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Restraining the blue potential

Assessing the Impacts of Resource Rent Tax on Norway's Thriving Aquaculture Industry

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(Sjømat Norge, 2018)

Abstract

This thesis analyses the effects on investment incentives of implementing a resource rent tax in the Norwegian aquaculture industry. As the second largest sector in the country, it is essential to design a fair and sustainable tax system that avoids distorting financial decisions, ensuring long-term growth and development.

The proposed resource rent tax aims to capture economic rents derived from natural resource extraction, giving the public a larger share of generated profits. A mixed-method approach is employed, combining qualitative text analysis and quantitative net present value analysis of hypothetical investment projects, accompanied by sensitivity analysis. This comprehensive method sheds light on how the resource rent tax will impact investment incentives in the industry.

The findings offer clear evidence that the resource rent tax affects investment incentives. First, we analyze the responses to the consultation letter, exploring stakeholder views and highlighting potential effects on industry growth, investment incentives, municipalities, and environmental development. Secondly, we assess how investment incentives may change and how the resource rent tax will affect aquaculture projects' profitability and financial feasibility.

The research identifies several factors influencing investment incentives, including the tax level and structure, required investor returns, and market conditions. Furthermore, it discusses the potential implications of these findings on industry growth.

The outcomes of this study provide valuable insights and recommendations for policymakers, industry stakeholders, and potential investors in the aquaculture industry. The study contributes to a deeper understanding of how the suggested resource rent tax may shape investment incentives. It offers guidance for designing a tax framework that balances revenue generation and industry growth. This thesis contributes to the ongoing discussion surrounding the implementation of resource rent taxation in the aquaculture industry and provides a foundation for further economic and growth analysis.

Keywords: Resource Rent Tax, aquaculture industry, investment incentives, profitability, economic growth.

Contents

Preface

Undertaking this master's thesis has been a transformative experience. It has allowed us to delve deep into the subject matter, question existing assumptions, and further develop critical thinking skills. The process of conducting research, analyzing data, and interpreting results has been intellectually stimulating, challenging, and immensely rewarding.

Throughout this journey, we have encountered obstacles and faced moments of doubt. However, through perseverance, resilience, and the support of those around us, we have overcome these challenges and reached this significant milestone.

We express our deepest gratitude to Sufyan Ullah Khan, Gorm Kipperberg, and Ragnar Tveterås for guidance, support, engaging conversations, and invaluable insights while completing this master thesis. Their expertise and encouragement have been instrumental in shaping the direction and quality of this research project.

Furthermore, we sincerely thank our families and friends for their unwavering support, encouragement, and understanding throughout this endeavor. Their love and encouragement have been a constant source of motivation.

We hope this research will contribute to the body of knowledge in the field and inspire further exploration and advancements. May it spark meaningful conversations, encourage critical thinking, and pave the way for future research and discoveries.

As we conclude this master thesis, we are reminded of the immense value of collaborative efforts, guidance, and support. We are truly grateful for the opportunity, allowing us to pursue this research and contribute to the scholarly community.

Tormod Ulsund Hodne and Matias Hebnes

31.05.2023

1. Introduction

Norwegian aquaculture has emerged as a global leader, experiencing significant growth and profitability (Greaker & Lindholt, 2019). As Norway's second largest export sector, salmon production is vital to the nation's economy. With strict regulations and valuable lessons learned in the 1950s and 1960s, the industry gradually developed, driven by the success of floating cages for Atlantic salmon and rainbow trout. The well-suited coastline, favorable weather, and electricity conditions provided an ideal environment for industry growth. Despite challenges in the 1980s and early 1990s, restructuring, and productivity improvements led to substantial production growth. By 2018, production had increased from 400,000 to 1.4 million tons (Statistics Norway, 2020). The aquaculture industry has become a significant employer, supporting over 105,000 jobs in 2021 and playing a crucial role in the Norwegian economy (Kyst redaksjonen, 2022).

Because of the aquaculture sector's rapid expansion and promising future in Norway, questions have been raised about whether these extraordinary profits should be divided more equally amongst the Norwegian public. The Norwegian government proposed the resource rent tax (RRT) as a policy tool to solve these problems as it tries to capture a portion of the economic rent produced by natural resources.

However, as the aquaculture industry can proudly call itself the second largest exporter in Norway, it is critical to comprehend how the imposition of such a tax would impact investments in the aquaculture sector as this is a vital factor for industry growth (Misund & Tveterås, 2019). This study examines how the proposed RRT would affect financial decisions and the overall development of the Norwegian aquaculture industry, mainly focusing on the farmed salmon industry as it is responsible for most of the turnover in the sector.

To investigate the impact of the suggested RRT on investments in Norwegian aquaculture, this thesis will address the following research question:

"How will the suggested resource rent tax affect investment incentives made by existing and potential aquaculture investors?"

The comprehension of the potential effects of the suggested RRT on investments in the Norwegian aquaculture industry is of great importance to industry stakeholders, investors, and policymakers. The derived research question is designed to provide insight into a critical challenge facing the industry that needs further investigation.

This research will add to the existing literature and knowledge by providing empirical insights and analysis into the potential outcomes of implementing the proposed tax. The results of this study will provide valuable insight for investors regarding how the proposed tax can affect potential investment projects. Furthermore, this study can help policymakers make more informed decisions and contribute to the sustainable growth of the aquaculture industry in Norway.

A mixed approach is employed to accurately answer the research question, enabling the collection and analysis of quantitative and qualitative data without sacrificing an in-depth understanding of the subject. More specifically, a net present value analysis will be conducted to gain insight into the economic feasibility of potential projects in the industry. This is based on standard investment behavior and valuation models described in Damodaran (2012) and Brealy et al. (2020). This is further backed with a qualitative approach by conducting a text analysis of the responses to the consultation letter to the proposed tax legislation.

Due to time and resource constraints and the complexity of the topic, this study focuses mainly on the financial decisions and the economy in the Norwegian aquaculture industry. Furthermore, the thesis heavily relies on secondary data sources such as existing literature, reports, statistical databases, and expert opinions, as some data is difficult to collect or classified by the companies. Finally, the thesis explores the effects on a traditional facility project, and two newer technologies, a closed facility project and an offshore facility project, as these are considered more environmentally friendly and are expected to be heavily invested in in the future.

The thesis comprises eight chapters addressing crucial aspects to answer the research question. Chapter two provides essential background information on the industry and the proposed tax regime. Chapter three conducts an extensive literature review on the RRT and investments in the aquaculture industry, presenting relevant findings. Chapter four explores pertinent economic theories as a foundation for analysis and discussion. In chapter five, the research methodology is outlined, including research design, data collection methods, and analytical tools. Chapter six presents empirical analysis findings, focusing on the potential impact of the suggested RRT on investments in the Norwegian aquaculture industry. Chapter seven offers a comprehensive discussion of the analysis, supported by sensitivity analysis. Finally, chapter eight concludes the thesis by summarizing key findings, drawing insightful conclusions, and providing practical recommendations for stakeholders.

2. Background

Norwegian aquaculture has established itself as a global leader in the industry over the past several years by enjoying a significant increase in profit and development (Greaker & Lindholt, 2019). As Norway's second largest export sector after the petroleum industry, the production and export of salmon is recognized as a vital sector in the nation's economy. Norwegian aquaculture is the world's largest producer and exporter of Atlantic salmon and rainbow trout (Ministry of Industry and Fisheries, 2021).

The start of the Norwegian aquaculture success story was less successful than one might think. With expensive lessons learned in the 1950s and 1960s, an experience and knowledge base followed, and the research environment grew. This created growth conditions for R&D and the industry as a whole. In the early 1970s, a viable sector started taking form. Atlantic salmon and rainbow trout in floating cages yielded better growth, less risk, and lower capital and operating costs than land-based facilities. The well-suited Norwegian coastline, combined with optimal weather and electricity conditions, created an ideal setup for industry growth and a robust economy. Permits for establishing new facilities were introduced in 1973 with strict rules for geographical localization and owner structure. Strict regulations lead to the industry remaining a district industry along the Norwegian coast-municipalities.

However, the 1980s were marked by an improvement in smolt production, which led to increased production. This, combined with an overflooded market, contributed to a significant reduction in the salmon price. A high real interest rate and reduced access to capital resulted in a wave of bankruptcies in 1991. This further caused the authorities to ease the strict requirements for local ownership. In retrospect, this has led to a more concentrated ownership structure (Norsk Industri, 2017).

Following a difficult phase in the 1980s and early 1990s, the industry experienced formidable growth following the sector's restructuring. Largely thanks to productivity improvements, the industry experienced a boost in production from 400,000 tons in 1998 to 1.4 million tons in 2018 (Statistics Norway, 2020). This is illustrated in Figure1 below:

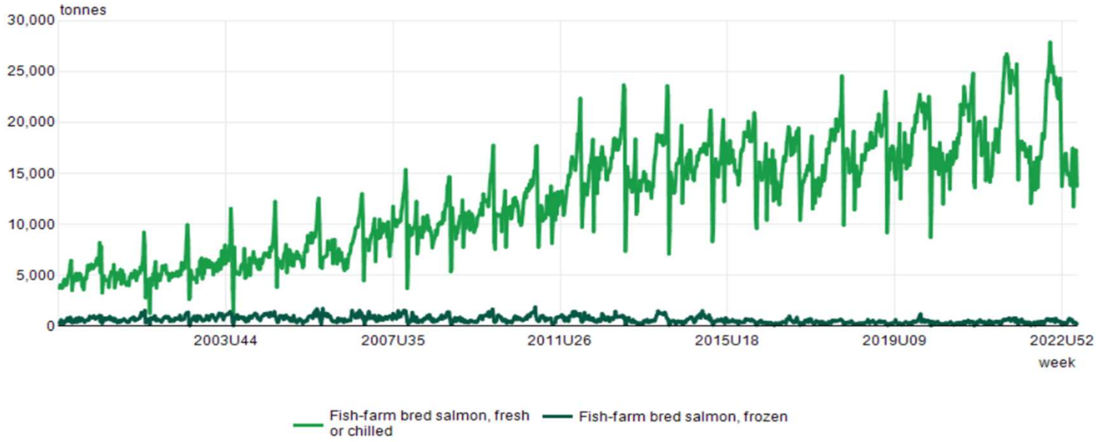


Figure 1: Export of salmon (weekly data, weight in tons) (Statistics Norway, 2022).

The industry was directly and indirectly responsible for employing more than 105,000 Norwegian people in 2021 (Kyst redaksjonen, 2022). This includes employees in the farming facilities, slaughterers, and transporters, making the aquaculture industry one of the most essential pillars of the Norwegian economy.

The development of the industry has been formidable since the beginning of the 1950s. However, despite this development and modern technology, the industry faces significant challenges, some connected to the production, such as salmon lice and escapes, and some can be viewed as regulatory challenges, such as restrictions. Despite being Norway's second largest export industry, it may face one of its toughest challenges yet, the RRT (Arnason, 2010; Misund & Tveteras, 2020).

2.1 The resource rent tax

Ideal natural conditions, in addition to regulations, have produced "pure profit" in the Norwegian aquaculture industry. "Pure profits" can be defined as the surplus a company is left with after all inputs in the production are accounted for (NOU 2019:18). A collective term often used for different types of “pure profits” is resource rent (RR).

After observing massive and rapid growth in the Norwegian aquaculture industry since early 2000, several researchers have identified these extraordinary profits as RR (Greaker & Lindholt, 2019). In 2022 the Norwegian government suggested implementing an RRT in the industry on this basis. The new tax system was designed as a cashflow-based RRT on Atlantic salmon and rainbow trout. It was sent for consultation on September 28, 2022, with a deadline for responses to the consultation letter on January 4, 2023.

Collecting a part of the extraordinary profits in the industry was presented as the justification for the proposition, as the principle that the public should get a share of the return created from public natural resources has been an essential part of the Norwegian way of thinking. Three critical dates in the resource rent debate are presented below.

September 28, 2022

The suggestion presented by the government on September 28, 2022, is designed as a cash flow tax, whereas income and investments are taxed continuously in the year they are earned/incurred. Furthermore, the salmon income is determined based on a standard price derived from market prices. Trout and rainbow trout income are based on actual transaction prices. There is no deduction or compensation for the acquisition cost of permanent permits. The ministry suggests a tax allowance of between 4,000 and 5,000 tons, or around NOK 54 and 67.5 million (the Ministry of Finance, 2022).

The suggested RRT is computed after corporation tax, and the foundation for RRT (equivalent to hydropower and petroleum) subtracts company tax related to resource rent (RR). Thus, an effective RRT rate of 40 percent entails a formal RRT equal to 51.3 percent. The overall effective marginal tax rate is 62 percent when corporate tax is included (the Ministry of Finance, 2022).

The projected tax earnings in 2023 are estimated to be between NOK 3.65 billion and NOK 3.8 billion. Half of these earnings are intended for the municipalities and are recorded in the books 2024 (the Ministry of Finance, 2022).

January 4, 2023

Following the proposed RRT from September 28, 2022, the deadline to respond to the consultation letter was January 4, 2023. This generated 416 replies, of which 262 were deemed to have a negative opinion of the proposed tax (Finansdepartementet, 2022). Furthermore, these responses and the overall perception of the proposition lead to a new proposal being developed following the rejection of the original suggestion.

March 28, 2023

The most recent proposal, unveiled on March 28, 2023, claims to ensure that the public will receive a higher portion of the values produced by the Norwegian aquaculture sector. The government further claims that the tax will increase local governments' revenue, which can be used to fund public services like hospitals and schools (the Ministry of Finance, 2023).

In the new proposal, the government suggests a tax rate of 35 percent (instead of 40%). From 2024, the government aims to establish an independent price council (replacing standard price). A tax allowance of 70 million is supposed to shield the smaller companies, making only the companies with significant profits pay RRT. Half of the income will go directly to the municipal sector. The tax will work retroactively from January 1, 2023. Finally, The government states that the responses to the consultation letter are weighted when designing this new proposal, factoring in continued growth while simultaneously securing a part of the RR generated in the aquaculture industry to the public (the Ministry of Finance, 2023).

3. Literature review

The phenomena of RRT and its possible effects on the aquaculture industry in Norway have attracted national attention and is heavily debated in existing literature. The following chapter will provide insight into the existing literature on the topic of the RRT and possible repercussions for implementing an RRT suggested by the Norwegian government. The literature review aims to identify and analyze various existing research studies conducted in this field of research, shedding light on potential effects the RRT may have on investment incentives and overall development in the industry.

The first sub-section will give insight into our strategy for gathering literature and the rationale behind our decision before presenting some of the publications we have reviewed for this thesis. Further sub-sections will offer an overview of the main findings from our review of the existing literature.

3.1 Search strategy

First, a structured strategy for selecting research papers was established, containing several steps. Furthermore, we developed a search strategy limiting our search to renowned academic journals and peer-reviewed articles, employing keywords including "resource rent," "aquaculture," and "investment." The relevant studies are then categorized in Endnote by topic, methodology, and critical findings. The method for handpicking the most relevant studies to our research is presented in Figure 2.

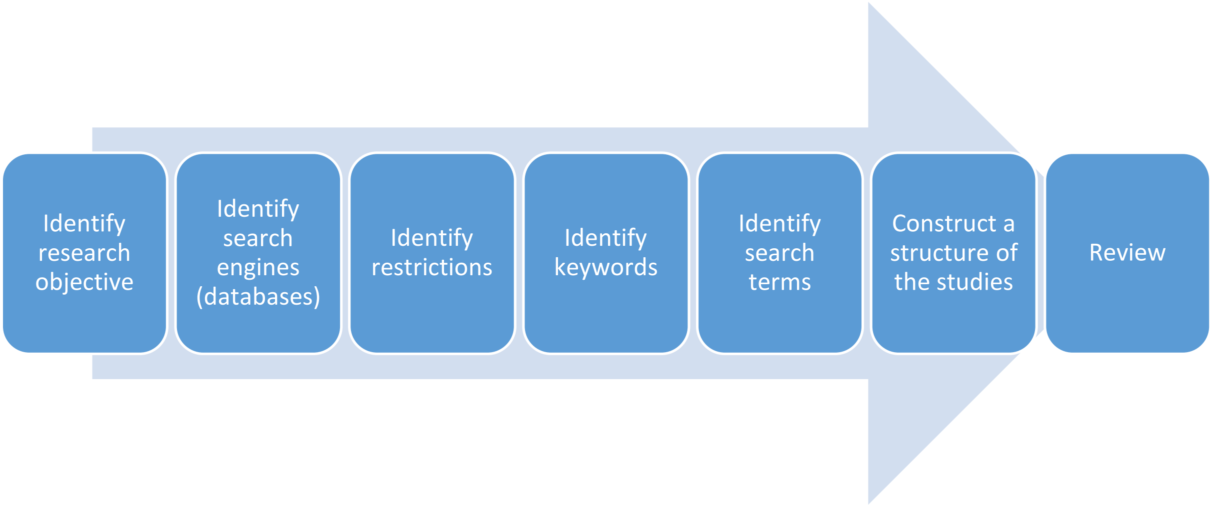


Figure 2: Method of handpicking relevant literature

3.2 Literature discussion

Furthermore, table 1 presents some of the publications we deemed most significant for our research, although several more have contributed. The literature ranging from 2010 to 2020 provides positive and negative perspectives on the RRT. It is based in various industries, with the majority focusing on the RRT in the marine industry. Some of the papers also provide valuable insight into the potential long-term impacts of the suggested RRT on growth and investments in the industry.

Author(s)	Data	Key objective(s)	Methodology	Key findings
(Arnason, 2010)	Secondary data	Identify whether the RRT is distortionary and what effects implementation may entail.	Deductive reasoning, theoretical analysis	RRT may be distortive and may have adverse effects on investment and production.
(Arnason & Bjørndal, 2020)	Secondary data	Analyze rents, infra-marginal profits, and profits in the Norwegian aquaculture industry.	Theoretical analysis, empirical analysis	The existence of a basic rent cannot be assumed, and the NOU studies were inaccurate and inconsistent with economic theory.
(Blomgren et al., 2019)	Primary data, secondary data	Mapping and analysis of investments in Norwegian aquaculture over the previous ten years.	Mixed method (Interviews and descriptive statistics)	Rapid growth in investments in Norwegian aquaculture.
(Greaker & Lindholt, 2019)	Secondary data	Estimates the resource rent and provides recommendations for developing the RRT in Norwegian aquaculture.	Empirical methods	There has been substantial resource rent in aquaculture production since 2000.
(Grünfeld et al., 2015)	Secondary data	Analyses how investments are affected by changes in corporation tax, dividend tax, and wealth tax.	Empirical analysis	Capital taxes have damaging long-term effects on investments in the Norwegian aquaculture industry.
(Misund et al., 2019b)	Primary data, secondary data	Establishing knowledge of potential financial consequences of the implementation of the RRT.	Empirical analysis, statistical analysis, Interviews	The introduction of the proposed RRT will weaken future investments in the industry.
(Misund & Tveteras, 2020)	Primary data, secondary data	Examines taxation implications in Norwegian aquaculture and discusses further growth in the industry.	Empirical analysis (descriptive and econometric analysis), comparative analysis	Policy goal conflicts between growth and tax revenue.
(Misund & Tveterås, 2019)	Primary data, secondary data	Outlines “Sjømat Norge” plan for achieving their sustainability goals by 2030. A significant subject of the paper is the required investments to achieve this.	Empirical analysis	It will require an enormous effort from the private and public sectors to achieve “Sjømat Norge” goals. The paper outlines the need for investments.
(Nøstbakken et al., 2020)	Primary data, secondary data	Analyses the neutrality characteristics of the proposed RRT to be able to predict how the tax will impact the execution of socio-economically successful projects	Valuation method, investment analysis	Supports the suggested RRT on the Norwegian aquaculture industry using fiscal and economic theory. RRT will not prevent growth in the industry.
(Tveterås et al., 2019)	Primary data, secondary data	Examines crucial elements in the aquaculture’s value chain, including industrial possibilities and challenges. It also considers the possible effects of political framework circumstances on the industry.	Empirical analysis	As applied in waterpower, the proposed RRT will make previous profitable projects unprofitable.
(Åm, 2021)	Secondary data	Clarifies the social factors that contributed to the failure of the first suggested RRT by outlining the participants and viewpoints in the discussion.	Situational analysis	The reason for rejecting introducing an RRT in the aquaculture industry can be traced to three positions among relevant Norwegian stakeholders who disagree with introducing an RRT.

Table 1: Literature table of eleven selected publications

3.3 Is there a basis for resource rent?

The existing research focuses on several aspects, whereas the following sub-section will address the predominant topics discussed. The first is whether there exists a basis for the

RRT in the farmed salmon industry in Norway. On the one hand, it is argued that the industry generates a significant economic rent and that this rent can be collected through an RRT (Flaaten & Pham, 2019; Misund & Tveteras, 2020; Nøstbakken & Selle, 2020). Moreover, Greaker & Lindholdt (2019) state that Norwegian aquaculture production has produced a substantial RR since early 2000.

On the other hand, it is argued by Arnason and Bjørndal (2020) that the calculations in the publications by Greaker and Lindholdt (2019) were inaccurate and inconsistent with economic theories. Therefore, according to this article, the existence of a basic rent cannot be assumed (Arnason & Bjørndal, 2020). As a somewhat established understanding exists of the presence of a RR in the industry, this study will account for an existing foundation of RR in the analysis.

3.4 Implementation effects

Furthermore, existing literature heavily debates the effects the proposed RRT may have on the industry. The following sub-section will illuminate several factors that could be affected by implementing an RRT, as reviewed by published literature. Investment incentives, industry development, market power, and resource allocation are highlighted as significant factors that may be impacted.

The issue of how the RRT will affect the investments made in the aquaculture industry in Norway is complex. When assuming the presence of RRT in the industry, one can argue both positive and negative effects on the economy. On the one hand, it could provide a valuable source of income that could be reinvested for further growth and innovation. On the other hand, high levels of RRT can lead to reduced investments in R&D. Arnason and Bjørndal (2020) state in their report that although the RRT can generate income for the Norwegian government, it can also reduce profitability in the industry and discourage further investments.

It is further argued that implementing an RRT can adversely affect industry growth as it will decrease the value-added generated in the industry and very likely reduce profitability (Arnason & Bjørndal, 2020; Nøstbakken et al., 2020). Arnason & Bjørndal (2020) further argue that implementing an RRT may lead to a more significant part of the industry being moved abroad. On the other hand, it is argued that the tax will not impact economic growth or affect investments in the industry as the tax will not act distortionary (Nøstbakken et al., 2020). Furthermore, authors like Folkvord and Misund et al. (2019) state that a well-designed policy can contribute to sustainable growth in the industry if it is not designed in a way that burdens economic growth.

