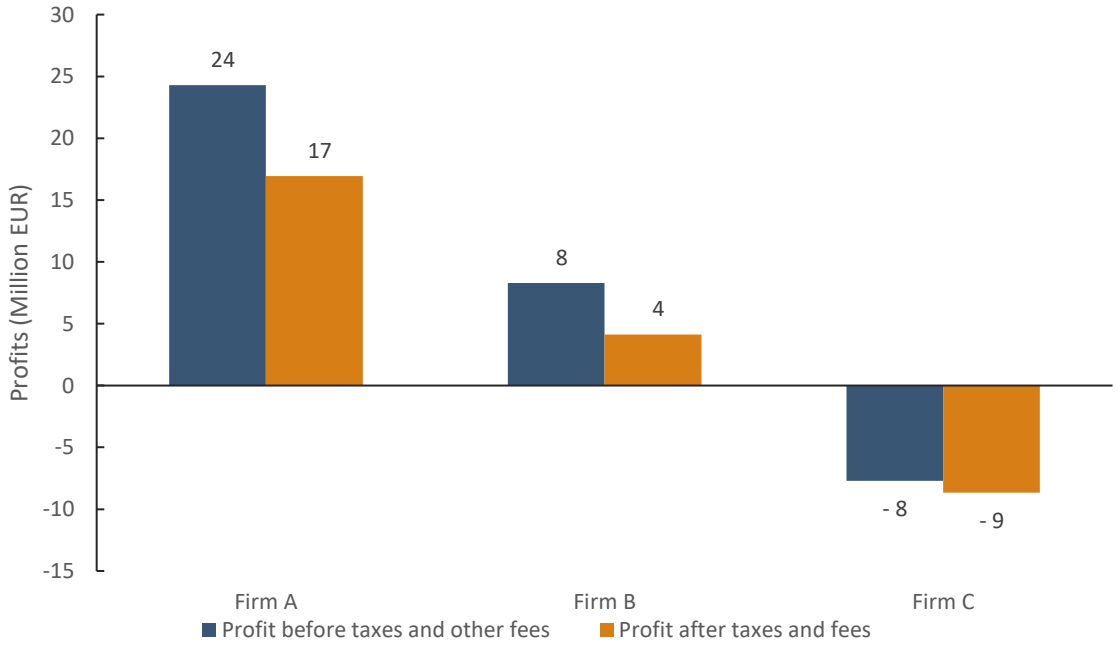
This figure illustrates a discrepancy between the cost levels for the producers. The costs differ with around EUR 1.5 euro per kg in 2012 and have increased to almost 3 euro in 2022. The variation is significant. The trend also illustrates a general higher cost related to aquaculture production than earlier, with the 90th percentile rising the most sharply, indicating higher production costs for some producers. The 10th percentile shows the lowest increase, suggesting that the most efficient producers have managed to control costs better than others. This divergence may reflect varying operational efficiencies, economies of scale, or differences in production techniques across producers. It should be noted that it is not possible to identify the costs to a specific company, so it is not clear to what extent the relative performance of players is consistent over time. However, it is clear that the variation between players within a given year is consistent over time .

This data demonstrates that there can be discrepancies between 10-20 percent in operating margins between the 25th and 75th percentiles, implying a significant heterogeneity between the firms. This is an important aspect to consider when considering a uniform tax policy model for the whole sector.

4.4 What does the variation in costs imply for the suitability of the tax model?

As we have shown in chapters 4.1-4.3, costs and thus profits should be expected to vary between firms. While a well-tuned cost index model will be able to account for developments in costs for the industry, it can each year yield very different tax burdens for different Icelandic companies. This is illustrated in the figure below. The figure shows a scenario where we have three firms with similar production (20 000 tons) and sales prices, but with varying cost levels. Firm B produces according to the Icelandic profitability scenario presented in chapter 2, i.e. at a cost of EUR 7,45/kg and a price of EUR 8,4/kg, while firm A and firm C produce respectively at a cost reduction and increase of EUR 0.8/kg (which corresponds to the average variance of Icelandic firms in recent years, see table 4-2)

Figure 4-4: Profits before and after taxes for producers with varying cost levels



The figure illustrates that the three firms will have big variations in profits before taxes, as costs obviously matter for the firms result. In this case, firms A and B and will have a profit of EUR 24 million and EUR 8 million before taxes, while firm C will operate at a loss of EUR 8 million. The profits after taxes are lowered by EUR 7, 4 and 1 million respectively. The change is not constant, as the changes in the corporate tax also contribute to the result, but while the corporate tax varies with the firms' profitability, the production fee does not. The production fee thus obviously gives a different burden to the three companies. The unprofitable firm will have to finance the production fee from its equity or a loan, while the profitable companies can use their surplus to finance it. Thus, the production fee will in fact weaken the less profitable firms even further relative to the more profitable firms.

Another issue with the production fee is that it can distort the firms' incentives for production. This is a problem in an economic sense, as the social and private returns of producing a given amount of fish might no longer be aligned. The optimal production level might be higher from a social point of view, but the firm will – given the incentives of the fee – might seek a lower production. In an economic sense, this is a core problem with production fees that don't take into account the actual costs of a firm.[8] In particular, this will be an issue if the firms' costs are systematically different, where a less profitable company is more likely to alter its production.

[8] *This issue was discussed at length by the Norwegian Aquaculture Tax Commission ("Havbruksskatteutvalget") in 2019.*

5 Properties of an improved tax model

The question of whether to tax the Icelandic aquaculture industry is on one hand a question of distribution (should the allocation of surpluses be shifted?) and on the other a question of efficiency (does a special tax increase the efficiency in the economy by allowing for reduction of other less efficient taxes; is the proposed special tax an efficient model for the aquaculture industry?). As technical advisers, we do not have an opinion on the question of distribution, as this is a question of policy. However, on the question of efficiency, we are of the opinion that the proposed production fee does not perform well. In this chapter we outline some key properties of a tax model we deem as better suited than the proposed Icelandic model.

We argue that a resource rent tax is likely the most suited model, given that extra taxes are to be levied upon the aquaculture industry.

A resource tax specifically targets an activity where the return on investment is/can be higher than normal due to natural conditions and/or regulatory constraints. In other words, where you can find a so called "resource rent". A resource tax fluctuates with profitability and does not (in theory) distort the incentives for farmers to maximize the profits from production. Thus, private and social returns are expected to be aligned and maximized. A resource tax implies high taxes when profits are large, and cost reimbursement when the company operates at a loss. This may provide support to the Icelandic industry in a growth phase where it operates at a loss.

In our view, the Norwegian model, with some significant improvements, would represent an improvement to the proposal. In particular, the model should:

- Not include a minimum deduction, as it causes distortions.
- Avoid artificial distinctions between types of permits (development permits, etc.)
    - We are unsure of the relevance of this concern in the Icelandic industry, but it is important to avoid tax wedges on a general basis.
- Ensure that prices and costs are as close to the companies' actual prices and costs as possible.
- For distributional purposes, historical cost deductions proportional to the chosen tax rate should be allowed for.
    - A significant tax which is introduced retroactively acts as a "windfall tax" which was not expected when investments were made. To compensate for this, tax deductions for historical costs proportional to the introduced tax rate can be granted retroactively.
    - This can be an important signal to investors in other Icelandic resource-based industries which in the future may face resource taxes (or production fees), as this indicates that if new taxes are introduced post-investment, investors will be compensated.
    - If this is done, fears of investing in industries that can face increased taxes in the future are addressed.

The last point pertains to **the challenge of transfer pricing**, which can be severe with resource taxes. All else equal, a firm will with such a scheme face lower taxes if profits can be "transferred" to a part of the value chain that does not face the resource tax. Thus, the incentives to move costs to the sea phase and income to other parts will be high. How this should be solved is not straight forward, and in Norway, a price commission has been put in place from 2024. They will have the authority to set reference prices for the companies, in order to reduce these incentives. This will in turn make the tax less precise, as firms risk facing taxes that do not mirror their profitability. This is unfortunate, especially if there are systematic biases in profitability over time. However, this

is no different from the proposed systems in Iceland with a schematic fee, so comparatively, this is not a disadvantage with this model.