Some studies suggest that the RRT may reduce the market power of firms in the farmed salmon industry in Norway. According to the research of Nøstbakken and Selle (2020), implementing an RRT may increase costs and reduce profitability. This could limit the firms' ability to invest in new production capacities (Åm, 2021). Furthermore, it is argued that the RRT may lead to a more efficient allocation of resources which can reduce the concentration of ownership in the industry, further reducing the market power of the affected firms (Arnason & Bjørndal, 2020). However, it should be noted that the existing literature is not unanimous on the possible effects the tax will have on the firms' market power. Some studies suggest that the tax may not significantly impact the market power in the industry (Folkvord et al., 2019; Greaker & Lindholt, 2019). In their article, Flåten and Pham (2019) suggest that if the tax is set at an appropriate level, it will have a limited impact on the market power. However, they acknowledge that the effects of an RRT on market power can vary depending on the specific characteristics of the aquaculture industry and the local market conditions. The authors recognize the tax's impact on the market power but emphasize that the magnitude depends on several factors, such as elasticity of supply and demand.

Authors like Garnaut (2010) argue that an RRT can promote economic efficiency and sustainable development. Furthermore, it is stated that the RRT is a way of capturing the economic rent that would otherwise accrue to the private sector. This economic rent can fund public goods and services such as education and health services. Moreover, it is argued that RRT can help reduce the environmental impacts of extracting resources by incentivizing firms to invest in new technology (Arnason & Bjørndal, 2020; Garnaut, 2010).

3.5 Industry consultation

The final important aspect discussed in the existing literature is the need for corporation and industry consultation when designing such an influential tax. In a critical policy study made by Åm (2020), it is argued that the failure of the policy implementation the last time it was up for evaluation was due to the lack of support from the industry and the poor design of a suitable policy from the government. Several other researchers back the argument of the need for industry consultation, as the RRT cannot be based solely on a theoretical foundation (Asche & Bjorndal, 2011; Folkvord et al., 2019; Nøstbakken et al., 2020).

Based on this literature review, this research intends to further examine the implications of implementing an RRT in the aquaculture industry in Norway. The study aims to address the gaps in existing knowledge by conducting a comprehensive analysis that considers recent research and industry stakeholders' perspectives. The research will investigate the potential effects of the RRT on investment decisions and industry development. Additionally, it will briefly explore the design considerations and the importance of industry consultation in implementing an effective and economically sustainable RRT in the aquaculture sector.

4. Theoretical framework

The following chapter will shed light on various economic theories employed in this thesis. The chapter aims to provide a comprehensive understanding of the fundamental factors affecting our further research. The theories explained will provide a basis for our analysis and discussion in the following chapters. The first sub-sections will contain economic theory on RR and Ricardian rent. Further, the prevailing economic theories employed in the responses to the consultation letter will be accounted for before finally presenting the valuation theory necessary to further carry out our analysis.

4.1 Resource rent

Economic rent is a return on top of what is necessary to provide the minimum payment needed for capital and labor input to have it supplied (Misund et al., 2019b; Schwerhoff et al., 2020). There exist many forms of economic rents, whereas RR is in the scope of this thesis. We emphasize the importance of distinguishing between profits and rent, as these two terms are often used interchangeably (Flaaten et al., 2017). This is especially important as rent is a latent variable that needs to be calculated. This may cause measuring errors (Misund et al., 2019b).

RR can be defined as the excess profit arising from a natural resource, such as oil, land, and fish, utilized in economic activity. Due to resource scarcity, it is impossible to saturate the demand in the market, driving the prices and profits up. In Industries not dependent on scarce natural resources, this excess profit would lead to producers increasing their production level and new firms entering the industry, increasing output, reducing prices, and dissipating rents. This, however, is different in sectors utilizing scarce natural resources (Gunnlaugsson et al., 2020). Excess profit is the surplus a firm is left with after all the input factors, such as capital and labor, are deducted from the equation. When a production-related input factor is in low quantity, pure profit might also emerge. This pure profit is typically referred to as RR if the lack of input is brought on by restricted access to a natural resource like oil, land, or fish. A profit- or gross-based model can be used to collect RR, with the former basing rent collection on a firm's profitability and the latter not (NOU 2019:18).

A time series of RR for all Norwegian natural resources sectors are calculated periodically by Statistics Norway to be used as indicators for sustainable development (Greaker et al., 2017). Table 2 describes how the realized RR is derived based on literature by Greaker et al. (2017).

	Realized resource rent
+	The basic value of production
-	Intermediate uses
+	Taxes on products
-	Subsidies on products
=	Gross products
-	Non-industry specific taxes
+	Non-industry specific subsidies
-	Compensation of employees
-	Return on fixed capital
-	Capital consumption
=	Resource rent of the sector

Table 2: Calculation of realized resource rent (Greaker et al., 2017).

4.2 Ricardian theory of taxation

The economist David Ricardo first proposed the Ricardian theory of rent in 1817, and it was later revised and republished in 2005 (Ricardo, 2005). Based on the variations in land quality, Ricardian rent seeks to explain why some farmers had more significant results despite using the same input factors in their production (Ricardo, 2005). Since the intra-marginal rent in fisheries is comparable to that in agriculture and typically results from variations in natural capital and locations, this can be compared to the farmed salmon industry (Copes, 1972). The locations of the many salmon farms vary in quality, and the better locations produce more profits in the form of Ricardian rent (Flaaten & Pham, 2019).

According to the Ricardian Theory of Rent, the rent for using land increases as more land is used for production (Ricardo, 2005). This is evident in the extension of salmon farms into new aquatic areas in the case of the farmed salmon industry. The productivity of the land (water) may decline as more farms are built, and more fish are produced, which would result in more significant input costs and reduced profitability for the salmon farming businesses. Due to the reduced production costs in the most productive aquatic areas, this can lead to higher rents being charged for their use.

The concept of economic rents is another way the Ricardian rent applies to the farmed salmon industry. Economic rent is the payment for utilizing a fixed supply production factor. Regarding salmon farming, the land (water) is in fixed supply, and the rent paid by the businesses can be viewed as the economic rent brought on by the resource's scarcity (Montgomery & Wernerfelt, 1988).

4.3 Theoretical foundation in the responses to the consultation letter

Over 400 responses were published by a broad spectrum of respondents. Responses to the consultation letter have been reviewed, and the following sub-sections aim to present further the economic theory some of these responses base their responses upon.

4.3.1 Employment

The aquaculture industry is an essential source of employment, according to a study by the Food and Agriculture Organization (FAO) (Food and Agriculture Organization, 2020). The industry is responsible for the employment, both directly and indirectly, of more than 105,000 people in Norway in 2020 (Kyst redaksjonen, 2022).

From a short-term perspective, introducing an RRT in the aquaculture industry in Norway will increase costs, leading to a decrease in profitability for the affected firms (Land, 2010). This could result in a reduction of the workforce to maintain profitability levels.

The long-term effects are, however, less clear. According to the theory of RRT, implementation can create long-term employment opportunities. This is because the tax incentivizes companies to spend money on new technologies and innovations to boost output and cut expenses. As a result, businesses could grow their operations, increasing the need for employees. Furthermore, demand may be boosted, and employment can be created in other sectors of the economy if tax revenues are utilized to fund government spending on public goods (Färe et al., 1998; Keynes, 1937).

4.3.2 Investments

Investment is a significant factor in economic growth since it promotes the creation of new technologies and jobs (Solow, 1956). Investment decisions are made in accordance with neoclassical economic theory according to the expected return on investment (ROI). Investors will invest only if the ROI exceeds the cost of capital, including the interest rate (Arrow, 1962). Furthermore, according to economic theories, the RRT can affect market entry for new entrants, making the market less competitive (Basak & Mukherjee, 2022). New entrants will assess the expected ROI of their investment options to the market, and they will compare it to the cost of capital. New players may decide not to invest in the market if the expected return is less than the cost of capital (Tveterås et al., 2019).

Several theories, such as Keynesian theory, have been published to explain investment behavior in addition to neoclassical economic theory, highlighting the importance of uncertainty in investment decisions (Keynes, 1937). Furthermore, according to behavioral finance theory, investors' biases and emotions may affect their investment decision-making (Barberis & Thaler, 2003).

4.3.3 Economic growth

According to neoclassical growth theory, several factors contribute to economic growth, including technological innovation and capital accumulation (Solow, 1999). However, taxes can play a vital role in the economic development of an industry by affecting both the factors mentioned above and significantly affecting long-term economic growth. More specifically, high taxes on capital and investment can lead to reduced incentives for investments in new technologies, leading to lower long-term growth rates (Feldstein, 1999; Solow, 1999).

4.3.4 Distortionary tax

Distortionary taxes are taxes that turn otherwise profitable investments, unprofitable. Economic theory suggests that distortionary taxes may harm equity, effectiveness, and economic growth. This is because there is a chance that they will create incentives that alter the behavior of market actors and have unintended effects (Feldstein, 1999). The Norwegian government claims that the RRT is a neutral tax. A neutral RRT should also not, in theory, have a distorting effect on investments or other transactions (NOU 2019:18). On the other hand, there is substantial disagreement regarding whether or not the RRT will cause distortions. One of the main issues of distortionary taxes is that they generate a deadweight loss in the market, resulting in a net reduction in social welfare (Saez & Stantcheva, 2016). The generated deadweight is illustrated in a simple macroeconomic sense in Figure 3 and is calculated through formula (1).

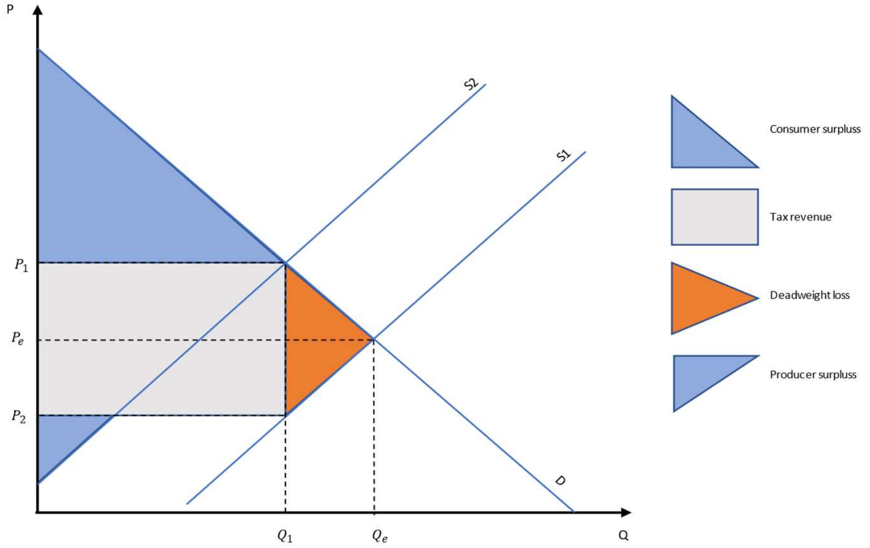


Figure 3: Deadweight loss:

When a tax is imposed on a good, it disrupts the market and creates a deadweight loss. The tax increases costs for producers, leading to the supply curve to shift from S_1 *to* S_2 *and the equilibrium price to change from* P_E *to* P_2*. As a result, the quantity demanded by consumers changes from* Q_E *to* Q_1*. The deadweight loss triangle represents the welfare loss caused by the tax, reducing both consumer and producer surplus. Overall, the tax creates inefficiency in the market and distorts resource allocation.*

$$Deadweight\ loss = \frac{1}{2}\ x\ (Q_e - Q_1)\ x\ (P_1 - P_2) \qquad (1)$$

The idea of market failure is the foundation for the economic theory supporting distortionary taxation. Market failure occurs when resources are allocated inefficiently (Ledyard, 1989). Furthermore, the economic theory of taxation explains that higher tax rates negatively impact market efficiency. The basic tenet is that taxes change incentives and lower the return from actions subject to taxation. This can discourage people from participating in these activities. This decrease in activity may reduce economic output and social welfare (Diamond & Mirrlees, 1971).

4.4 Valuation theory

In the analysis part of this thesis, we will construct three "typical" aquaculture investment projects. We will use the net present value (NPV) model to determine whether the projects are profitable before and after the proposed RRT. The theory underlying this model will be explained in the following sub-section.

4.4.1 DCF, equity, and firm valuation

We assume that companies in the industry use a standard discounted cash flow (DCF) model as described in (Damodaran, 2012, p. 12). In essence, DCF involves estimating the future cash flows of an asset and then discounting them to their present value (PV).

Various approaches exist within the realm of DCF with advantages and limitations. Despite the multitude of DCF variations, two main methods prevail. "Equity valuation" entails assessing the value of a company's equity to determine the return for owners. Conversely, "firm value" considers the entire business entity (Damodaran, 2012, p. 12). As our analysis will center around estimating "firm value," we will emphasize this approach.

The calculation of "firm value" involves discounting future cash flows to the company, also known as "free cash flow to the firm" (FCFF). These cash flows are discounted based on the weighted average cost of capital (WACC). The formula derived from Damodaran (2012, p. 13-14) is presented below:

$$Value\ of\ firm = \sum_{t=1}^{t=n} \frac{CF\ to\ firm_t}{(1+WAC\ \ )^t} \qquad (2)$$

The formula calculates the value of a firm by summarizing the cash flows it generates over a specific time period (t=1 to t=n) and discounting them to their present value. The cash flows to the firm ($CF\ to\ firm_t$*) are divided by the corresponding discount factor* $(1 + WACC)^t$*. The formula provides an estimation of the firm's overall value based on future cash flow projections and the weighted average cost of capital (WACC).*

4.4.2 Free cash flow to the firm

The concept of FCFF encompasses the total generated cashflows of the company's owners and creditors. One can calculate the FCFF by aggregating the cashflows from operating activities and deducting capital expenditures (Damodaran, 2012, p. 380; Stowe et al., 2007, p. 109). The FCFF formula, as illustrated by Damodaran (2012, p. 381), is presented below:

$$FCFF = EBIT(1 - Tax\ rate) + Depreciation - Capex - Change\ in\ working\ capital \qquad (3)$$

The formula calculates the cash available to a company after meeting its operating expenses. It is determined by subtracting the tax-adjusted earnings before interest and taxes (EBIT) from depreciation and adding non-cash charges. Deducting capital expenditures (Capex) and changes in working capital accounts for investments in long-term assets and fluctuations in short-term assets and liabilities. The Free Cash Flow to the Firm represents the cash available for debt repayment, dividends, and future investments.

4.4.3 Weighted average cost of capital

The Weighted Average Cost of Capital (WACC) is a fundamental metric representing the expected return a firm can anticipate on its assets and debt. It serves as an indicator of the capital cost associated with a company or project. In calculating WACC, the assets and debt components are assigned weights based on their respective proportions within the overall capital structure. WACC is commonly employed as the minimum acceptable return rate for investments, making it a frequently utilized discount rate by investors. The formula for calculating WACC is provided below (Brealey et al., 2020, p. 411):

$$WACC = \left[\frac{D}{V} * (1 - T_c) r_{debt}\right] + \left(\frac{E}{V} * r_{equity}\right) \qquad (4)$$

The formula incorporates debt (D) and equity (E) proportions in the capital structure. The cost of debt (r_{debt}*) represents the expected return demanded by debt holders, while the cost of equity (*r_{equity}*) represents the required return from equity holders. The tax shield (*t_c*) adjusts the cost of debt, considering the tax benefits of interest payments.*

4.4.4 Net present value

In corporate finance, the net present value rule (NPV) is a fundamental tool for investment analysis. At its core, NPV analysis aims to assess whether the execution of a project yields greater value than its costs. This evaluation is achieved by aggregating the project's anticipated future cash flows, discounted to their present value. If the cumulative discounted cash flows result in a positive value, the project will be profitable and, thus, should be pursued. Conversely, if the cumulative discounted cash flows amount to a negative value, the project is not financially viable and should be abandoned (Brealey et al., 2020, p. 716; Damodaran, 2012, pp. 871-872). The NPV of a project can be calculated using the following formula (Misund et al., 2019b, p. 105):

$$NPV_0 = \sum_{t=0}^{\infty} \frac{FCFF_t}{(1+WACC)^t} \qquad (5)$$

The formula calculates a project's net present value (NPV) by discounting the free cash flows to the firm (FCFF) over an infinite time horizon. Each FCFF at time t is divided by $(1+WACC)^t$ *to account for the time value of money. The NPV represents the sum of these discounted cash flows.*

5. Methodology

The following chapter provides insight into the chosen methodological approach used to analyze and illustrate the result from our collected data. The process of increasing one's knowledge of a particular topic or verifying the knowledge one has obtained through the study of social science can be described as the method (Dalland, 2007). The methodology used is a mixed method, combining a document analysis of the responses to the consultation letter and an NPV analysis of three hypothetical projects in the Norwegian aquaculture industry. The rationale for combining these methodologies is to provide a comprehensive analysis of the potential effects of the RRT on the sector by examining qualitative and quantitative data.

5.1 Research design

A methodology can be defined as a structured way of gaining knowledge in a field of research (Nasution, 2020). The decision of which method to apply depends on the nature of the research problem we will answer (Morgan & Smircich, 1980). A research question and critical factors important to the thesis are defined in the preceding chapters.

A research design has been chosen to analyze the collected data needed to answer the research question. A mixed methodology containing qualitative and quantitative methods will be employed for our thesis. It is generally understood that quantitative research involves the collection and analysis of numerical data. Qualitative research, on the other hand, considers narrative or experiential data (Hayes et al., 2013).

The quantitative method aims to establish a correlation between given variables and outcomes by collecting numerical data, which is applied through a self-developed NPV calculator. The findings from this methodology should be possible to replicate to allow others to validate the findings (Choy, 2014). Furthermore, quantitative research must examine the analyzed data while employing prior knowledge in the field of study to develop a theory. The research also weighs alternate interpretations, compares the study's findings with those of prior research, and determines the broader ramifications of the study (Choy, 2014).

The qualitative method has been commonly utilized in research as it is often focused on particular individuals, contexts, and events and aims to explain certain phenomena and the relationship between different factors in a field of research (Hesse-Biber & Leavy, 2010). Moreover, qualitative methods are valuable in providing detailed explanations of complex phenomena and in illuminating views and interpretations of actors with widely different stakes and roles (Sofaer, 1999).

To comprehensively analyze the research question, a mixed-method approach enables the collection and analysis of quantitative and qualitative data. A methodology based solely on a qualitative research design must be revised, as it often sacrifices the in-depth understanding of the context in which the research question is situated (Johnson & Onwuegbuzie, 2004). Moreover, a research design based solely on a qualitative methodology can provide inconsistency across the different research and responses to the consultation letter analyzed (Meyer, 2001). Therefore, because it enables a deeper comprehension of the research topic and paints a complete picture of the research question, the mixed-method research design is ideal for this study as it makes it possible to analyze the effects on investments and other effects it may cause.

5.2 Data collection and processing

The process of collecting and processing data is explained in the following sub-section. We distinguish between primary and secondary data, with primary data referring to information gathered by the researcher specifically for that research project. Data previously gathered by other researchers for different (but often comparable) reasons are called secondary data (Sapsford & Jupp, 1996). This thesis primarily uses secondary data from responses to the consultation letter and information about investment projects gathered through related analysis and expert opinion.

5.2.1 Responses to the consultation letter

Four hundred and twelve responses to the consultation letter were gathered (Regjeringen, 2022), including comments, opinions, and suggestions from various stakeholders impacted by the implementation of an RRT in the Norwegian aquaculture industry. The data collection process ensures that a wide range of perspectives is captured to provide a comprehensive understanding of the potential effects the resource rent tax may have. The collected text data are prepared for analysis by compiling the responses to the consultation letter into a single document, whereas anonymous answers are omitted, reducing the collection to 335 responses.

5.2.2 NPV-analysis

First and foremost, indisputable numerical data, such as the RRT rate, production fee, and tax allowance, from the suggested RRT proposal (spring 2023) is used as a foundation for the calculations in the NPV analysis. Furthermore, data is collected from the reports (Bjørndal & Tusvik, 2018; Misund et al., 2019b), expert opinions from Tveterås (2023) and Bård Misund (2023), and salmon prices from the FishPool database (FishPool, 2006). The data is adjusted according to our prerequisites which is further accounted for later in the thesis. Finally, the accuracy of the data is validated by experts Ragnar Tveterås and Bård Misund. An overview of the most critical variables used in the analysis is provided in Table 3 below.

NPV Variables

- WACC
- Investments
- Permits
- Production ratio
- Salmon prices
- Production costs
- Prodction volume
- Taxes and fees

Table 3: Overview of most significant variables used in the NPV analysis.

5.3 Text analysis

An R-studio coding strategy is created to properly categorize and arrange the data to perform text analysis on the compiled document containing all 335 responses. The information is characterized as being positive, neutral, or negative to the proposed RRT (correspondingly 27, 46, and 262). The data is further separated into various populations (industry stakeholders, private individuals, municipalities, and academics) to address our research topic effectively. Furthermore, a word cloud is created to capture essential insights into the respondents' perspectives on the RRT by examining the most frequently used words while excluding non-useful words. Additionally, we have chosen at least one statement from each population that we believe best captures the views and opinions of that population to capture the key concepts, issues, and viewpoints that emerged from the responses to the consultation letter. By conducting a text analysis of the responses to the consultation letter, we provide valuable insight and a comprehensive understanding of stakeholders' viewpoints, concerns, and suggestions complementing the NPV analysis in the following chapters.

5.4 Excel calculator

This sub-section aims to present the development process of an Excel-based NPV calculator. The NPV calculator has been designed explicitly to evaluate the NPV of expected cash flows for three fictitious projects examined in this master's thesis.

For the thesis analysis, three distinct NPV calculators have been created, sharing a similar framework but differing in inputs and project durations to account for the unique characteristics of each project. Each NPV calculator is divided into five sections containing variables arranged over time. The duration of the time series varies across the three projects, spanning from 10 to 30 years.

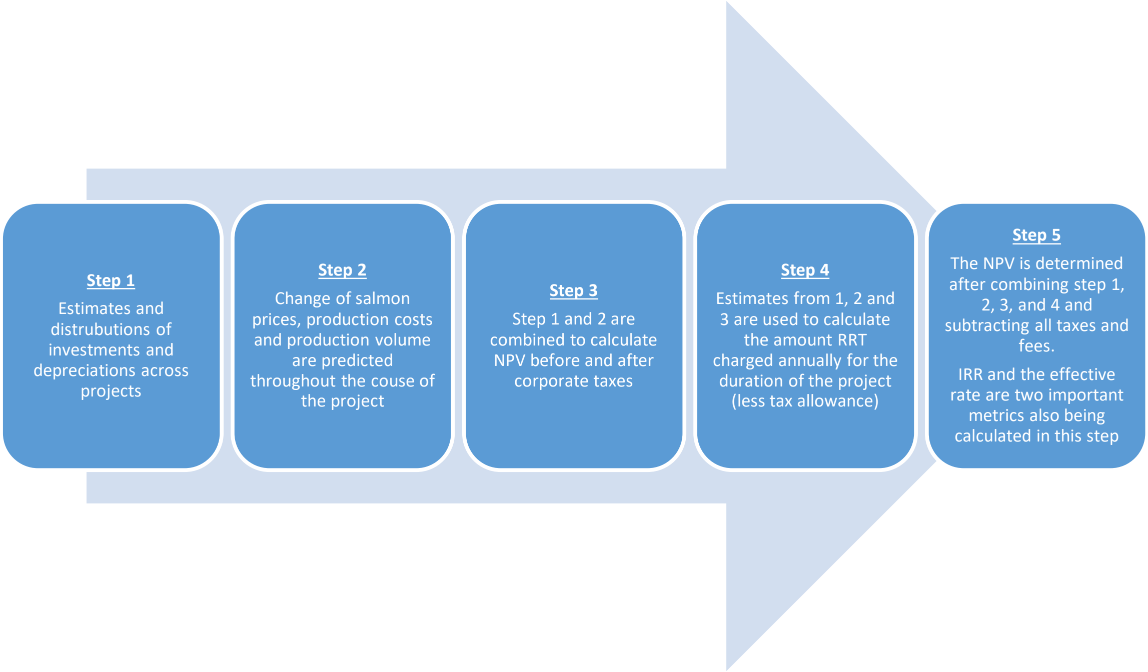


Figure 4: Steps of making the NPV calculator

To enhance the credibility of the NPV analysis further, sensitivity analysis on affecting variables will be conducted. Sensitivity analysis is an essential tool used to assess the impact of varying input parameters on the output of a model or analysis. By systematically altering the selected variables within predetermined ranges, the aim is to understand the degree of influence each variable exerts on the calculated NPV. These sensitivity analyses provide valuable insights into the robustness and flexibility of the model, enabling a more comprehensive understanding of the potential outcomes under different scenarios (Saltelli et al., 2008; Stavseth, 2020).

5.5 Reliability and validity

Ensuring the reliability and validity of the findings is crucial to maintaining the research's rigor and credibility. The following section discusses the strategies employed to enhance the reliability and validity of the study. Reliability entails that the results should be the same if the same process is repeated by the same or a different researcher (Meyer, 2001; Neuman, 2013). Conversely, validity means we are measuring what we think we are measuring (Franklin & Ballan, 2001).

5.5.1 Reliability

Several measures were implemented to enhance reliability. First, the responses to the consultation letter contain feedback from various individuals and organizations from different backgrounds and geographical locations. This ensures the avoidance of biases as best as we can. Furthermore, a coding scheme is developed for the collected data and is easy to reproduce, hence providing reliability to the qualitative part of the thesis.

Moreover, the quantitative part of the thesis is based on calculations in our self-developed NPV calculator using consistent numerical data (as of today's date) that is easily reproducible. Some numerical data collected are estimates based on our prerequisites (explained later in the research) and experts' opinions. This enhances the reliability of the thesis.

5.5.2 Validity

Validity within quantitative research differs from that of a qualitative research design as it can easily be replicated. Furthermore, we have ensured that the collection of quantitative data is collected from reputable databases such as FishPool (2006) and supplemented with data from peer-reviewed reports conducted by Bjørndal & Tusvik (2018) and Misund et al. (2019), as well as collecting expert opinion from Ragnar Tveterås and Bård Misund on data not otherwise available. We acknowledge that biases may occur when using expert opinions, and we are therefore further testing the results through sensitivity analyses as well as discussing through text analysis.

Furthermore, the validity of the employed data can be enhanced by resolving the inconsistency among different respondents' replies (Meyer, 2001). This is solved by diving deep into the responses to the consultation letter and comparing replies from each perspective, further improving the validity of the thesis.

6. Analysis

This chapter presents the findings from the analyzed effects of implementing an RRT on the aquaculture industry in Norway. The research incorporates a document analysis of the responses to the consultation letter and an NPV analysis of three hypothetical investment projects. Furthermore, we have employed sensitivity analysis to test the variables included in the NPV analysis. Through these analyses, the chapter presents findings explaining the effects of implementing an RRT.

6.1 Responses to the consultation letter

The subsequent sub-section will further analyze the responses to the RRT in Norwegian aquaculture. The responses to the consultation letter are based on the suggested RRT in the industry from September 28, 2022, and this sub-section will go into further detail about parts of the new tax implementation as of March 28, 2023, that is thought to have a similar effect. A word cloud assessing the most frequently used words in the responses to the consultation letter will be included in the analysis of the responses. The word frequency analysis is carried out to uncover potential implications the tax may have on the industry and to gain a more profound knowledge of how respondents perceive the tax. In addition, a review of significant insights made by academics, policymakers, private citizens, and industry stakeholders will be conducted.

Figure 5: Word cloud of most frequently used word in the responses to the consultation letter

The words that appeared the most frequently in the responses to the consultation letter are presented in Figure 5 (non-useful words omitted). First, the word cloud reveals that the responses are overwhelmingly negative in their perspectives. The word "negative" is used the most, but other words like "worried," "risk," and "critical" are regularly used, highlighting this finding. The fact that the word "positive" is among the most often used words demonstrates several points of view on the matter.

Furthermore, the word cloud shows that the respondents are passionate about various significant factors. More specifically, there are expressed worries about how the imposition of such a tax may impact investments and industry growth. Another evidence that consultation is required while preparing such a tax on the sector comes from frequently using the word "dialog." The analysis emphasizes how the tax's design and execution must be carefully considered to achieve its intended purposes and prevent unforeseen outcomes.

Finally, we find the use of strong vocabulary. Some of the most frequently used words are “worried,” “critical,” “strong,” and “very.” Strong vocabulary can provide insight into the sense of concern and urgency and the speaker’s perception of the topic.

6.1.1 Industry stakeholders

> *«Den foreslåtte innretningen innebærer at grunnrenteskatten ikke er nøytral. Skatteforslaget vil etter vår vurdering innebære lavere avkastning i prosent etter grunnrenteskatt enn før slik skatt. Forslaget vil også redusere tilgangen til kapital til bransjen.»*
>
> *"The proposed device implies that the resource rent tax is not neutral. In our assessment, the tax proposal will result in lower returns in percentage terms after the resource rent tax compared to before such tax. The proposal will also reduce access to capital for the industry."*

(Hvistendahl, 2022)

The quote above (first in its original state in Norwegian, then translated to English) highlights the potential negative impact of the RRT on profitability and access to capital for the industry. The statement that the tax will lead to a decrease in the returns in percentage after tax is based on the assumption that the tax will increase the total cost for the companies, as they will be forced to pay a portion of their profits to the government. Several studies support this claim when examining the impact of the RRT on the industry, stating that introducing such a tax could reduce profitability and lower investment levels (Federici & Parisi, 2015; Holtsmark & Schreiner, 2023; Misund & Tveterås, 2019; Smith, 1999).

Furthermore, the quote from DNB ASA suggests that the proposed tax will reduce access to capital in the aquaculture industry. This statement is based on the assumption that the RRT will increase the cost of capital for the companies operating in the industry, making it more challenging to raise funds. This, in turn, can make the affected companies struggle to raise funds to finance future projects, which could limit the growth and development of the industry (DNB Bank ASA, 2022). Several studies have researched this potential effect and support the statement (Arnason & Bjørndal, 2020; Misund et al., 2019a).

Additionally, Carnegie AS raised a concern about applying a standard price. The standard price is supposed to represent the value of the salmon without taking activities that increase the value into account. Such activities include distribution, marketing, and sales activities. The market price for salmon is, however, very volatile (Bloznelis, 2016; Oglend, 2013;

Opstad et al., 2022) as it depends on several factors, such as supply and demand, currency exchange rates, and quality. The government suggested using a standard price based on the annual average price of salmon (adjusted for inflation). Using standard pricing has the drawback of not accurately reflecting the state of the market at the time of production and sale. Furthermore, companies in the Norwegian salmon industry frequently sell their fish for a fixed price that does not correspond to the standard price, rendering the RRT erroneous (Christian Begby et al., 2022). Figure 6 from the Ministry of Finance's consultation letter shows how the standard price is created along the value chain, as the second dotted line represents where the suggested standard price is derived.

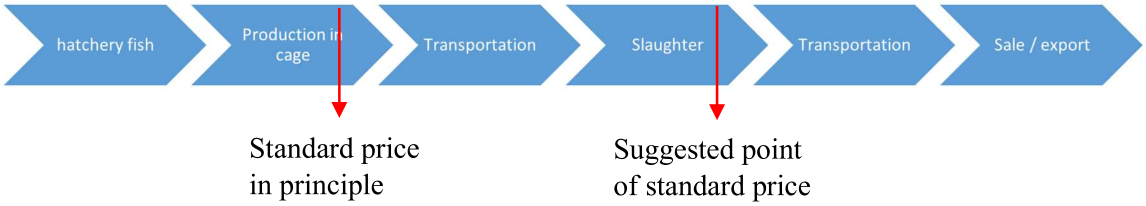


Figure 6: Point of standard price in the value chain

6.1.2 Private persons

> *«Etter hvert som eksport/ transport av oppdrettsfisk (og annen sjømat) øker, øker også forurensingsmengden.»*
>
> *"As the export/transport of farmed fish (and other seafood) increases, so does the pollution."*

(Hassel, 2022)

> *«Naturvern bør tas mer inn som en viktig del av argumentene for å innføre grunnrenteskatten. Oppdrettsnæringen må opplagt betale for de store skadene den påfører klimaet og naturen vår»*
>
> *"Nature conservation should be emphasized more as an important part of the debate for introducing the resource rent tax. The farming industry must pay for the great damage it causes to our climate and nature."*

(Godtland, 2023)

The abovementioned statements are typical of how some Norwegian private individuals feel about applying an RRT in Norwegian aquaculture. According to the quotes, the RRT is fair, and nature preservation and pollution should draw more attention, as implementing an RRT will hold polluting fish farms responsible for their pollution.

It is argued by Misund and Tveterås (2020) that further sustainable growth according to the UN's sustainable development goals is possible in Norwegian salmon production. However, the authors emphasize that this is based on the assumption of a properly designed policy regime providing incentives for innovative solutions in production. The most pressing environmental issue in the Norwegian aquaculture industry is pollution from fish feed, waste, and sea lice, which causes high mortality (Arnason & Bjørndal, 2020; Flaaten & Pham, 2019).

The proposed tax may encourage businesses to adopt more environmentally friendly practices, but it might also negatively impact the environment as it would diminish their revenue. According to the final report of Misund et al. (2019), who analyzed the previously suggested RRT from 2019, clear evidence of a negative effect on investments in innovative technology was found. This will hurt the industry's ability to grow sustainably. This assertion is supported by several responses to the consultation letter, including one from Sjømat Norge, which says it will hinder the industry's ability to meet its sustainability goal (Ystmark, 2023).

6.1.3 Municipality

«Forslaget til grunnrenteskatt gir ikke grunnlag for verdiskapning, grønt industrielt skifte, sysselsetting og bosetting langs norskekysten. Tvert imot – det skaper stor usikkerhet om kystens fremtid.»

"The proposal for resource rent tax does not provide a basis for value creation, green industrial change, employment, and settlement along the Norwegian coast. On the contrary – it creates great uncertainty about the coast's future."

(Frøya kommune, 2022)

The statement above reflects a large part of the views and concerns from the municipal standpoint. Some supporters of the RRT argue that it could provide a basis for value creation by encouraging the development of new technologies that reduce the environmental impact of resource extraction and processing (Grünfeld et al., 2021). The revenues from the tax could, for instance, be used to fund the R&D of new technologies.

On the other hand, opponents of the tax argue that the tax could discourage investments in the industry and disincentivize innovations. According to calculations made by Kontali Analyse, republished in Sjømat Norge's response to the consultation letter, the income of the host municipalities will decrease with the RRT, resulting in a movement in capital from fjord and coast municipalities to central areas in the country. This will, in turn, reduce the possibility of investing in workplaces in the municipalities (Ystmark, 2023).

6.1.4 Academics

«Vi mener at det er avgjørende at skatten implementeres slik at den økonomiske effektiviteten ikke svekkes. Det innebærer at skatten i minst mulig grad skal påvirke beslutninger om produksjon, investering og organisering i havbruksnæringen.»

"We believe that it is crucial that the tax is implemented so that economic efficiency is not weakened. It involves that the tax should, to the least possible extent, influence decisions about production, investment, and organization in the aquaculture industry."

(Bjerksund & Schjelderup, 2023)

«Etter en foreslått kontantstrømskatt utgjør skattene typisk mellom 70% og 100% av resultat før skatt for mange havbruksselskaper. Dette er et unikt høyt skattetrykk som vesentlig svekker evnen til å investere og vokse bærekraftig.»

"After a proposed cash flow tax, the taxes typically amount to between 70% and 100% of profit before tax for many aquaculture companies. This uniquely high tax burden significantly weakens the ability to invest and grow sustainably."

(Misund & Tveterås, 2023)

The first of the two quotes emphasizes the importance of implementing taxes in a manner that will have the most negligible impact possible on the economic efficiency of the aquaculture industry. It suggests that the tax policy should be designed to avoid influencing decisions related to production, investments, and organization. This quote reflects the concern for maintaining a favorable and stable industry that encourages sustainable growth.

One of the key objectives when designing a tax policy is to ensure that it does not create significant distortions in economic activities. Minimizing its influence on economic activities allows the companies to operate based on market forces rather than being driven primarily by tax considerations. Although some studies claim to prove that the proposed tax will not act distortionary (NOU 2019:18; Nøstbakken et al., 2020), many oppose this view. Several studies claim that the tax will act distortionary (Misund et al., 2019a; Tveterås et al., 2019). This is also proven further in this study, demonstrating how economic incentives such as investment incentives will alter as an effect of the proposed RRT weakening the overall economic efficiency in the industry.

The second quote sheds light on the high tax burden Norwegian aquaculture companies face. The quote further suggests that the real tax rate will land between 70 and 100 percent of profits before tax, stating that it hampers affected companies' ability to invest and grow sustainably.

A substantial tax burden can pose challenges for companies operating in the Norwegian aquaculture industry by limiting the funds available for reinvestments, R&D, production improvements, and expansion. This may further result in the reduction of investments in sustainable practices and modernization of the industry, hindering the industry's long-term economic viability (Arnason & Bjørndal, 2020; Engen & Skinner, 1996; Szarowska, 2013). Furthermore, a high tax burden may discourage potential investors from entering the industry or lead existing companies to relocate to regions with more favorable tax legislation (Arnason & Bjørndal, 2020). As a result, the sector might experience a decline in economic activity, employment opportunities, and innovation, undermining its overall competitiveness and sustainability.

6.2 NPV analysis

The following sub-section will analyze three hypothetical investment projects considered typical investments in the aquaculture business. More specifically, we will make estimates on the following projects: traditional facility, closed facility, and offshore facility. These projects are presented visually below in figure 7, 8, and 9 respectively. Furthermore, we will determine whether the investment projects are profitable by conducting an NPV analysis. These analyses will be conducted with and without the RRT to determine whether investment incentives are affected. To conduct the analyses effectively, specific prerequisites must be considered. Given the numerous factors involved, it is crucial to perform sensitivity analyses to ensure the quality and reliability of the overall research.

Figure 7: Traditional facility (AKVA Group, 2018)

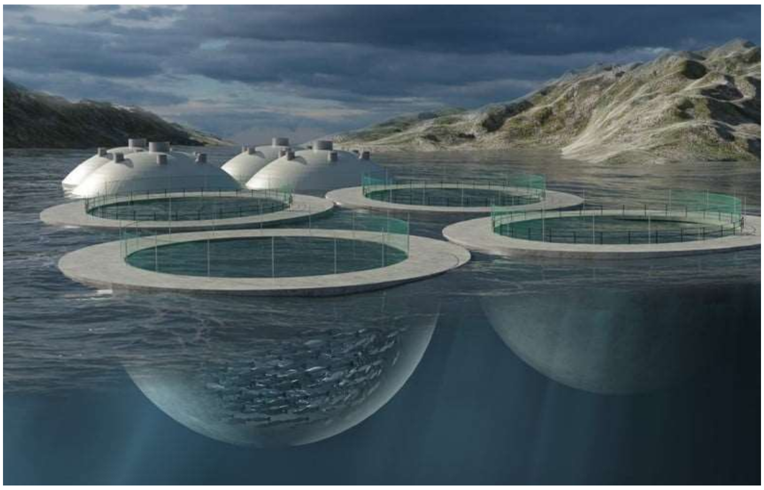


Figure 8: Closed facility (Stiim Aquacluster, 2021)

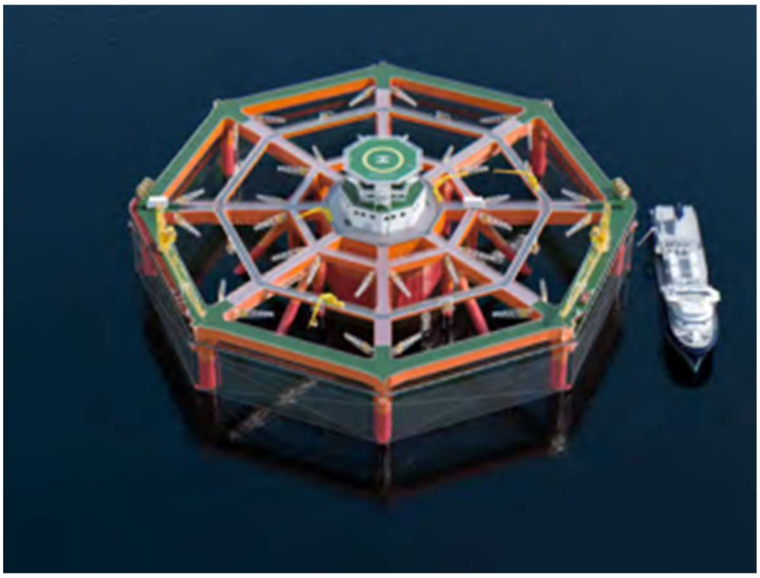


Figure 9: Offshore facility (SalMar, 2020)

6.2.1 Time Frame, Investments, and Depreciation

The timeframe of the projects is a crucial aspect to consider. The traditional facility and closed facility have a lifespan of 20 years, while the offshore facility have a lifespan of 30 years. Furthermore, the construction period for the traditional facility and closed facility is 2 years and 5 years for the offshore facility.

The investments for the traditional facility and the closed facility are evenly distributed, with 50% in each construction year. Since the construction period for the offshore facility is somewhat longer, the investments are distributed differently. In year 0, it accounts for 11%; in year 1, 30%; in year 2, 38%; in year 3, 15%; and in year 4, 4%. We assume the fish will be released in the projects' completion year and is ready for harvest after 1.5 years. This results in cash flows occurring in year 3.5 for the traditional facility and closed facility and year 6.5 for the offshore facility. An illustration of the timeframe of the investments can be seen in Table 4 below.

Timeframe of investments					
Year	**0**	**1**	**2**	**3**	**4**
Traditional facility	50%	50%			
Closed facility	50%	50%			
Offshore facility	11,54%	30,77%	38,46%	15,38%	3,85%

Table 4: Timeframe of how investments are distributed.

All investments, excluding those related to permits, will be depreciated equally. Permits are not depreciated due to their perpetual nature. Depreciation will commence in the period following the year of investment and continue for the next 10 years, with the same amount being depreciated annually. Additionally, it is essential to note that no RRT deductions are granted for permit investments (Ministry of Finance, 2022, pp. 59-60).

Timeframe of depreciation															
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Traditional facility		5%	10%	10%	10%	10%	10%	10%	10%	10%	10%	5%			
Closed facility		5%	10%	10%	10%	10%	10%	10%	10%	10%	10%	3,3%			
Offshore facility		1,2%	4,2%	8,1%	9,6%	10%	10%	10%	10%	10%	10%	8,8%	5,8%	1,9%	0,4%

Table 5: Timeframe of how the investments is depreciated

Further, we assume a price per permit of NOK 150 million, with each permit giving a maximum permitted biomass (MPB) of 780 tons (Misund et al., 2019b, p. 111). An overview of the total investments made for the three projects is illustrated in Table 6:

Total investments in million NOK					
	Price per permit	**Number of permits**	**Total investment permits**	**Investments without permits**	**Total investment**
Traditional facility	150	5	750	100	850
Closed facility	150	3	450	200	650
Offshore facility	150	20	3000	3900	6900

Table 6: Overview of investments made in the three projects.

6.2.2 WACC

Companies often utilize a higher WACC for investment projects than the calculated WACC. This is primarily due to capital rationale and operational limitations (Fernandez et al., 2018; Jacobs & Shivdasani, 2012). In this analysis, we have incorporated a WACC of 10 percent for all three investment projects based on the estimates provided by Misund et al. (2019). The estimate is derived from consultations with financial analysts, industry companies, corporate finance advisors in investment banks, and empirical studies (Ruiz Campo & Zuniga-Jara, 2018). Furthermore, Misund et al. (2019) indicate that this WACC estimate is derived from larger companies and is assumed to be even higher for smaller companies.

6.2.3 Salmon Prices

Obtaining accurate future estimates for salmon prices over the next 30 years is considered an exceptionally challenging task. Therefore, conducting sensitivity analyses is crucial. Considering that the earliest generated cash flows from traditional facility and closed facility originate in year 3.5, we have utilized the average of Fishpool's latest future prices in 2025. This average is estimated to be NOK 80.5 per kilogram. It is important to note that Fishpool's future prices apply to fully processed salmon. Consequently, we need to subtract the costs associated with the processing of salmon to determine the correct price for income calculations. After deducting these costs, the price of produced salmon is estimated to be NOK 78 per kilogram. The calculations are illustrated in Table 7 below:

Calculating netback salmon price	
Fishpool average salmon price 2025	80,50 NOK
Transport	-0,70 NOK
Quality adjustments	-0,55 NOK
Size adjustments	-0,25 NOK
Export	-1,00 NOK
Netback salmon price 2025	78,00 NOK

Table 7: Calculations of real salmon price

6.2.4 Production volume and production costs

To determine the production volume for the different projects, we multiply the MPB by the production ratio (which represents the annual MPB proportion). A production ratio of 1.6 is used in this analysis as this is assumed to be a standard ratio (Tvedterås, 2023).