If the value chain is not as integrated, there will be more reference prices and costs, and the risk of transfer prices will be reduced. The Icelandic value chain is less integrated than Norway's at present. This suggests there are fewer challenges with transfer pricing than compared to Norway. Relying on actual prices and costs makes the administration of a resource tax relatively inexpensive for the Icelandic tax authorities and the companies themselves.

General OECD taxation rules on arm's length principle for transfer pricing should also apply. This also gives the tax authorities the ability to control enterprises, and in turn gives companies incentives to report costs and income truthfully.

A key question is what **tax rate** one should settle on. This is largely a question of income distribution. In Norway, a resource rent tax has recently been introduced for both salmon farming and onshore wind power, settling at tax rates of 25%. Higher rates are applied to hydropower (45%) and petroleum (56%).

We have previously argued that economists can't provide an unambiguous answer to this question, and that there are many considerations to make when settling on a tax rate.[9] Factors such as geographical distribution and degree of local ownership is also relevant to include in the assessment.

Above all, it is important that the tax scheme is stable over time. Volatile tax schemes are highly detrimental to future investments and can hinder future development. This is a general point and is irrespective of the chosen taxation system. The main issue with a production fee is that it is unable to account for variations in costs, and both on the Faroe Islands, and now in Iceland, the different production fee schemes have been/are proposed to be altered several times to account for "the next challenge" that shows up following the previous fix. Thus, it is difficult to maintain a stable scheme, which in turn should be expected to reduce incentives to invest in the industry.

[9] *https://www.intrafish.no/kommentarer/hvor-hoy-bor-grunnrenteskatten-vare-/2-1-1428569*

6 Conclusion

In this report we have considered the properties of the newly proposed production fee in Iceland.

We show that the model does not deal well with variations in costs between players. In our view, this is still a major concern with the proposal. This is illustrated by the fact that taxation as a share of profits can vary between 28-132 % given certain assumptions on variations in costs and prices for an individual producer. The current Icelandic players consistently see variations in costs. This implies that the proposed production fee also will lead to highly varying tax rates between the players in a given year.

The proposed model is an improvement of the previous proposal in the sense that it to a larger extent can account for variations in costs in the industry as a whole. There appears to be some room for improving the composition of the cost index, and more thought should be put into how capital costs can be expected to change in the future.

If there is a desire to introduce a new taxation of the aquaculture industry in Iceland, it is in our view key that the model should be able to account for variations in costs between players. This is important because costs can and should be expected to vary between players. A tax which is not able to account for this, will be difficult to handle for companies with higher costs. This also means the model will fare better when profits are low. The proposed model still does not fare well when profits are low. This can distort the private and the social returns which implies an economic welfare loss.

List of references

Annual reports of MOWI ASA, Lerøy Seafoods ASA, Salmar ASA (2016-2023).

Boston Consulting Group - Björnsson, B., Perez, D., Martinsen, S., Langhorn, M. P., Koralewicz, A., Olsen, G., Vedeler, H., Schack, L., Muedano, S., Thorup, S., & Julegaard, V. (2023). The state and future of aquaculture in Iceland. Government of Iceland - Ministry of Food, Agriculture and Fisheries

Grønvik, O. Grünfeld L., Skjeldrum J. O., Rognsås L. L. (2024) *Taxation of Aquaculture in Iceland – A Comparative Study of the Effects of Tax Systems in Iceland, Norway and Faroe Islands.* Menon-report 8/2024.

The Norwegian Directorate of Fisheries' profitability surveys (2012-2022).

Ulltveit-Moe, K. Andvord, G. B., Armstrong, C. W., Christiansen, V., Fossli, G., Haugen, O. L., Moen, H., Noss, A., & Nøstbakken, L. (2019). NOU 2019: 18 Skattlegging av havbruksvirksomhet.

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