The average production cost is estimated to be NOK 43.5 per kilogram for all projects (the Directorate of Fisheries, 2021), as we could not find reliable sources providing more accurate estimates on the closed facility and the offshore facility projects.

6.2.5 Results and Sensitivity

This sub-section presents the NPV analyses' comprehensive results and the significant findings from the sensitivity analyses. To thoroughly assess each project, we conducted 28 sensitivity analyses, consisting of seven analyses for the traditional facility and the closed facility. Since the offshore facility showing extreme deficits under the same assumptions as the traditional facility and closed facility, we chose to conduct two offshore facility analyses. One including permit costs similar to the traditional facility and the closed facility, and one exclusive of permits. However, given space limitations, presenting all 28 tables in the main text would be impractical. Therefore, we have opted to showcase the tables specifically for the traditional facility project in this section while referring to the tables for the closed facility and offshore facility projects in the appendix.

We initially designated the first four analyses as scenario analyses (SA) based on different WACC values: 5%, 10%, and 15%, to facilitate a clear understanding of the analyses conducted. These SA effectively illustrate the impact before and after implementing the RRT on the projects' NPV. Additionally, the SA analyses present the prevailing IRR following the RRT implementation, considering various scenarios. Specifically, the figures depict the outcomes resulting from a 20% increase or decrease in salmon prices, production costs, investment costs (excluding aquaculture permits), and price per permit. In the analysis where permits are excluded in the offshore facility project, two new scenarios, RRT +/- 10%, are added.

The findings from these analyses are visually presented in Figures 10 to 17 below. Figure 11 summarizes the findings from our original calculations, incorporating different WACC scenarios before presenting the sensitivity analyses. It is important to note that our original calculations utilized a WACC of 10%, and the subsequent analyses compare the effects of other variables against this baseline. Finally, Figures 14 to 17 showcase the sensitivity analyses that individually examine two variables, highlighting their impact on the NPV (after RRT) when these variables change. The cell highlighted in red corresponds to the original NPV estimates for easy reference.

6.3 Scenario analysis

First, Figure 10 illuminates the impact of the RRT on the NPV of the traditional facility project. For all projects 27 scenarios will be presented. Specifically, it reveals a consistently positive NPV in all scenarios, both before and after the RRT, assuming a WACC of 5%. However, there is a shift in the NPV outcomes when considering different WACC values. With a WACC of 10%, 1 out of 9 scenarios yields a negative NPV before RRT, while after the RRT, this increases to 4 out of 9 scenarios. Moreover, with a WACC of 15%, the NPV becomes negative in 6 out of 9 scenarios before the RRT and in all nine scenarios after the RRT.

Secondly, Figure 18 in the appendix showcases the impact of the RRT on the closed facility project. We find that for a WACC of 5%, 8 out of 9 scenarios exhibit a positive NPV both before and after the RRT. Furthermore, when the WACC is set at 10%, 7 out of 9 scenarios show a positive NPV before the RRT, while 4 out of 9 scenarios result in a negative NPV after the RRT. Finally, a WACC of 15% leads to a negative NPV in 8 out of 9 scenarios before the RRT and in all scenarios after the RRT.

The third NPV analysis, presented in Figure 26 in the appendix, presents the impact of the RRT on the NPV in offshore facility project (permits included). This analysis indicates a positive NPV in 7 out of 9 scenarios with a WACC of 5% before the RRT, which reduces to 5 out of 9 scenarios after the RRT. Conversely, when the WACC is set at 10%, the NPV turns negative in 8 out of 9 scenarios before the RRT and in all scenarios after the RRT. Furthermore, a WACC of 15% yields a negative NPV in all scenarios before and after implementing RRT.

Finally, Figure 34 in the appendix illuminates the impact of the RRT on the NPV of the offshore facility project (permits excluded). The findings reveal that the NPV remains positive when the WACC is 5% in all scenarios. Moreover, when the WACC is set to 10%, the NPV is positive in 8 out of 9 scenarios before the RRT and in 5 out of 9 scenarios after the RRT. With a WACC of 15%, the NPV becomes negative in 6 out of 9 scenarios before the RRT and in all scenarios after the RRT.

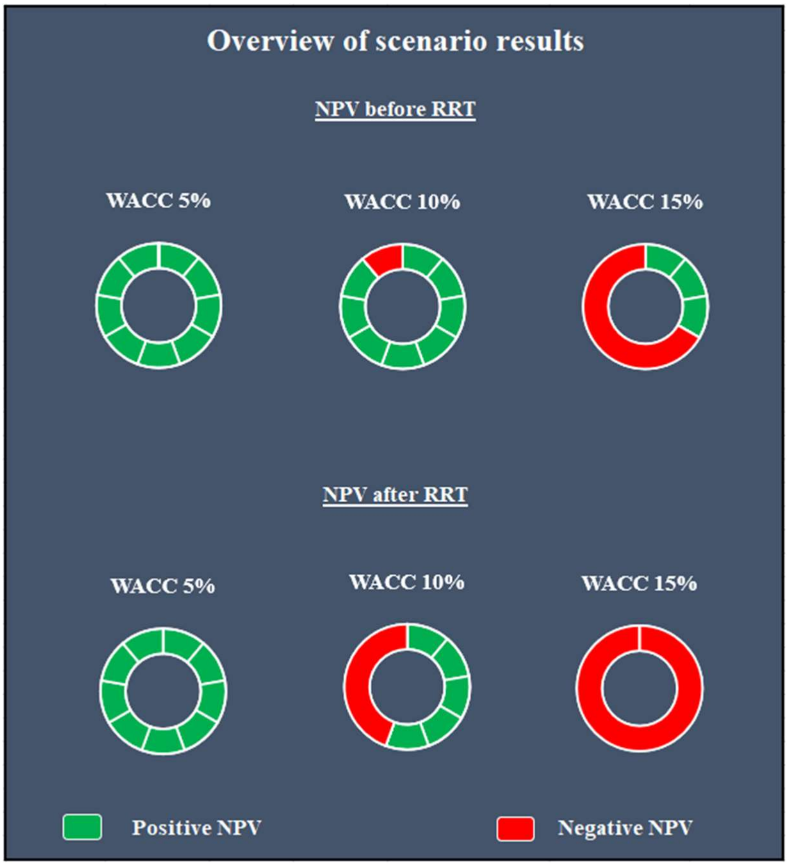


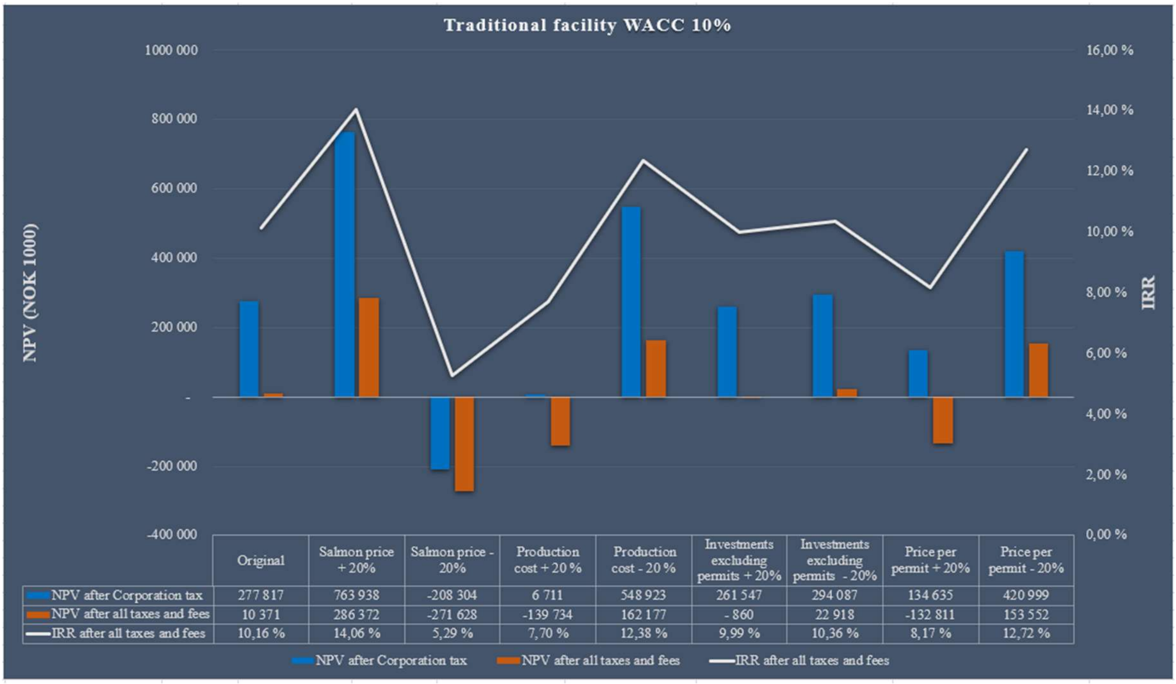
Figure 10: Overview of Scenario results before and after implementing RRT for the traditional facility project. The green cells illustrate the scenarios with positive NPV results, and the red illustrates the scenarios with negative NPV results.

Scenario analyses WACC 10%

With existing literature presented earlier as a foundation, a WACC of 10% is deemed the most probable required return for companies in the industry. For this reason, this will be used as a foundation for further analyzing the different projects. The implementation of RRT has a negative impact on the NPV of the traditional facility project, with a WACC of 10%. The NPV decreases dramatically in all traditional facility scenarios after introducing the RRT, indicating reduced profitability. The most considerable changes in NPV are driven by fluctuations in salmon prices, highlighting the project's sensitivity to this variable. Production costs and price per permit changes also significantly affect the project's profitability. However, other investment costs (excluding permits) have a relatively minor impact on NPV. Despite the adverse effects of RRT, the traditional facility project remains economically viable given no altercations in the variables.

When considering a WACC of 10% for the closed facility project, similar logical trends are found, including a reduction in investment incentives, and the analysis result in a change from positive to negative NPV in our original estimates. Furthermore, the analysis shows a shift from positive to negative NPV in two scenarios, indicating that in the case of these scenarios, the project turns unprofitable when introducing the RRT.

Finally, we find that when a WACC of 10% is applied to the offshore facility project, including the investment in permits, one scenario undergoes a transition from a positive to a negative NPV. Although the offshore facility project demonstrates similar trends as the traditional facility and closed facility projects, we observe that the investment costs (excluding permit costs) exert a more substantial influence on the offshore facility project compared to the traditional facility and closed facility projects. Additionally, when analyzing the offshore facility project excluding permit investments, we observe that the NPV shifts from positive to negative in three scenarios while experiencing a significant decrease in all scenarios. As prices per permit are irrelevant in this scenario, a change in RRT of +/- 10% is added to the figure. Although a 10% decrease in RRT does not change the NPV from negative to positive, it significantly increases the NPV value. Conversely, a 10% increase in the RRT will shift the NPV from positive to negative. These findings are presented in Figure 28 and Figure 36, respectively.



	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	277 817	763 938	-208 304	6 711	548 923	261 547	294 087	134 635	420 999
NPV after all taxes and fees	10 371	286 372	-271 628	-139 734	162 177	- 860	22 918	-132 811	153 552
IRR after all taxes and fees	10,16 %	14,06 %	5,29 %	7,70 %	12,38 %	9,99 %	10,36 %	8,17 %	12,72 %

Figure 11: Scenario analysis (9 scenarios) for traditional facility considering a WACC of 10%

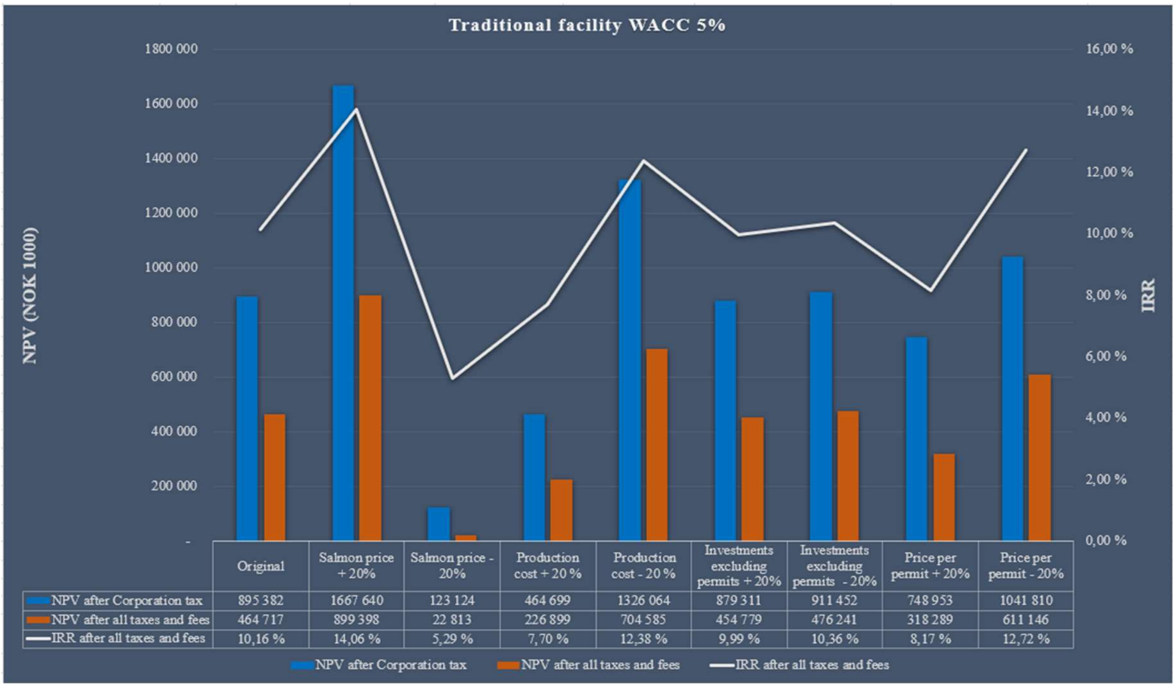
Scenario analysis WACC 5%

With a WACC of 5% applied to the traditional facility project, the analysis reveals similar trends in the impact of implementing RRT on the NPV compared to a WACC of 10%. Specifically, the implementation of RRT reduces the NPV across all scenarios. Fluctuations in salmon prices continue to significantly impact the NPV, followed by production costs and price per permit changes. Other investment costs have a minor influence. Despite the reduced NPV, the traditional facility remains economically viable with positive returns even after the implementation of RRT, albeit at significantly lower levels. These results are presented in figure 12.

With an applied WACC of 5 % to the closed facilities project, the NPV shows similar intuitive trends as that in the case of traditional facility projects and is presented in Figure 19 in the appendix. The findings show that although the investment incentives will change negatively, the NPV will not change from positive to negative in any of the analyzed scenarios.

Finally, the offshore facility project, including permit acquisition, with an applied WACC of 5%, exhibits a change from positive to negative NPV in two scenarios, in addition to an intuitive change in investment incentives in all scenarios. These findings are illustrated in

Figure 27 in the appendix. In contrast, all NPV values in the offshore facility project scenarios with permit cost excluded remain positive after RRT and are presented in Figure 35 in the appendix.



	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	895 382	1667 640	123 124	464 699	1326 064	879 311	911 452	748 953	1041 810
NPV after all taxes and fees	464 717	899 398	22 813	226 899	704 585	454 779	476 241	318 289	611 146
IRR after all taxes and fees	10,16 %	14,06 %	5,29 %	7,70 %	12,38 %	9,99 %	10,36 %	8,17 %	12,72 %

Figure 12: Scenario analysis (9 scenarios) for traditional facility considering a WACC of 5%

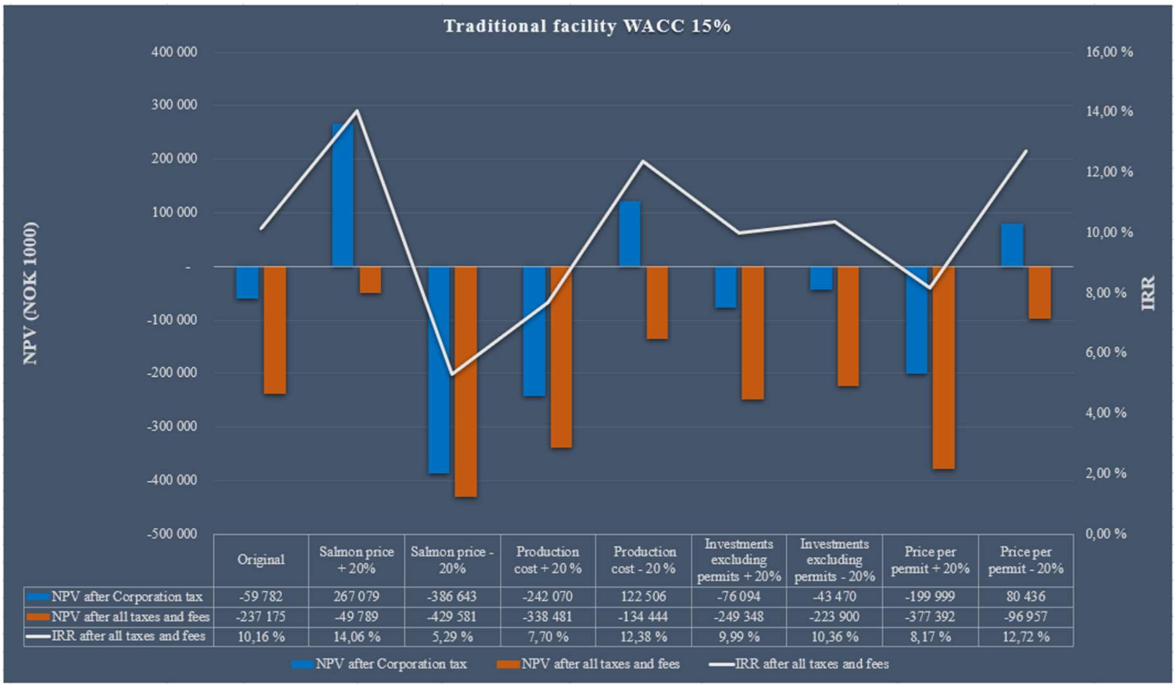
Scenario analysis WACC 15%

When considering a WACC of 15% for the traditional facility project, the analysis in Figure 13 highlights a significant decrease in profitability. Prior to the implementation of RRT, the project is only profitable in three out of the nine scenarios. However, once RRT is introduced, the NPV consistently becomes negative across all scenarios. The fluctuations in salmon prices, changes in production costs, and the price per permit have a substantial impact on the NPV, while other investment costs have a relatively minor influence. These results emphasize the financial challenges faced by the traditional facility project due to a combination of higher WACC and the additional burden of RRT implementation.

Furthermore, the findings presented in Figure 21 in the appendix shed light on the changes in investment incentives following the implementation of RRT for the closed facility project across all analyzed scenarios when applying a WACC of 15%. The NPV value undergoes a transition from positive to negative in the scenario of increased salmon prices.

Moreover, the NPV for the closed facility project shows similar intuitive trends as that of the traditional facility projects.

A WACC of 15% for the offshore facility project, including permit investments, further decreases an already negative NPV value, decreasing investment incentives, and is presented in Figure 29 in the appendix. Moreover, the findings from the analysis of the offshore facility project excluding investment in permits, presented in Figure 37 in the appendix, similarly decrease investment incentives and change the NPV value from positive to negative in three analyzed scenarios, illustrating that the project turned from profitable to unprofitable in these scenarios.



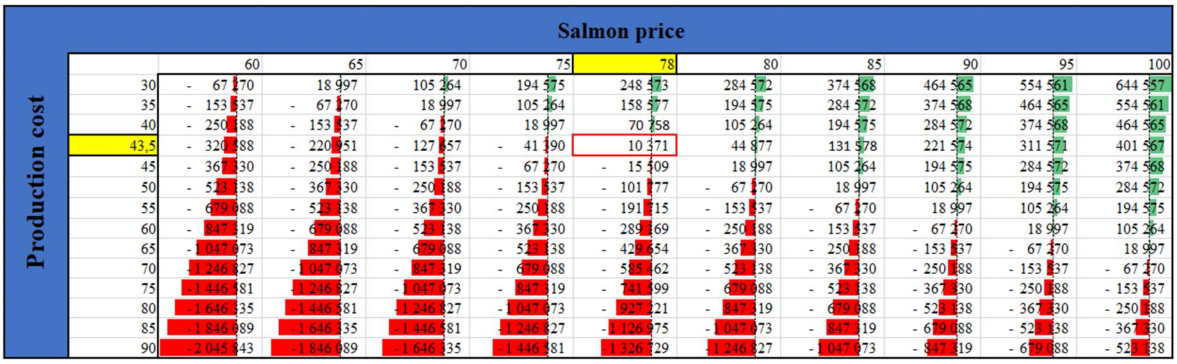
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	-59 782	267 079	-386 643	-242 070	122 506	-76 094	-43 470	-199 999	80 436
NPV after all taxes and fees	-237 175	-49 789	-429 581	-338 481	-134 444	-249 348	-223 900	-377 392	-96 957
IRR after all taxes and fees	10,16 %	14,06 %	5,29 %	7,70 %	12,38 %	9,99 %	10,36 %	8,17 %	12,72 %

Figure 13: Scenario analysis (9 scenarios) for traditional facility considering a WACC of 15%

6.4 Sensitivity analysis

Salmon prices and production costs

Analysis of the sensitivity analysis regarding salmon prices and production costs reveals key insights. If the salmon price is NOK 60 or lower, the NPV becomes negative for all production cost values from NOK 30 and above. Importantly, this analysis highlights the consistent influence of salmon prices and production costs on the NPV, emphasizing their crucial role in project profitability. These findings are presented in Figure 14 below. Similar trends are applicable for the closed facility and the offshore facility project, as illustrated in the appendix in figures 22, 30, and 38. However, we find that the NPV is only positive when a production cost of NOK 30 combined with a salmon price of NOK 100 is applied in the OF project, including permit costs.

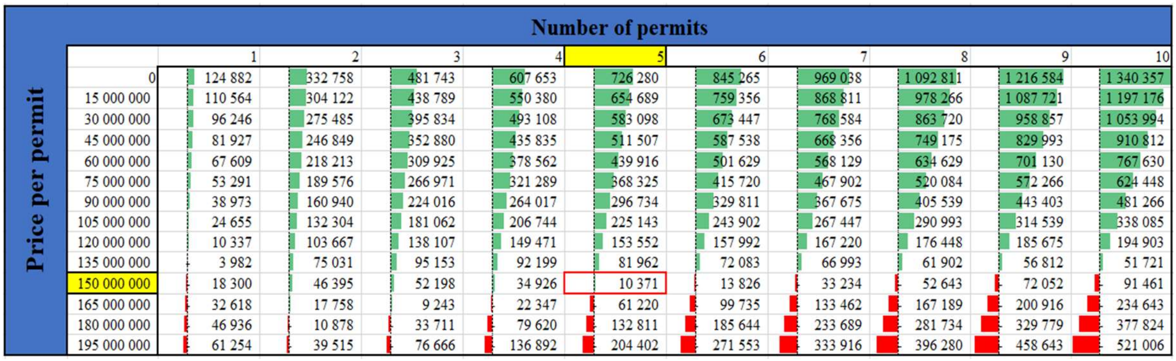


	Salmon price									
Production cost	60	65	70	75	78	80	85	90	95	100
30	- 67 270	18 997	105 264	194 575	248 573	284 572	374 568	464 565	554 561	644 557
35	- 153 537	- 67 270	18 997	105 264	158 577	194 575	284 572	374 568	464 565	554 561
40	- 250 188	- 153 537	- 67 270	18 997	70 758	105 264	194 575	284 572	374 568	464 565
43,5	- 320 588	- 220 951	- 127 657	- 41 190	10 371	44 877	131 578	221 574	311 571	401 567
45	- 367 330	- 250 188	- 153 537	- 67 270	- 15 509	18 997	105 264	194 575	284 572	374 568
50	- 523 138	- 367 330	- 250 188	- 153 537	- 101 777	- 67 270	18 997	105 264	194 575	284 572
55	- 679 088	- 523 138	- 367 330	- 250 188	- 191 715	- 153 537	- 67 270	18 997	105 264	194 575
60	- 847 319	- 679 088	- 523 138	- 367 330	- 289 169	- 250 188	- 153 537	- 67 270	18 997	105 264
65	- 1 047 073	- 847 319	- 679 088	- 523 138	- 429 654	- 367 330	- 250 188	- 153 537	- 67 270	18 997
70	- 1 246 827	- 1 047 073	- 847 319	- 679 088	- 585 462	- 523 138	- 367 330	- 250 188	- 153 537	- 67 270
75	- 1 446 581	- 1 246 827	- 1 047 073	- 847 319	- 741 599	- 679 088	- 523 138	- 367 330	- 250 188	- 153 537
80	- 1 646 335	- 1 446 581	- 1 246 827	- 1 047 073	- 927 221	- 847 319	- 679 088	- 523 138	- 367 330	- 250 188
85	- 1 846 089	- 1 646 335	- 1 446 581	- 1 246 827	- 1 126 975	- 1 047 073	- 847 319	- 679 088	- 523 138	- 367 330
90	- 2 045 843	- 1 846 089	- 1 646 335	- 1 446 581	- 1 326 729	- 1 246 827	- 1 047 073	- 847 319	- 679 088	- 523 138

Figure 14: Sensitivity analysis of salmon prices and production cost, considering a WACC of 10 % for traditional facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

Price per permit / Number of permits

Figure 15 presents an analysis of the findings and reveals patterns regarding the price per permit and number of permits. The relationship between the number of permits and NPV is unpredictable, sometimes increasing and sometimes decreasing NPV at the same price per permit. With a price per permit of 135 million, acquiring 1-10 permits yields a positive NPV, whereas, at 195 million, the NPV is negative for the same range of permits. These findings emphasize the significant effect the price per permit and number of permits have on the NPV value, with the number of permits proving an unpredictable influence on the NPV. When comparing, we find similar patterns for all other projects, these are presented in figure 23, 31 and 39 in the appendix.

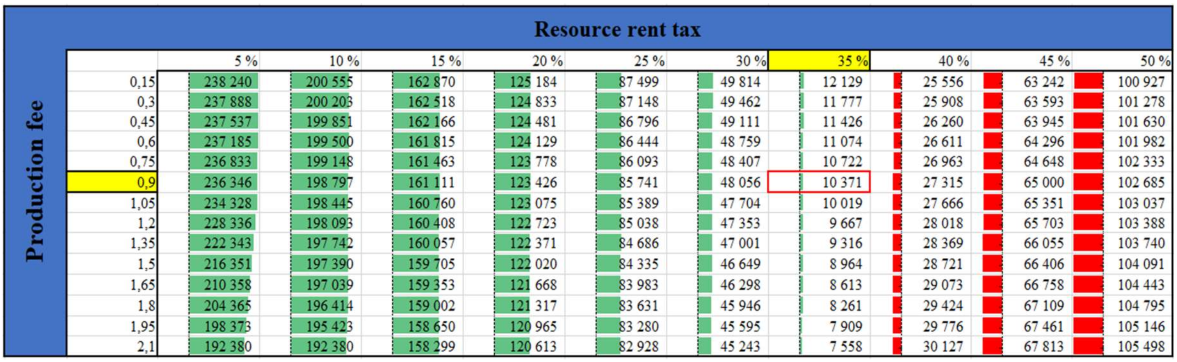


Price per permit	Number of permits									
	1	2	3	4	5	6	7	8	9	10
0	124 882	332 758	481 743	607 653	726 280	845 265	969 038	1 092 811	1 216 584	1 340 357
15 000 000	110 564	304 122	438 789	550 380	654 689	759 356	868 811	978 266	1 087 721	1 197 176
30 000 000	96 246	275 485	395 834	493 108	583 098	673 447	768 584	863 720	958 857	1 053 994
45 000 000	81 927	246 849	352 880	435 835	511 507	587 538	668 356	749 175	829 993	910 812
60 000 000	67 609	218 213	309 925	378 562	439 916	501 629	568 129	634 629	701 130	767 630
75 000 000	53 291	189 576	266 971	321 289	368 325	415 720	467 902	520 084	572 266	624 448
90 000 000	38 973	160 940	224 016	264 017	296 734	329 811	367 675	405 539	443 403	481 266
105 000 000	24 655	132 304	181 062	206 744	225 143	243 902	267 447	290 993	314 539	338 085
120 000 000	10 337	103 667	138 107	149 471	153 552	157 992	167 220	176 448	185 675	194 903
135 000 000	3 982	75 031	95 153	92 199	81 962	72 083	66 993	61 902	56 812	51 721
150 000 000	18 300	46 395	52 198	34 926	10 371	13 826	33 234	52 643	72 052	91 461
165 000 000	32 618	17 758	9 243	22 347	61 220	99 735	133 462	167 189	200 916	234 643
180 000 000	46 936	10 878	33 711	79 620	132 811	185 644	233 689	281 734	329 779	377 824
195 000 000	61 254	39 515	76 666	136 892	204 402	271 553	333 916	396 280	458 643	521 006

Figure 15: Sensitivity analysis of number of permits and price per permits, considering a WACC of 10 % for traditional facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

Sensitivity RRT rate and production fee

The analysis of the production fee and RRT rate reveals key insights and is illustrated in Figure 16. The production fee has a minor impact on the NPV compared to the RRT rate. When the NPV reaches 40%, it becomes negative, indicating a critical threshold. Reducing the RRT rate by 5% consistently increases the NPV. We find similar patterns in the closed facility and the offshore facility project, as presented in figures 24, 32, and 40 in the appendix. However, we find that the closed facility project is considerably more impacted by a change in production fee.

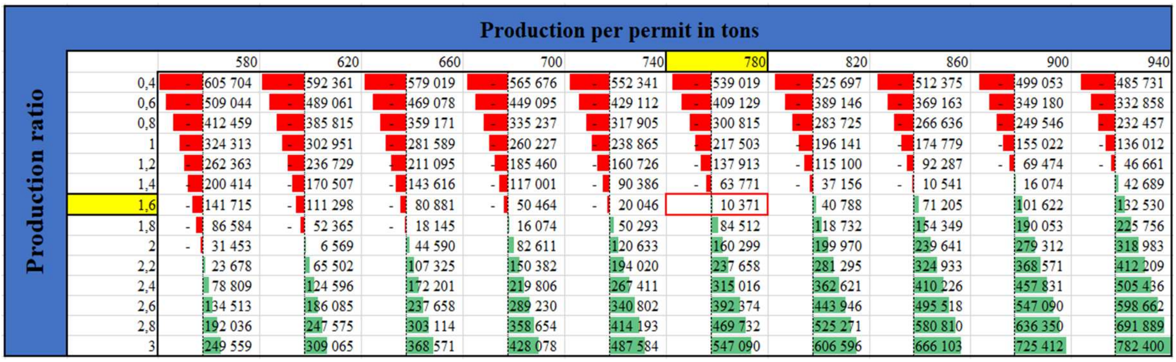


Production fee	Resource rent tax									
	5 %	10 %	15 %	20 %	25 %	30 %	35 %	40 %	45 %	50 %
0,15	238 240	200 555	162 870	125 184	87 499	49 814	12 129	25 556	63 242	100 927
0,3	237 888	200 203	162 518	124 833	87 148	49 462	11 777	25 908	63 593	101 278
0,45	237 537	199 851	162 166	124 481	86 796	49 111	11 426	26 260	63 945	101 630
0,6	237 185	199 500	161 815	124 129	86 444	48 759	11 074	26 611	64 296	101 982
0,75	236 833	199 148	161 463	123 778	86 093	48 407	10 722	26 963	64 648	102 333
0,9	236 346	198 797	161 111	123 426	85 741	48 056	10 371	27 315	65 000	102 685
1,05	234 328	198 445	160 760	123 075	85 389	47 704	10 019	27 666	65 351	103 037
1,2	228 336	198 093	160 408	122 723	85 038	47 353	9 667	28 018	65 703	103 388
1,35	222 343	197 742	160 057	122 371	84 686	47 001	9 316	28 369	66 055	103 740
1,5	216 351	197 390	159 705	122 020	84 335	46 649	8 964	28 721	66 406	104 091
1,65	210 358	197 039	159 353	121 668	83 983	46 298	8 613	29 073	66 758	104 443
1,8	204 365	196 414	159 002	121 317	83 631	45 946	8 261	29 424	67 109	104 795
1,95	198 373	195 423	158 650	120 965	83 280	45 595	7 909	29 776	67 461	105 146
2,1	192 380	192 380	158 299	120 613	82 928	45 243	7 558	30 127	67 813	105 498

Figure 16: Sensitivity analysis of resource rent tax and production fee, considering a WACC of 10 % for traditional facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

Sensitivity analysis production per permit and production ratio

The analysis of the production ratio and MTB values provides valuable insights. When the production ratio is 1.2, the NPV is negative across all MTB values, indicating negative NPV values. Conversely, with a production ratio of 2.2, the NPV is positive for all MTB values, suggesting strong profitability. The finding from Figure 17 demonstrates a logical pattern of the effect of the analyzed variables on the NPV. Similar trends are identified for the closed facility project and the offshore facility project and are presented in Figures 25, 33, and 41.



	Production per permit in tons									
Production ratio	580	620	660	700	740	780	820	860	900	940
0,4	- 605 704	- 592 361	- 579 019	- 565 676	- 552 341	- 539 019	- 525 697	- 512 375	- 499 053	- 485 731
0,6	- 509 044	- 489 061	- 469 078	- 449 095	- 429 112	- 409 129	- 389 146	- 369 163	- 349 180	- 332 858
0,8	- 412 459	- 385 815	- 359 171	- 335 237	- 317 905	- 300 815	- 283 725	- 266 636	- 249 546	- 232 457
1	- 324 313	- 302 951	- 281 589	- 260 227	- 238 865	- 217 503	- 196 141	- 174 779	- 155 022	- 136 012
1,2	- 262 363	- 236 729	- 211 095	- 185 460	- 160 726	- 137 913	- 115 100	- 92 287	- 69 474	- 46 661
1,4	- 200 414	- 170 507	- 143 616	- 117 001	- 90 386	- 63 771	- 37 156	- 10 541	16 074	42 689
1,6	- 141 715	- 111 298	- 80 881	- 50 464	- 20 046	10 371	40 788	71 205	101 622	132 530
1,8	- 86 584	- 52 365	- 18 145	16 074	50 293	84 512	118 732	154 349	190 053	225 756
2	- 31 453	6 569	44 590	82 611	120 633	160 299	199 970	239 641	279 312	318 983
2,2	23 678	65 502	107 325	150 382	194 020	237 658	281 295	324 933	368 571	412 209
2,4	78 809	124 596	172 201	219 806	267 411	315 016	362 621	410 226	457 831	505 436
2,6	134 513	186 085	237 658	289 230	340 802	392 374	443 946	495 518	547 090	598 662
2,8	192 036	247 575	303 114	358 654	414 193	469 732	525 271	580 810	636 350	691 889
3	249 559	309 065	368 571	428 078	487 584	547 090	606 596	666 103	725 412	782 400

Figure 17: Sensitivity analysis of production per permit in tons, considering a WACC of 10 % for traditional facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

7. Discussion

The discussion section presents the key findings regarding the implications of the proposed RRT in the aquaculture industry, as observed from various stakeholder perspectives. The RRT is found to have a distortionary effect, resulting in lower returns, and potentially rendering some projects financially unviable. It also poses a hindrance to investments in environmentally friendly technologies and may have adverse effects on local economic development and employment opportunities. The high tax burden associated with the RRT can impede the industry's ability to grow sustainably and prompt companies to consider relocating. Additionally, the design of the tax system may incentivize undesirable behavior within the industry. These findings emphasize the importance of considering the potential consequences and evaluating the impact of the RRT on the aquaculture sector from multiple angles.

7.1 Industry stakeholders

"The proposed device implies that the resource rent tax is not neutral. In our assessment, the tax proposal will result in lower returns in percentage terms after the resource rent tax compared to before such tax."

Despite the positive NPV results, given original estimates in the traditional facility project, indicating initial feasibility, the suggested RRT will significantly impact investment incentives in the aquaculture industry. This assertion is further supported by our findings, which reveal that 14 out of 27 scenarios in the traditional facility project, 13 out of 27 scenarios in both the closed facility and the offshore facility project (excluding permits), and 22 out of 27 scenarios in the offshore facility project (including permits), would no longer be economically viable. Furthermore, our sensitivity analysis demonstrates that certain variables substantially influence the NPV, especially very volatile salmon prices. Consequently, the NPV could likely turn negative, rendering the projects financially unviable.

The findings of Greaker and Lindholt (2019) and the Ministry of Finance (2017) suggest that the RRT would not distort investment decisions, with their conclusions based on a required return on investments of 7%. However, according to Tveterås (2023) and Misund (2023) this required return on investments is not a realistic assumption in practice based on interviews with industry players. In our study, we employed a WACC of 10%, which reflects a more realistic financial environment (Jacobs & Shivdasani, 2012; Jagannathan et al., 2016). The utilization of a higher WACC in our analysis indicates that the actual impact of the RRT is considerably more significant than suggested in these earlier studies.

As the NPV heavily relies on salmon prices, it is essential to consider the price volatility. The salmon prices have been characterized by a substantial volatility over the last years and with several scenarios providing an NPV relatively close to zero, it is not unlikely that the price volatility may impact investment decisions. As it adds more risk and uncertainty to the projects, the investors may shift their required return on investment upwards, resulting in certain projects not being undertaken (Kumar et al., 2018; Oglend, 2013; Virlics, 2013).

7.2 Private persons

"Nature conservation should be emphasized more as an important part of the debate for introducing the resource rent tax. The farming industry must obviously pay for the great damage it causes to our climate and nature."

There is a need for a more extensive discussion on the environmental impact of Norwegian aquaculture. However, it is essential to consider the potential consequences of the RRT on investment incentives, particularly about environmentally friendly technologies. However, the current tax structure does not differentiate between traditional facility projects and newer and greener technologies such as closed facility and offshore facility projects. Investors may be reluctant to invest in these technologies, which produce less pollution than the traditional facility. Our analysis reveals that a significant number of scenarios will make investors more reluctant to invest in the closed facility and the offshore facility projects with an implemented RRT. This could also lead to a decline in developing and adopting innovative and greener technologies within the aquaculture industry. As these technologies are still in a research and development stage, and in a vulnerable state, it is crucial to keep investment incentives up, in order to keep up with the green transition (Sandersen, 2018). Although the government has yet to propose an RRT specifically targeting the closed facility and offshore facility project, the uncertainty of if or when it will affect these technologies as well, may create hesitancy among investors when making investment decisions in these greener technologies (Misund et al., 2019a).

7.3 Municipalities

"The proposal for resource rent tax does not provide a basis for value creation, green industrial change, employment, and settlement along the Norwegian coast. On the contrary – it creates great uncertainty about the coast's future."

The government stated that implementing an RRT will provide the local municipalities with a larger share of the created income from the industry (NOU, 2019:18). On the other hand, Kontali Analyse, as cited in Sjømat Norge's response to the consultation letter, calculates that the income of host municipalities will decrease due to the RRT. This would lead to a capital shift from fjord and coast municipalities to more central areas in the country. Consequently, this capital movement would limit the municipalities' ability to invest in new workplaces, potentially impacting local economic development (Ystmark, 2023). Furthermore, Arnason and Bjørndal (2020) argue that implementing the RRT could result in a significant portion of the industry being relocated abroad. This relocation would have detrimental effects on domestic employment and the overall contribution of the aquaculture industry to the local economy. Moreover, reduced profitability, illustrated in the NPV analysis, in investment projects due to the RRT may lead to a decline in job creation within the aquaculture industry. The decrease in profitability would likely discourage investors from initiating new projects or expanding existing operations, consequently limiting employment opportunities generated by the industry.

7.4 Academics

"After a proposed cash flow tax, the taxes typically amount to between 70% and 100% of profit before tax for many aquaculture companies. This is a uniquely high tax burden that significantly weakens the ability to invest and grow sustainably."

An effective RRT rate of 40 percent entails a formal RRT equal to 51.3 percent. The overall effective marginal tax rate is 62 percent when corporate tax is included (the Ministry of Finance, 2022). Such a burden poses challenges by limiting the funds available for reinvestments, research and development (R&D), production improvements, and expansion. This reduction in financial resources could hinder investments in sustainable practices, impede the modernization of the industry, and ultimately undermine its long-term economic viability (Arnason & Bjørndal, 2020). Moreover, a high tax burden can discourage potential investors from entering the aquaculture industry or prompt existing companies to consider relocating to regions with more favorable tax legislation. The prospect of more favorable tax environments in other areas may outweigh the benefits of operating within the Norwegian jurisdiction, potentially losing investments and expertise (Arnason & Bjørndal, 2020).

7.5 Tax design

The analysis also reveals that the RRT can potentially incentivize certain behaviors within the aquaculture industry. For instance, aquaculture operators may be incentivized to manipulate production figures or engage in tax planning strategies to reduce their tax liability. This can create challenges in accurately assessing the economic rent generated by aquaculture activities, potentially undermining the effectiveness of the tax regime, and compromising its neutrality (Tveterås, 2023).

Industry consultation is paramount in designing the RRT in Norway's aquaculture industry. Engaging with industry stakeholders, including aquaculture companies and associations, provides valuable insights into the sector's specific needs and challenges. This input ensures that the RRT is effective and feasible and considers the industry's competitiveness, investment decisions, and overall growth. Industry consultation fosters transparency, credibility, and stakeholder ownership, resulting in a well-informed and tailored RRT that captures economic rent while minimizing unintended consequences.

8. Conclusion

The research aimed to identify how the suggested resource rent tax will affect investment incentives in the aquaculture industry. The derived research question was as follows:

"How does the suggested resource rent tax affect investment incentives in the aquaculture industry?"

In conclusion, this research has shed light on the potential effects of implementing a resource rent tax on investment incentives in the aquaculture industry. Through a comprehensive analysis of responses to the consultation letter and the net present value of three investment projects, it is evident that the introduction of the RRT has the potential to significantly alter investment incentives in the aquaculture sector.

The findings demonstrate the distortionary effect of the RRT, as 62 out of 108 of the analyzed scenarios in different investment projects would no longer be economically viable. This distortionary effect leads to lower returns and the possibility of rendering certain projects financially unviable. Furthermore, the RRT hampers investments in environmentally friendly technologies and poses challenges to local economic development and employment opportunities. The high tax burden associated with the RRT can impede sustainable industry growth and even incentivize companies to consider relocating. Additionally, the design of the tax system may promote undesirable behavior within the industry, further emphasizing the need for careful evaluation of the potential consequences and overall impact of the RRT on the aquaculture sector from multiple perspectives.

Moreover, this analysis highlights that the RRT would substantially impact investment incentives, even when considering a realistic Weighted Average Cost of Capital of 10%. This challenges earlier studies that suggested the RRT would not distort investment decisions based on a lower required return on investments. The presence of significant volatility in salmon prices further complicates investment decisions and introduces additional uncertainty.

To address these concerns and ensure a well-informed and effective RRT, industry consultation becomes crucial in the design of the tax system in the aquaculture sector. Engaging with industry stakeholders fosters a better understanding of the industry's specific needs and challenges, allowing for the development of a tailored RRT that captures economic rent while minimizing unintended consequences. Collaboration with aquaculture companies, associations, and other stakeholders fosters transparency, credibility, and stakeholder ownership, ultimately resulting in a more balanced and fair tax regime for the aquaculture industry in Norway.

While this thesis primarily focuses on investment decisions and economic implications in the industry, it is essential to acknowledge that a comprehensive analysis of potential environmental and socio-economic effects on Norwegian society was not conducted due to time and resource constraints. Future studies should explore these aspects in greater detail, investigating potential technical breakthroughs, long-term ecological effects, and alternative policy options to meet sustainability objectives.

Given the limitations of this research, it is important to note that there may be additional factors and dimensions influencing investment incentives that were not addressed. Moreover, the reliance on secondary data sources introduces inherent limitations in the quality and availability of the utilized data. Efforts have been made to ensure the reliability and validity of the collected data; however, caution should be exercised when interpreting the results.

To further advance our understanding of the effects of the RRT on investments in the aquaculture industry, comparative studies across different nations and regions could provide valuable insights, considering the diversity of legislative frameworks, economic situations, and cultural contexts. This thesis serves as a foundation for future research, inviting researchers, industry stakeholders, and policymakers to delve deeper into the complexities and dynamics of the RRT in the aquaculture industry and work toward the development of a more informed and effective tax regime that promotes sustainable growth, innovation, and long-term viability in the sector.

In conclusion, this research underscores the need for a comprehensive evaluation, stakeholder engagement, and ongoing analysis to ensure the successful implementation of the RRT in the aquaculture industry and its contribution to a prosperous and resilient economy.

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Appendix A – Closed facility

All figures in the appendix are created using data processed in Excel. Excel sheets are available upon request.

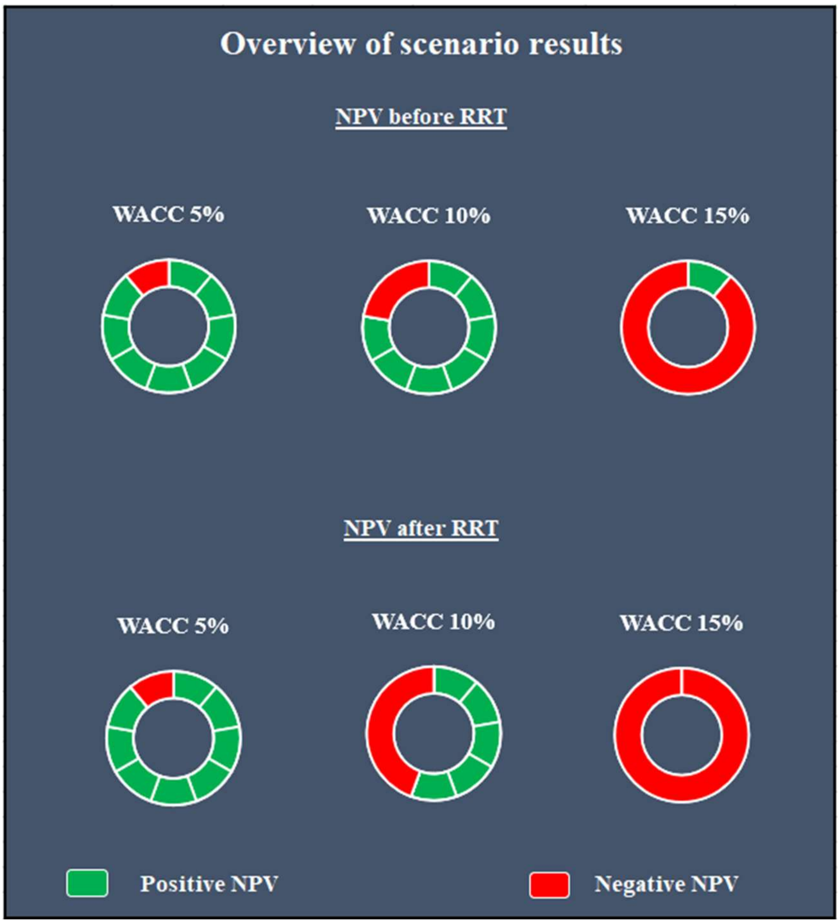
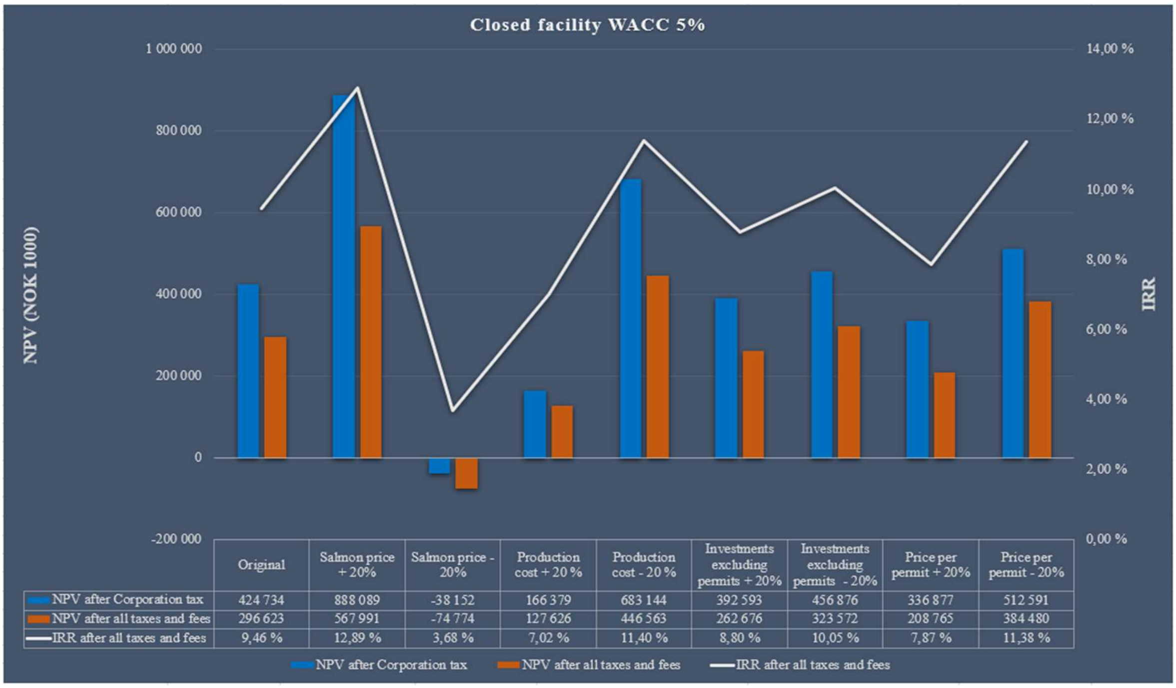
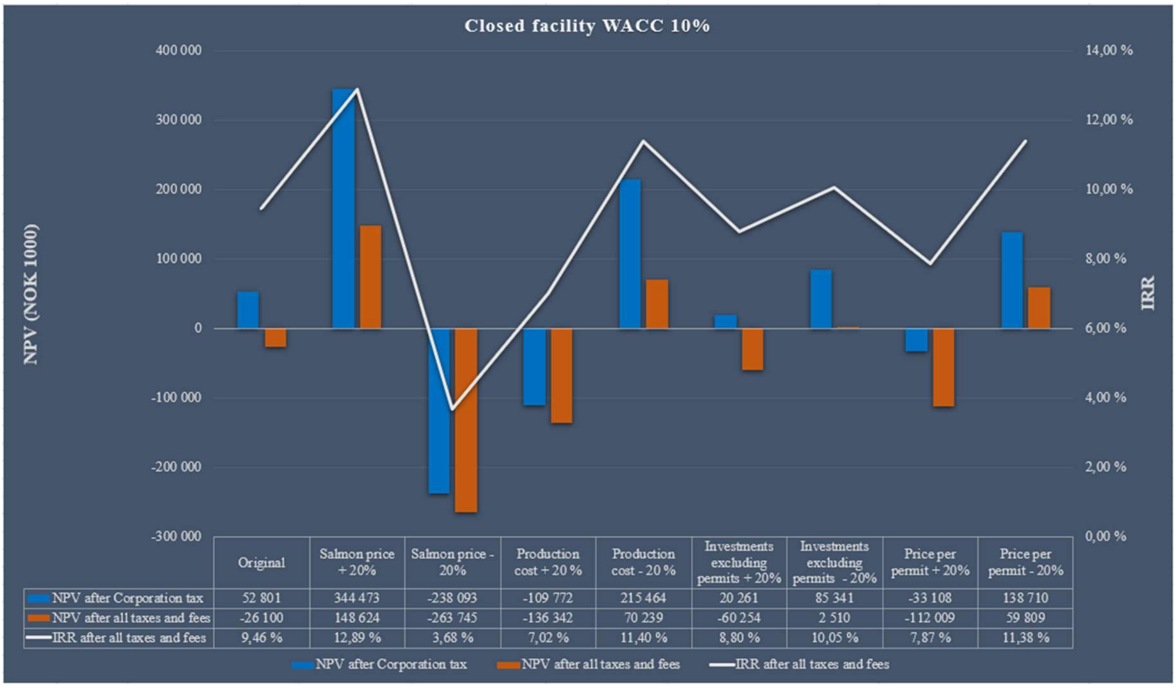


Figure 18: Overview of Scenario results before and after implementing RRT for the closed facility project. The green cells illustrate the scenarios with positive NPV results, and the red illustrates the scenarios with negative NPV results.



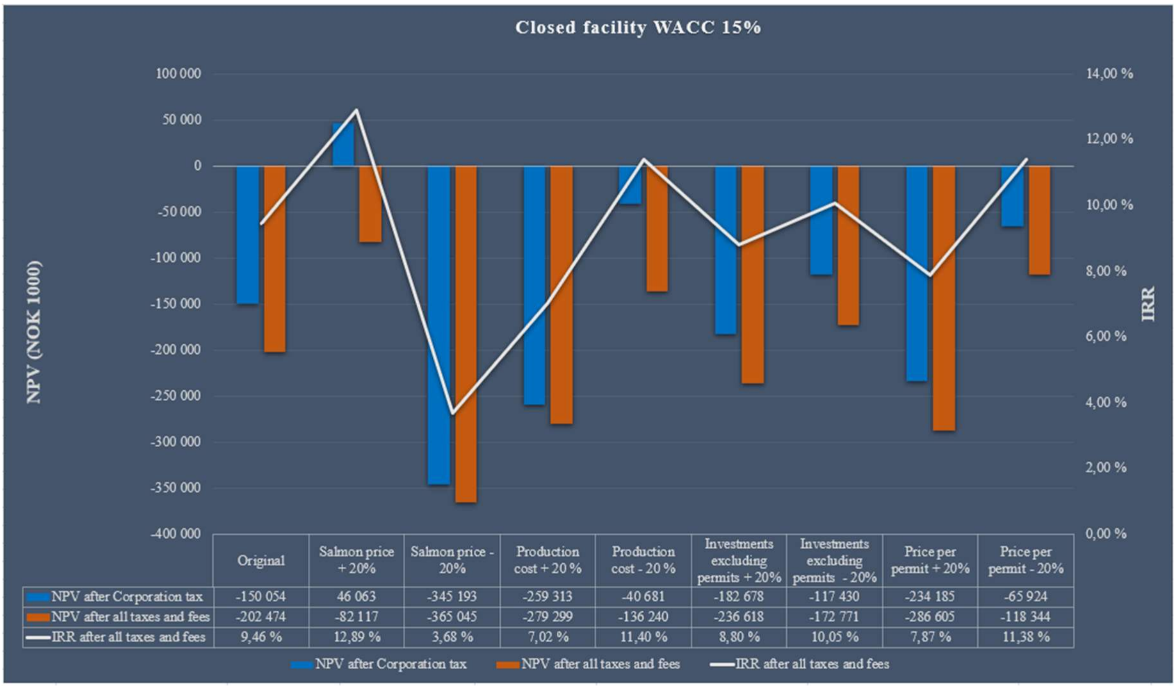
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	424 734	888 089	-38 152	166 379	683 144	392 593	456 876	336 877	512 591
NPV after all taxes and fees	296 623	567 991	-74 774	127 626	446 563	262 676	323 572	208 765	384 480
IRR after all taxes and fees	9,46 %	12,89 %	3,68 %	7,02 %	11,40 %	8,80 %	10,05 %	7,87 %	11,38 %

Figure 19: Scenario analysis (9 scenarios) for closed facility considering a WACC of 5%



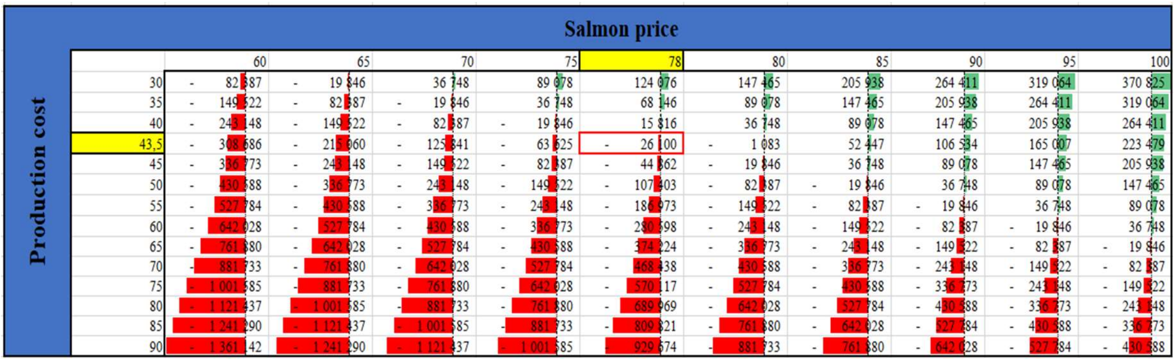
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	52 801	344 473	-238 093	-109 772	215 464	20 261	85 341	-33 108	138 710
NPV after all taxes and fees	-26 100	148 624	-263 745	-136 342	70 239	-60 254	2 510	-112 009	59 809
IRR after all taxes and fees	9,46 %	12,89 %	3,68 %	7,02 %	11,40 %	8,80 %	10,05 %	7,87 %	11,38 %

Figure 20: Scenario analysis (9 scenarios) for closed facility considering a WACC of 10%



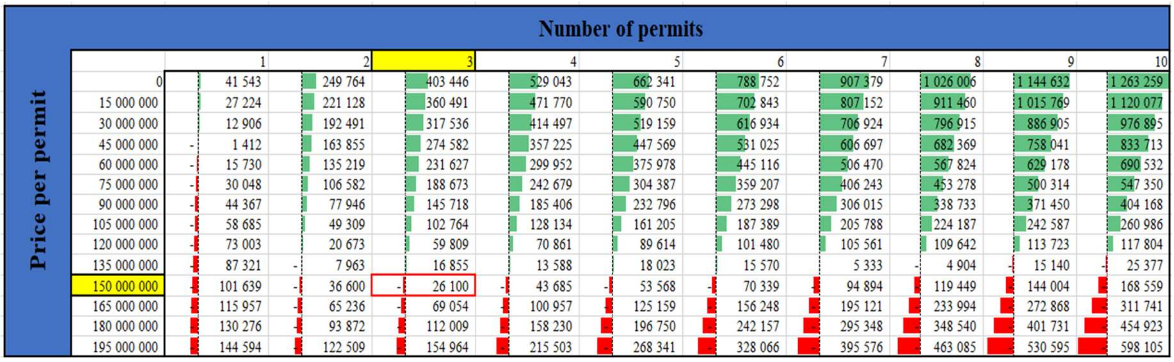
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	-150 054	46 063	-345 193	-259 313	-40 681	-182 678	-117 430	-234 185	-65 924
NPV after all taxes and fees	-202 474	-82 117	-365 045	-279 299	-136 240	-236 618	-172 771	-286 605	-118 344
IRR after all taxes and fees	9,46 %	12,89 %	3,68 %	7,02 %	11,40 %	8,80 %	10,05 %	7,87 %	11,38 %

Figure 21: Scenario analysis (9 scenarios) for closed facility considering a WACC of 15%



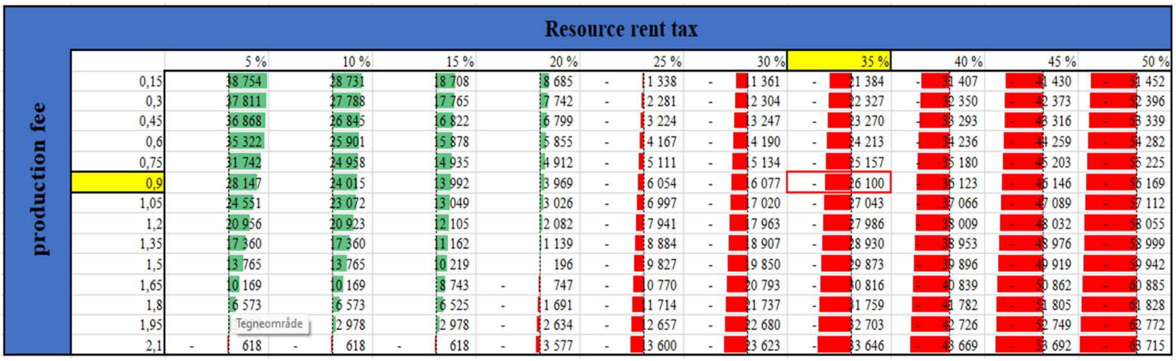
	Salmon price									
Production cost	60	65	70	75	78	80	85	90	95	100
30	- 82 887	- 19 846	36 748	89 078	124 076	147 465	205 938	264 411	319 064	370 825
35	- 149 522	- 82 887	- 19 846	36 748	68 146	89 078	147 465	205 938	264 411	319 064
40	- 243 148	- 149 522	- 82 887	- 19 846	15 816	36 748	89 078	147 465	205 938	264 411
43,5	- 308 686	- 215 060	- 125 841	- 63 625	- 26 100	- 1 083	52 447	106 534	165 007	223 479
45	- 336 773	- 243 148	- 149 522	- 82 887	- 44 862	- 19 846	36 748	89 078	147 465	205 938
50	- 430 588	- 336 773	- 243 148	- 149 522	- 107 403	- 82 887	- 19 846	36 748	89 078	147 465
55	- 527 784	- 430 588	- 336 773	- 243 148	- 186 973	- 149 522	- 82 887	- 19 846	36 748	89 078
60	- 642 028	- 527 784	- 430 588	- 336 773	- 280 598	- 243 148	- 149 522	- 82 887	- 19 846	36 748
65	- 761 880	- 642 028	- 527 784	- 430 588	- 374 224	- 336 773	- 243 148	- 149 522	- 82 887	- 19 846
70	- 881 733	- 761 880	- 642 028	- 527 784	- 468 438	- 430 588	- 336 773	- 243 148	- 149 522	- 82 887
75	- 1 001 585	- 881 733	- 761 880	- 642 028	- 570 117	- 527 784	- 430 588	- 336 773	- 243 148	- 149 522
80	- 1 121 437	- 1 001 585	- 881 733	- 761 880	- 689 969	- 642 028	- 527 784	- 430 588	- 336 773	- 243 148
85	- 1 241 290	- 1 121 437	- 1 001 585	- 881 733	- 809 821	- 761 880	- 642 028	- 527 784	- 430 588	- 336 773
90	- 1 361 142	- 1 241 290	- 1 121 437	- 1 001 585	- 929 674	- 881 733	- 761 880	- 642 028	- 527 784	- 430 588

Figure 22: Sensitivity analysis of salmon price and production cost, considering a WACC of 10 % for closed facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.



	Number of permits									
Price per permit	1	2	3	4	5	6	7	8	9	10
0	41 543	249 764	403 446	529 043	662 341	788 752	907 379	1 026 006	1 144 632	1 263 259
15 000 000	27 224	221 128	360 491	471 770	590 750	702 843	807 152	911 460	1 015 769	1 120 077
30 000 000	12 906	192 491	317 536	414 497	519 159	616 934	706 924	796 915	886 905	976 895
45 000 000	- 1 412	163 855	274 582	357 225	447 569	531 025	606 697	682 369	758 041	833 713
60 000 000	- 15 730	135 219	231 627	299 952	375 978	445 116	506 470	567 824	629 178	690 532
75 000 000	- 30 048	106 582	188 673	242 679	304 387	359 207	406 243	453 278	500 314	547 350
90 000 000	- 44 367	77 946	145 718	185 406	232 796	273 298	306 015	338 733	371 450	404 168
105 000 000	- 58 685	49 309	102 764	128 134	161 205	187 389	205 788	224 187	242 587	260 986
120 000 000	- 73 003	20 673	59 809	70 861	89 614	101 480	105 561	109 642	113 723	117 804
135 000 000	- 87 321	- 7 963	16 855	13 588	18 023	15 570	5 333	- 4 904	- 15 140	- 25 377
150 000 000	- 101 639	- 36 600	- 26 100	- 43 685	- 53 568	- 70 339	- 94 894	- 119 449	- 144 004	- 168 559
165 000 000	- 115 957	- 65 236	- 69 054	- 100 957	- 125 159	- 156 248	- 195 121	- 233 994	- 272 868	- 311 741
180 000 000	- 130 276	- 93 872	- 112 009	- 158 230	- 196 750	- 242 157	- 295 348	- 348 540	- 401 731	- 454 923
195 000 000	- 144 594	- 122 509	- 154 964	- 215 503	- 268 341	- 328 066	- 395 576	- 463 085	- 530 595	- 598 105

Figure 23: Sensitivity analysis of number of permits and price per permit, considering a WACC of 10 % for closed facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

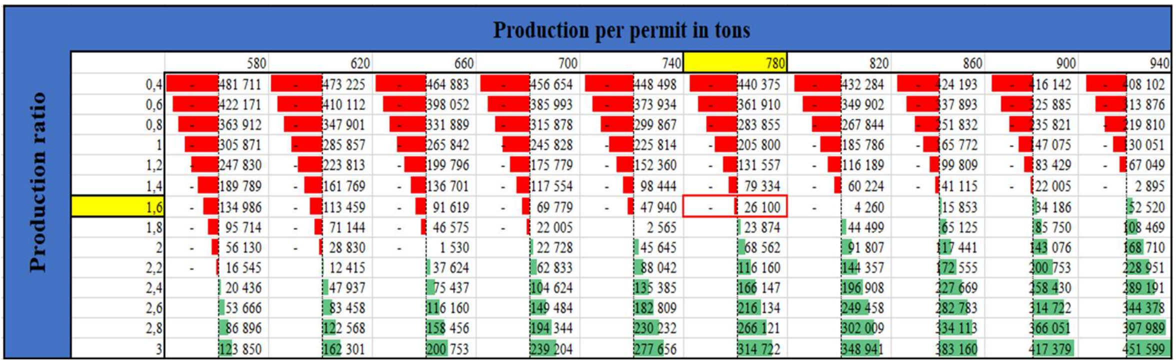


Resource rent tax

production fee

	5 %	10 %	15 %	20 %	25 %	30 %	35 %	40 %	45 %	50 %
0,15	38 754	28 731	18 708	8 685	- 1 338	- 11 361	- 21 384	- 31 407	- 41 430	- 51 452
0,3	37 811	27 788	17 765	7 742	- 2 281	- 12 304	- 22 327	- 32 350	- 42 373	- 52 396
0,45	36 868	26 845	16 822	6 799	- 3 224	- 13 247	- 23 270	- 33 293	- 43 316	- 53 339
0,6	35 322	25 901	15 878	5 855	- 4 167	- 14 190	- 24 213	- 34 236	- 44 259	- 54 282
0,75	31 742	24 958	14 935	4 912	- 5 111	- 15 134	- 25 157	- 35 180	- 45 203	- 55 225
0,9	28 147	24 015	13 992	3 969	- 6 054	- 16 077	- 26 100	- 36 123	- 46 146	- 56 169
1,05	24 551	23 072	13 049	3 026	- 6 997	- 17 020	- 27 043	- 37 066	- 47 089	- 57 112
1,2	20 956	20 923	12 105	2 082	- 7 941	- 17 963	- 27 986	- 38 009	- 48 032	- 58 055
1,35	17 360	17 360	11 162	1 139	- 8 884	- 18 907	- 28 930	- 38 953	- 48 976	- 58 999
1,5	13 765	13 765	10 219	196	- 9 827	- 19 850	- 29 873	- 39 896	- 49 919	- 59 942
1,65	10 169	10 169	8 743	- 747	- 10 770	- 20 793	- 30 816	- 40 839	- 50 862	- 60 885
1,8	6 573	6 573	6 525	- 1 691	- 11 714	- 21 737	- 31 759	- 41 782	- 51 805	- 61 828
1,95	Tegneområde	2 978	2 978	- 2 634	- 12 657	- 22 680	- 32 703	- 42 726	- 52 749	- 62 772
2,1	- 618	- 618	- 618	- 3 577	- 13 600	- 23 623	- 33 646	- 43 669	- 53 692	- 63 715

Figure 24: Sensitivity analysis of resource rent tax and production fee, considering a WACC of 10 % for closed facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.



Production per permit in tons

Production ratio

	580	620	660	700	740	780	820	860	900	940
0,4	- 481 711	- 473 225	- 464 883	- 456 654	- 448 498	- 440 375	- 432 284	- 424 193	- 416 142	- 408 102
0,6	- 422 171	- 410 112	- 398 052	- 385 993	- 373 934	- 361 910	- 349 902	- 337 893	- 325 885	- 313 876
0,8	- 363 912	- 347 901	- 331 889	- 315 878	- 299 867	- 283 855	- 267 844	- 251 832	- 235 821	- 219 810
1	- 305 871	- 285 857	- 265 842	- 245 828	- 225 814	- 205 800	- 185 786	- 165 772	- 147 075	- 130 051
1,2	- 247 830	- 223 813	- 199 796	- 175 779	- 152 360	- 131 557	- 116 189	- 99 809	- 83 429	- 67 049
1,4	- 189 789	- 161 769	- 136 701	- 117 554	- 98 444	- 79 334	- 60 224	- 41 115	- 22 005	- 2 895
1,6	- 134 986	- 113 459	- 91 619	- 69 779	- 47 940	- 26 100	- 4 260	15 853	34 186	52 520
1,8	- 95 714	- 71 144	- 46 575	- 22 005	2 565	23 874	44 499	65 125	85 750	108 469
2	- 56 130	- 28 830	- 1 530	22 728	45 645	68 562	91 807	117 441	143 076	168 710
2,2	- 16 545	12 415	37 624	62 833	88 042	116 160	144 357	172 555	200 753	228 951
2,4	20 436	47 937	75 437	104 624	135 385	166 147	196 908	227 669	258 430	289 191
2,6	53 666	83 458	116 160	149 484	182 809	216 134	249 458	282 783	314 722	344 378
2,8	86 896	122 568	158 456	194 344	230 232	266 121	302 009	334 113	366 051	397 989
3	123 850	162 301	200 753	239 204	277 656	314 722	348 941	383 160	417 379	451 599

Figure 25: Sensitivity analysis of production per permit and production ratio, considering a WACC of 10 % for closed facility. The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

Appendix B: Offshore facility (permits included)

All figures in the appendix are created using data processed in Excel. Excel sheets are available upon request.

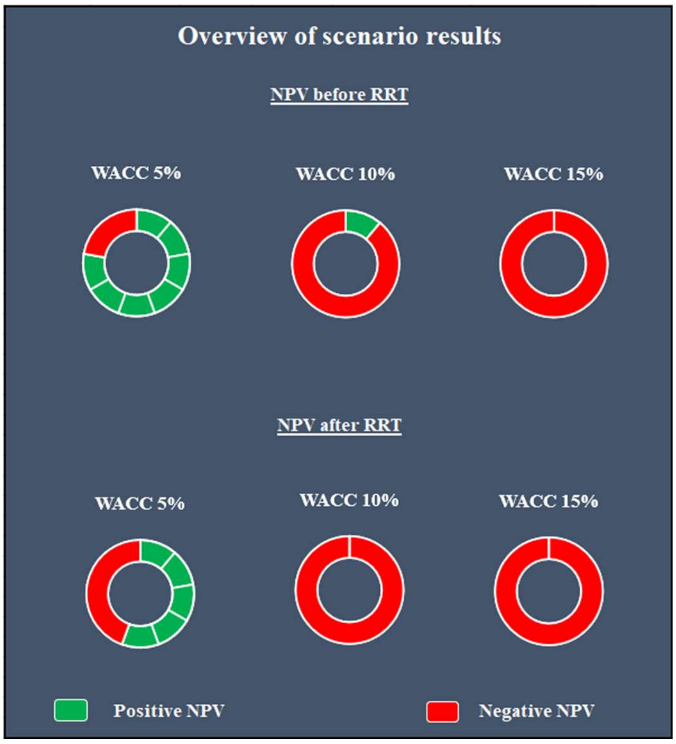
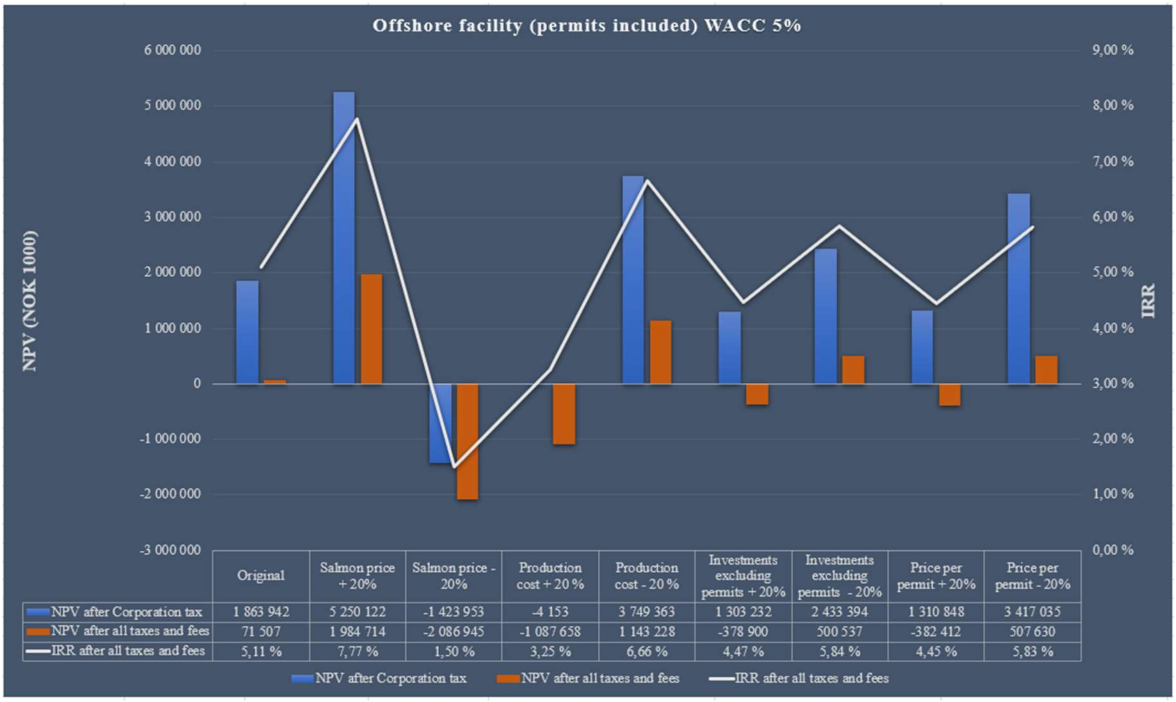
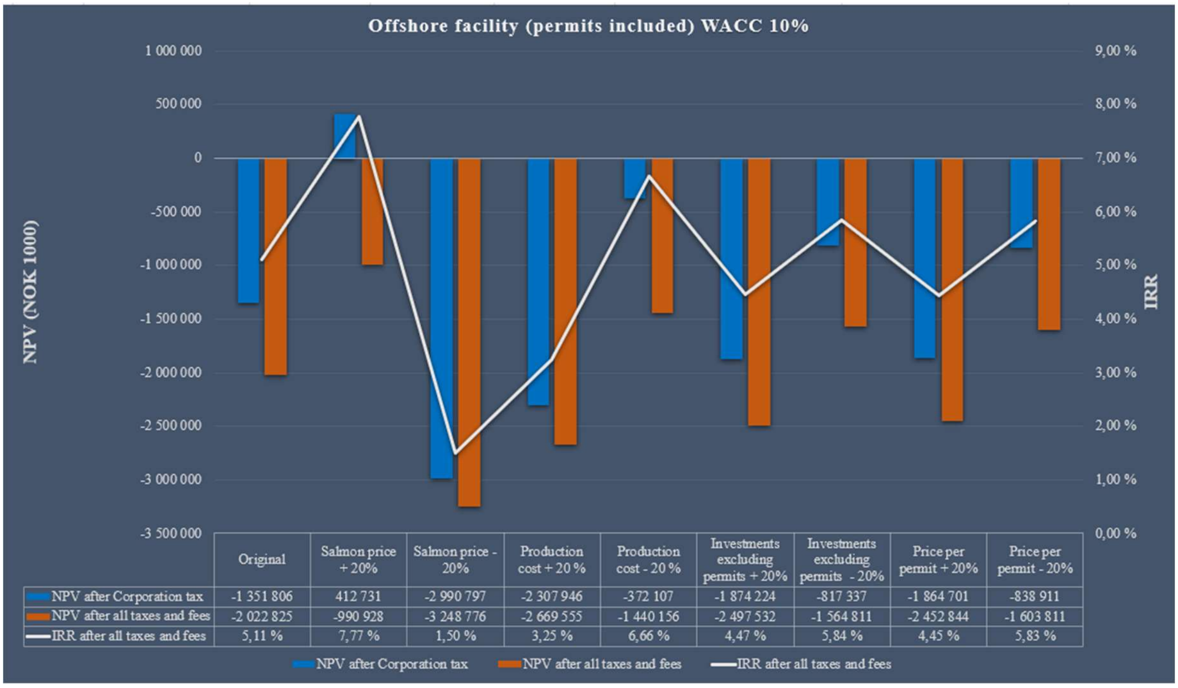


Figure 26: Overview of Scenario results before and after implementing RRT for the Offshore facility (permits included) project. The green cells illustrate the scenarios with positive NPV results, and the red illustrates the scenarios with negative NPV results.



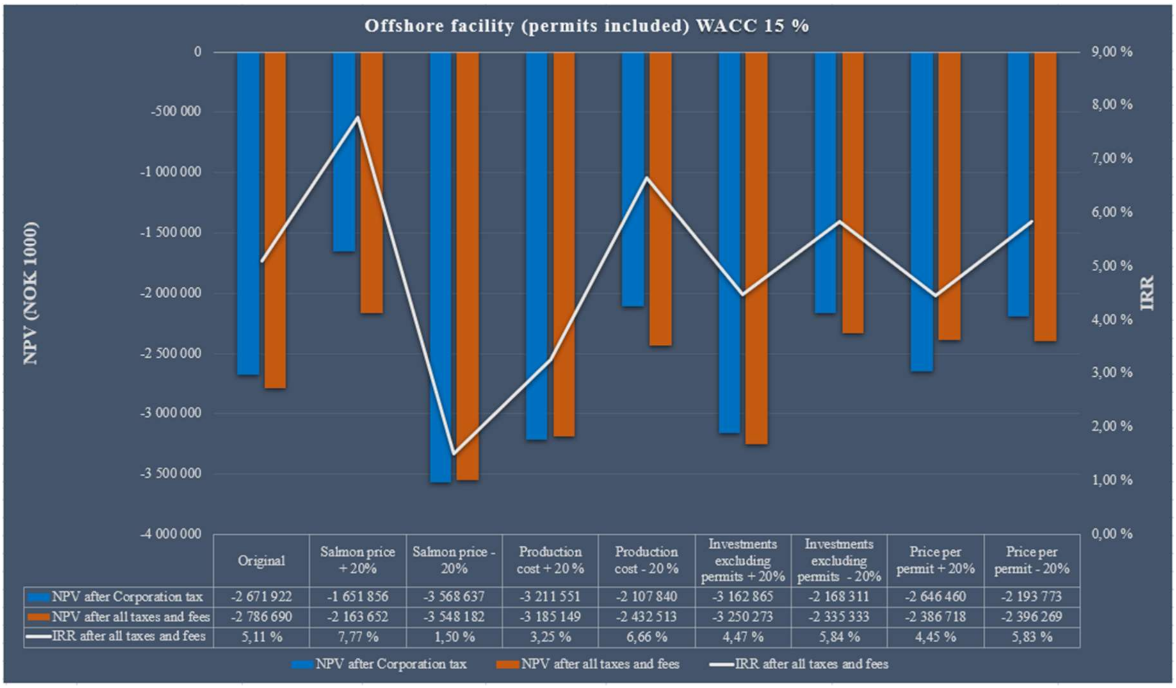
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	1 863 942	5 250 122	-1 423 953	-4 153	3 749 363	1 303 232	2 433 394	1 310 848	3 417 035
NPV after all taxes and fees	71 507	1 984 714	-2 086 945	-1 087 658	1 143 228	-378 900	500 537	-382 412	507 630
IRR after all taxes and fees	5,11 %	7,77 %	1,50 %	3,25 %	6,66 %	4,47 %	5,84 %	4,45 %	5,83 %

Figure 27: Scenario analysis (9 scenarios) for offshore facility (permits included) considering a WACC of 5%



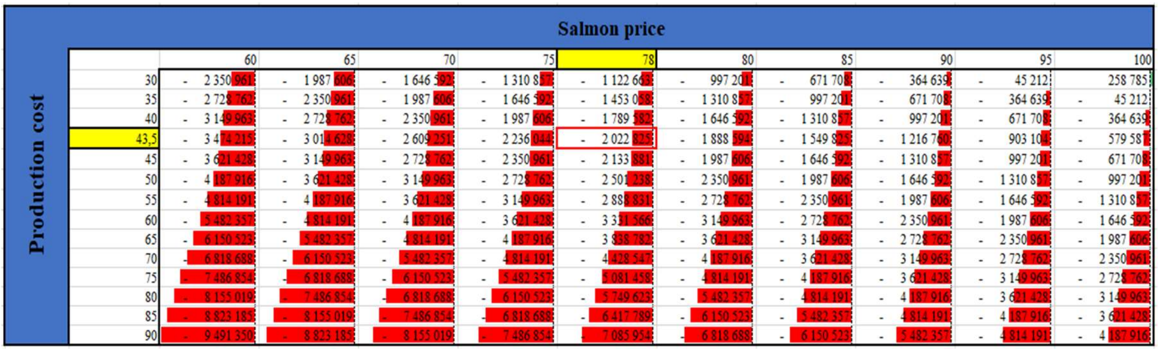
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	-1 351 806	412 731	-2 990 797	-2 307 946	-372 107	-1 874 224	-817 337	-1 864 701	-838 911
NPV after all taxes and fees	-2 022 825	-990 928	-3 248 776	-2 669 555	-1 440 156	-2 497 532	-1 564 811	-2 452 844	-1 603 811
IRR after all taxes and fees	5,11 %	7,77 %	1,50 %	3,25 %	6,66 %	4,47 %	5,84 %	4,45 %	5,83 %

Figure 28: Scenario analysis (9 scenarios) for offshore facility (permits included) considering a WACC of 10%



	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments excluding permits + 20%	Investments excluding permits - 20%	Price per permit + 20%	Price per permit - 20%
NPV after Corporation tax	-2 671 922	-1 651 856	-3 568 637	-3 211 551	-2 107 840	-3 162 865	-2 168 311	-2 646 460	-2 193 773
NPV after all taxes and fees	-2 786 690	-2 163 652	-3 548 182	-3 185 149	-2 432 513	-3 250 273	-2 335 333	-2 386 718	-2 396 269
IRR after all taxes and fees	5,11 %	7,77 %	1,50 %	3,25 %	6,66 %	4,47 %	5,84 %	4,45 %	5,83 %

Figure 29: Scenario analysis (9 scenarios) for offshore facility (permits included) considering a WACC of 15%

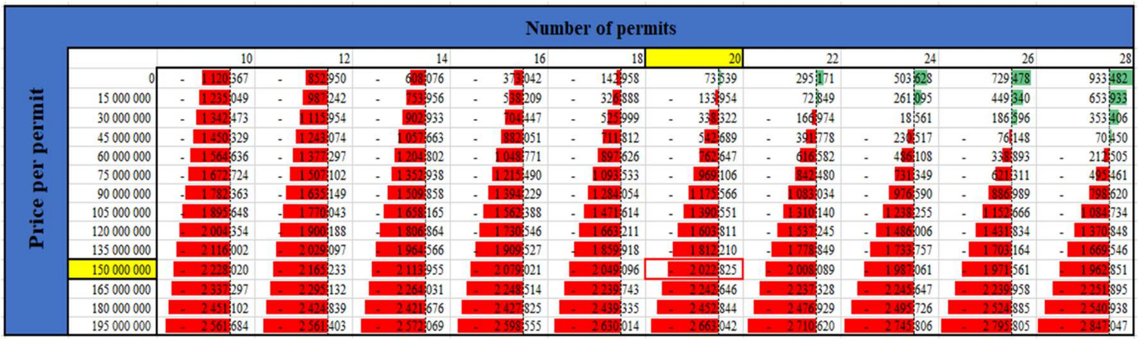


Salmon price

Production cost

	60	65	70	75	78	80	85	90	95	100
30	- 2 350 961	- 1 987 606	- 1 646 592	- 1 310 857	- 1 122 663	- 997 201	- 671 708	- 364 639	- 45 212	258 785
35	- 2 728 762	- 2 350 961	- 1 987 606	- 1 646 592	- 1 453 058	- 1 310 857	- 997 201	- 671 708	- 364 639	- 45 212
40	- 3 149 963	- 2 728 762	- 2 350 961	- 1 987 606	- 1 789 582	- 1 646 592	- 1 310 857	- 997 201	- 671 708	- 364 639
43,5	- 3 474 215	- 3 014 628	- 2 609 251	- 2 236 044	- 2 022 825	- 1 888 594	- 1 549 825	- 1 216 760	- 903 104	- 579 587
45	- 3 621 428	- 3 149 963	- 2 728 762	- 2 350 961	- 2 133 881	- 1 987 606	- 1 646 592	- 1 310 857	- 997 201	- 671 708
50	- 4 187 916	- 3 621 428	- 3 149 963	- 2 728 762	- 2 501 238	- 2 350 961	- 1 987 606	- 1 646 592	- 1 310 857	- 997 201
55	- 4 814 191	- 4 187 916	- 3 621 428	- 3 149 963	- 2 888 831	- 2 728 762	- 2 350 961	- 1 987 606	- 1 646 592	- 1 310 857
60	- 5 482 357	- 4 814 191	- 4 187 916	- 3 621 428	- 3 331 566	- 3 149 963	- 2 728 762	- 2 350 961	- 1 987 606	- 1 646 592
65	- 6 150 523	- 5 482 357	- 4 814 191	- 4 187 916	- 3 838 782	- 3 621 428	- 3 149 963	- 2 728 762	- 2 350 961	- 1 987 606
70	- 6 818 688	- 6 150 523	- 5 482 357	- 4 814 191	- 4 428 547	- 4 187 916	- 3 621 428	- 3 149 963	- 2 728 762	- 2 350 961
75	- 7 486 854	- 6 818 688	- 6 150 523	- 5 482 357	- 5 081 458	- 4 814 191	- 4 187 916	- 3 621 428	- 3 149 963	- 2 728 762
80	- 8 155 019	- 7 486 854	- 6 818 688	- 6 150 523	- 5 749 623	- 5 482 357	- 4 814 191	- 4 187 916	- 3 621 428	- 3 149 963
85	- 8 823 185	- 8 155 019	- 7 486 854	- 6 818 688	- 6 417 789	- 6 150 523	- 5 482 357	- 4 814 191	- 4 187 916	- 3 621 428
90	- 9 491 350	- 8 823 185	- 8 155 019	- 7 486 854	- 7 085 954	- 6 818 688	- 6 150 523	- 5 482 357	- 4 814 191	- 4 187 916

Figure 30: Sensitivity analysis of salmon price and production cost, considering a WACC of 10 % for offshore facility (permits included). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.



Number of permits

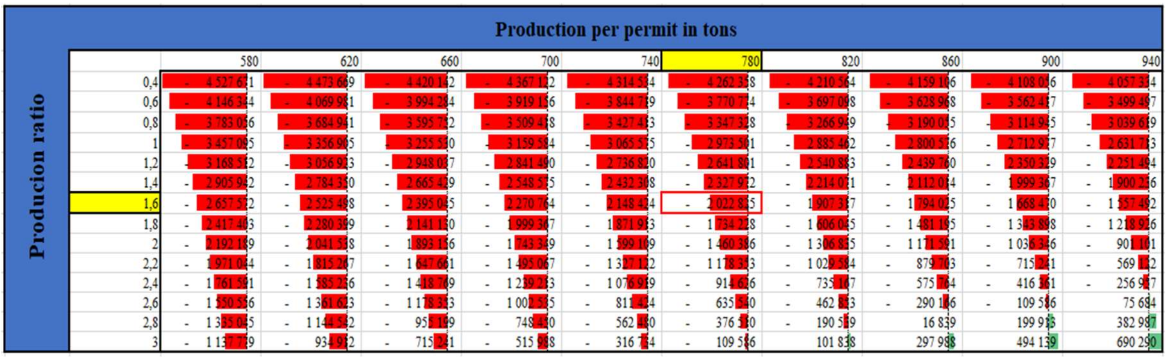
Price per permit

	10	12	14	16	18	20	22	24	26	28
0	- 1 120 367	- 852 950	- 608 076	- 373 042	- 142 958	73 539	295 171	503 628	729 478	933 482
15 000 000	- 1 235 049	- 987 242	- 753 956	- 538 209	- 326 888	- 133 954	72 849	261 095	449 340	653 933
30 000 000	- 1 342 473	- 1 115 954	- 902 933	- 704 447	- 525 999	- 338 322	- 166 974	18 561	186 596	353 406
45 000 000	- 1 450 329	- 1 243 074	- 1 057 663	- 882 051	- 711 812	- 542 689	- 391 778	- 230 517	- 76 148	70 450
60 000 000	- 1 564 636	- 1 377 297	- 1 204 802	- 1 048 771	- 897 626	- 762 647	- 616 582	- 486 108	- 338 893	- 212 505
75 000 000	- 1 672 724	- 1 507 102	- 1 352 938	- 1 215 490	- 1 093 533	- 969 106	- 842 480	- 731 349	- 621 311	- 495 461
90 000 000	- 1 782 363	- 1 635 149	- 1 509 858	- 1 394 229	- 1 284 054	- 1 175 566	- 1 083 034	- 976 590	- 886 989	- 798 620
105 000 000	- 1 895 648	- 1 770 043	- 1 658 165	- 1 562 388	- 1 471 614	- 1 390 551	- 1 310 140	- 1 238 255	- 1 152 666	- 1 084 734
120 000 000	- 2 004 354	- 1 900 188	- 1 806 864	- 1 730 546	- 1 663 211	- 1 603 811	- 1 537 245	- 1 486 006	- 1 431 834	- 1 370 848
135 000 000	- 2 116 002	- 2 029 097	- 1 964 566	- 1 909 527	- 1 859 918	- 1 812 210	- 1 778 849	- 1 733 757	- 1 703 164	- 1 669 546
150 000 000	- 2 228 020	- 2 165 233	- 2 113 955	- 2 079 021	- 2 049 096	- 2 022 825	- 2 008 089	- 1 987 061	- 1 971 561	- 1 962 851
165 000 000	- 2 337 297	- 2 295 132	- 2 264 031	- 2 248 514	- 2 239 743	- 2 242 646	- 2 237 328	- 2 245 647	- 2 239 958	- 2 251 895
180 000 000	- 2 451 102	- 2 424 839	- 2 421 676	- 2 427 825	- 2 439 335	- 2 452 844	- 2 476 929	- 2 495 726	- 2 524 885	- 2 540 938
195 000 000	- 2 561 684	- 2 561 403	- 2 572 069	- 2 598 555	- 2 630 014	- 2 663 042	- 2 710 620	- 2 745 806	- 2 795 805	- 2 847 047

Figure 31: Sensitivity analysis of number of permits and price per permit, considering a WACC of 10 % for offshore facility (permits included). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

Production fee	Resource rent tax 5 %	10 %	15 %	20 %	25 %	30 %	35 %	40 %	45 %	50 %
0,15	- 1 484 101	- 1 563 683	- 1 643 723	- 1 723 763	- 1 803 802	- 1 883 842	- 1 963 882	- 2 043 922	- 2 123 961	- 2 204 001
0,3	- 1 496 432	- 1 575 943	- 1 655 455	- 1 735 108	- 1 815 148	- 1 895 188	- 1 975 227	- 2 055 267	- 2 135 307	- 2 215 347
0,45	- 1 508 764	- 1 588 275	- 1 667 786	- 1 747 297	- 1 826 808	- 1 906 533	- 1 986 573	- 2 066 613	- 2 146 652	- 2 226 692
0,6	- 1 521 095	- 1 600 606	- 1 680 118	- 1 759 629	- 1 839 140	- 1 918 651	- 1 998 162	- 2 077 958	- 2 157 998	- 2 238 038
0,75	- 1 533 427	- 1 612 938	- 1 692 449	- 1 771 960	- 1 851 471	- 1 930 983	- 2 010 494	- 2 090 005	- 2 169 516	- 2 249 383
0,9	- 1 545 758	- 1 625 269	- 1 704 780	- 1 784 292	- 1 863 803	- 1 943 314	- 2 022 825	- 2 102 336	- 2 181 847	- 2 261 359
1,05	- 1 558 090	- 1 637 601	- 1 717 112	- 1 796 623	- 1 876 134	- 1 955 645	- 2 035 157	- 2 114 668	- 2 194 179	- 2 273 690
1,2	- 1 570 421	- 1 649 932	- 1 729 443	- 1 808 955	- 1 888 466	- 1 967 977	- 2 047 488	- 2 126 999	- 2 206 510	- 2 286 022
1,35	- 1 582 753	- 1 662 264	- 1 741 775	- 1 821 286	- 1 900 797	- 1 980 308	- 2 059 820	- 2 139 331	- 2 218 842	- 2 298 353
1,5	- 1 595 084	- 1 674 595	- 1 754 106	- 1 833 618	- 1 913 129	- 1 992 640	- 2 072 151	- 2 151 662	- 2 231 173	- 2 310 685
1,65	- 1 612 753	- 1 686 927	- 1 766 438	- 1 845 949	- 1 925 460	- 2 004 971	- 2 084 483	- 2 163 994	- 2 243 505	- 2 323 016
1,8	- 1 632 798	- 1 699 258	- 1 778 769	- 1 858 281	- 1 937 792	- 2 017 303	- 2 096 814	- 2 176 325	- 2 255 836	- 2 335 348
1,95	- 1 652 843	- 1 711 590	- 1 791 101	- 1 870 612	- 1 950 123	- 2 029 634	- 2 109 145	- 2 188 657	- 2 268 168	- 2 347 679
2,1	- 1 672 888	- 1 723 921	- 1 803 432	- 1 882 943	- 1 962 455	- 2 041 966	- 2 121 477	- 2 200 988	- 2 280 499	- 2 360 010

Figure 32: Sensitivity analysis of resource rent tax and production fee, considering a WACC of 10 % for offshore facility (permits included). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.



Producion ratio	Production per permit in tons 580	620	660	700	740	780	820	860	900	940
0,4	- 4 527 671	- 4 473 669	- 4 420 142	- 4 367 122	- 4 314 534	- 4 262 358	- 4 210 564	- 4 159 106	- 4 108 036	- 4 057 334
0,6	- 4 146 344	- 4 069 981	- 3 994 284	- 3 919 136	- 3 844 719	- 3 770 714	- 3 697 098	- 3 628 968	- 3 562 417	- 3 499 497
0,8	- 3 783 036	- 3 684 941	- 3 595 712	- 3 509 418	- 3 427 413	- 3 347 318	- 3 266 949	- 3 190 015	- 3 114 945	- 3 039 619
1	- 3 457 095	- 3 356 905	- 3 255 530	- 3 159 584	- 3 065 515	- 2 973 501	- 2 885 462	- 2 800 516	- 2 712 917	- 2 631 713
1,2	- 3 168 512	- 3 056 913	- 2 948 037	- 2 841 490	- 2 736 820	- 2 641 801	- 2 540 883	- 2 439 760	- 2 350 319	- 2 251 494
1,4	- 2 905 942	- 2 784 350	- 2 665 419	- 2 548 515	- 2 432 308	- 2 327 912	- 2 214 011	- 2 112 014	- 1 999 367	- 1 900 236
1,6	- 2 657 512	- 2 525 498	- 2 395 045	- 2 270 764	- 2 148 424	- 2 022 825	- 1 907 317	- 1 794 025	- 1 668 410	- 1 557 492
1,8	- 2 417 403	- 2 280 399	- 2 141 130	- 1 999 367	- 1 871 913	- 1 734 228	- 1 606 045	- 1 481 195	- 1 343 898	- 1 218 926
2	- 2 192 189	- 2 041 518	- 1 893 156	- 1 743 349	- 1 599 109	- 1 460 386	- 1 306 815	- 1 171 591	- 1 036 346	- 901 101
2,2	- 1 971 044	- 1 815 207	- 1 647 661	- 1 495 067	- 1 327 122	- 1 178 313	- 1 029 584	- 879 703	- 715 241	- 569 122
2,4	- 1 761 591	- 1 585 236	- 1 418 769	- 1 239 213	- 1 076 919	- 914 626	- 735 167	- 575 764	- 416 361	- 256 917
2,6	- 1 550 556	- 1 361 623	- 1 178 313	- 1 002 515	- 811 424	- 635 540	- 462 813	- 290 166	- 109 586	75 684
2,8	- 1 335 045	- 1 144 542	- 955 199	- 748 410	- 562 480	- 376 510	- 190 519	16 839	199 913	382 987
3	- 1 137 729	- 934 912	- 715 241	- 515 988	- 316 714	- 109 586	101 838	297 988	494 139	690 290

Figure 33: Sensitivity analysis of production per permit and production ratio, considering a WACC of 10 % for offshore facility (permits included). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

Appendix C: Offshore facility (permits excluded)

All figures in the appendix are created using data processed in Excel. Excel sheets are available upon request.

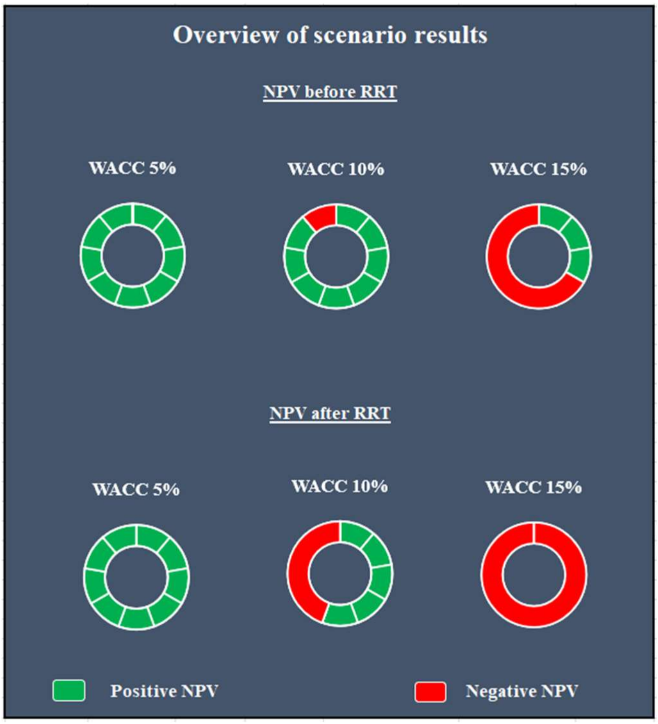
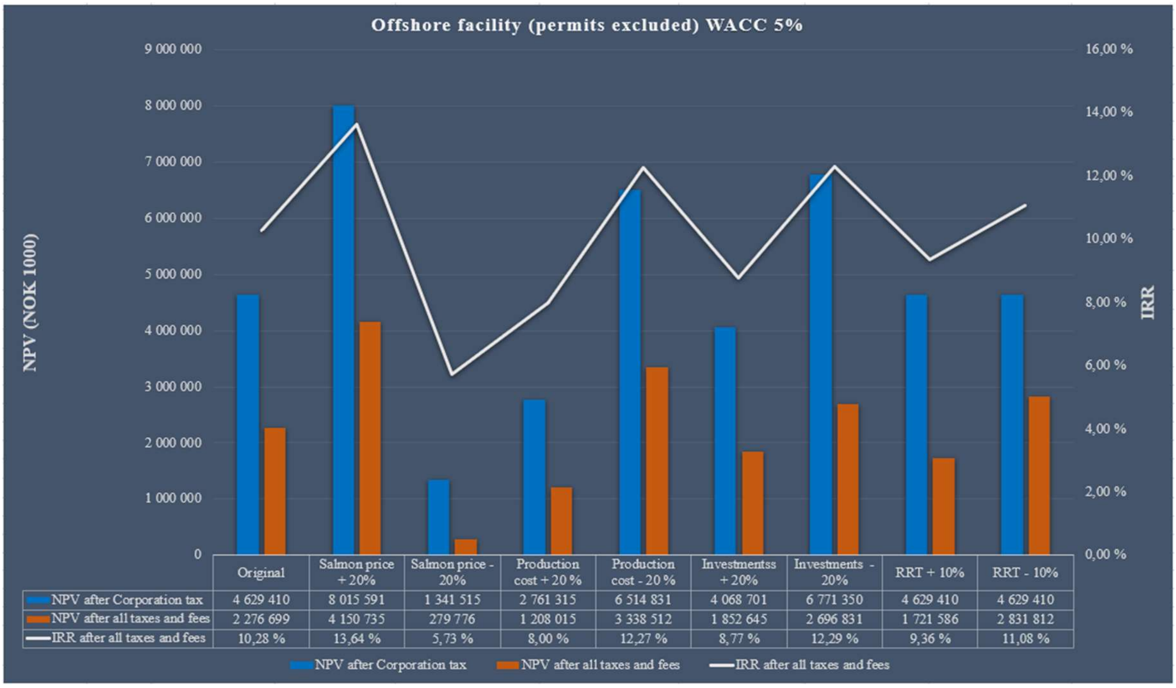
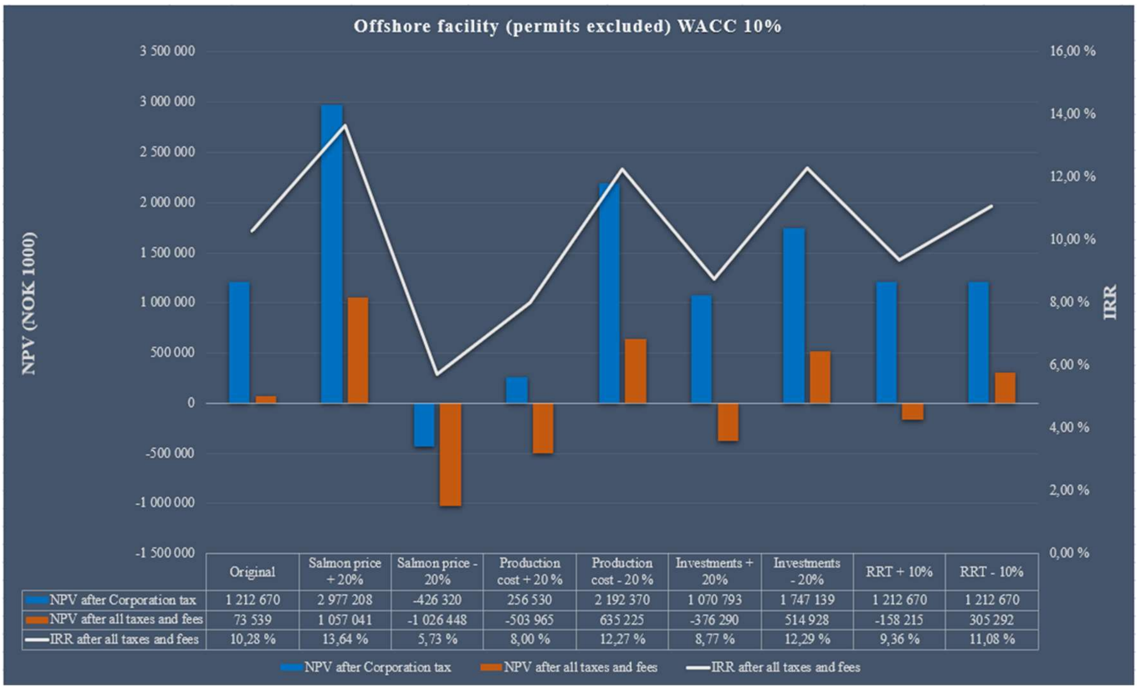


Figure 34: Overview of Scenario results before and after implementing RRT for the Offshore facility (permits excluded) project. The green cells illustrate the scenarios with positive NPV results, and the red illustrates the scenarios with negative NPV results.



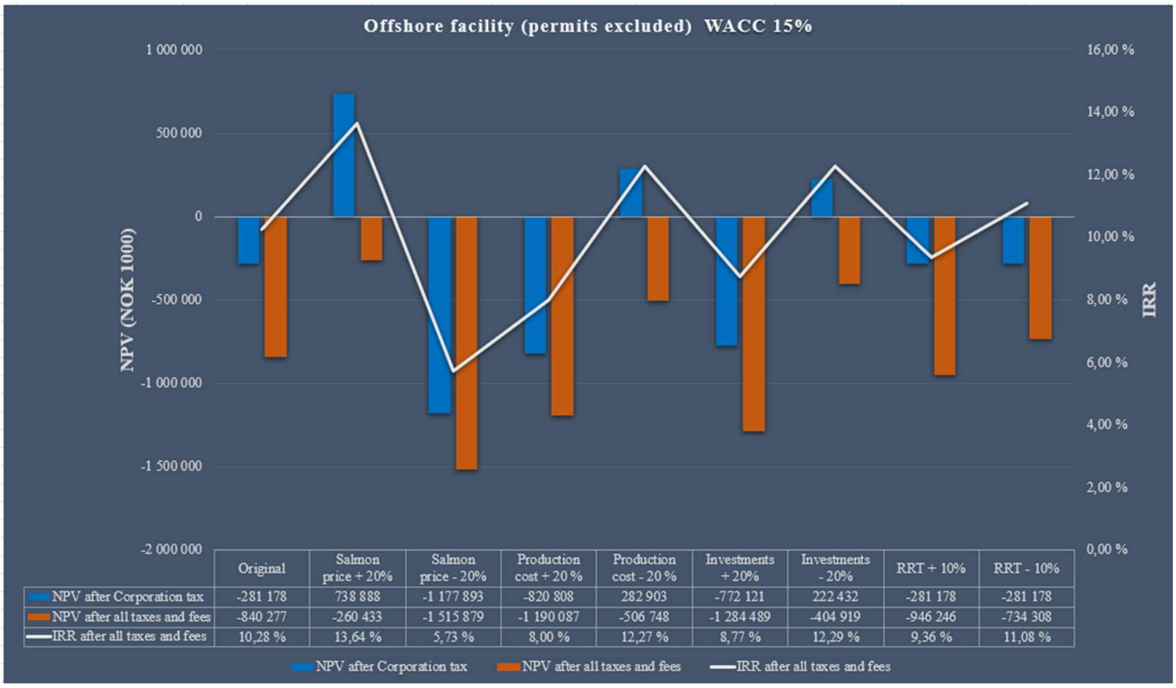
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investmentss + 20%	Investments - 20%	RRT + 10%	RRT - 10%
NPV after Corporation tax	4 629 410	8 015 591	1 341 515	2 761 315	6 514 831	4 068 701	6 771 350	4 629 410	4 629 410
NPV after all taxes and fees	2 276 699	4 150 735	279 776	1 208 015	3 338 512	1 852 645	2 696 831	1 721 586	2 831 812
IRR after all taxes and fees	10,28 %	13,64 %	5,73 %	8,00 %	12,27 %	8,77 %	12,29 %	9,36 %	11,08 %

Figure 35: Scenario analysis (9 scenarios) for offshore facility (permits excluded) considering a WACC of 5%



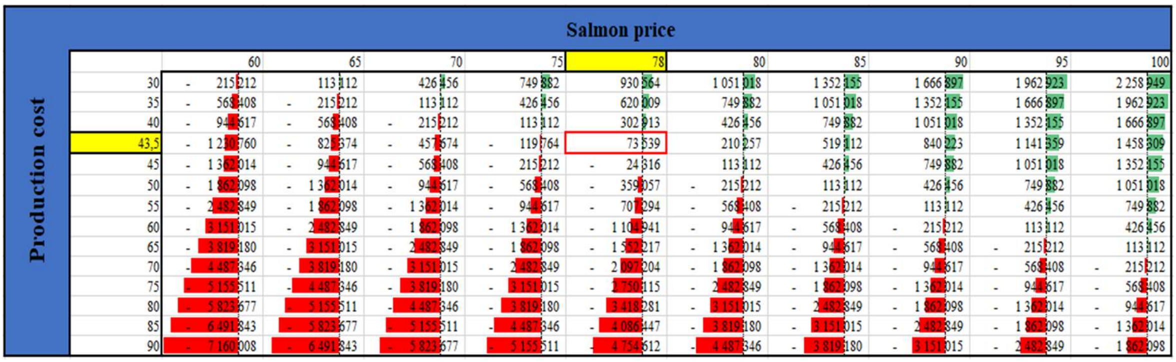
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments + 20%	Investments - 20%	RRT + 10%	RRT - 10%
NPV after Corporation tax	1 212 670	2 977 208	-426 320	256 530	2 192 370	1 070 793	1 747 139	1 212 670	1 212 670
NPV after all taxes and fees	73 539	1 057 041	-1 026 448	-503 965	635 225	-376 290	514 928	-158 215	305 292
IRR after all taxes and fees	10,28 %	13,64 %	5,73 %	8,00 %	12,27 %	8,77 %	12,29 %	9,36 %	11,08 %

Figure 36: Scenario analysis (9 scenarios) for offshore facility (permits excluded) considering a WACC of 10%



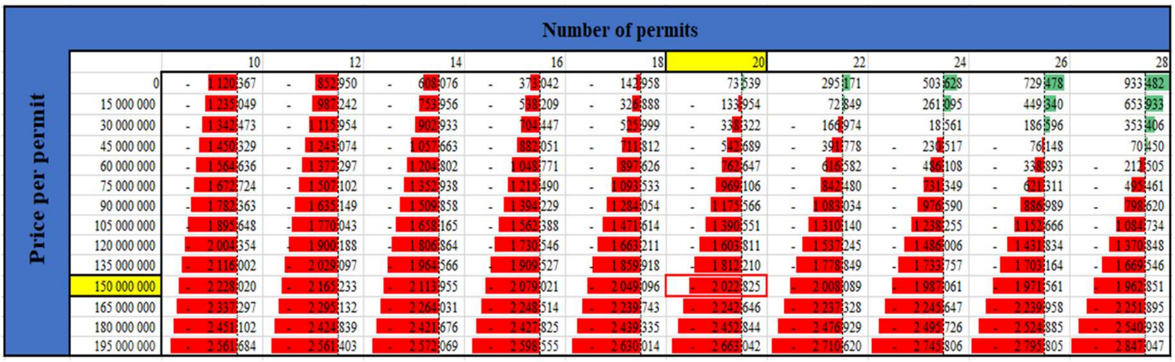
	Original	Salmon price + 20%	Salmon price - 20%	Production cost + 20 %	Production cost - 20 %	Investments + 20%	Investments - 20%	RRT + 10%	RRT - 10%
NPV after Corporation tax	-281 178	738 888	-1 177 893	-820 808	282 903	-772 121	222 432	-281 178	-281 178
NPV after all taxes and fees	-840 277	-260 433	-1 515 879	-1 190 087	-506 748	-1 284 489	-404 919	-946 246	-734 308
IRR after all taxes and fees	10,28 %	13,64 %	5,73 %	8,00 %	12,27 %	8,77 %	12,29 %	9,36 %	11,08 %

Figure 37: Scenario analysis (9 scenarios) for offshore facility (permits excluded) considering a WACC of 15%



Production cost	Salmon price								
	60	65	70	75	78	80	85	90	95	100
30	- 215 212	113 112	426 456	749 882	930 564	1 051 018	1 352 155	1 666 897	1 962 923	2 258 949
35	- 568 408	- 215 212	113 112	426 456	620 009	749 882	1 051 018	1 352 155	1 666 897	1 962 923
40	- 944 617	- 568 408	- 215 212	113 112	302 913	426 456	749 882	1 051 018	1 352 155	1 666 897
43,5	- 1 230 760	- 825 374	- 457 674	- 119 764	73 539	210 257	519 112	840 223	1 141 359	1 458 309
45	- 1 362 014	- 944 617	- 568 408	- 215 212	- 24 316	113 112	426 456	749 882	1 051 018	1 352 155
50	- 1 862 098	- 1 362 014	- 944 617	- 568 408	- 359 057	- 215 212	113 112	426 456	749 882	1 051 018
55	- 2 482 849	- 1 862 098	- 1 362 014	- 944 617	- 707 294	- 568 408	- 215 212	113 112	426 456	749 882
60	- 3 151 015	- 2 482 849	- 1 862 098	- 1 362 014	- 1 104 941	- 944 617	- 568 408	- 215 212	113 112	426 456
65	- 3 819 180	- 3 151 015	- 2 482 849	- 1 862 098	- 1 552 217	- 1 362 014	- 944 617	- 568 408	- 215 212	113 112
70	- 4 487 346	- 3 819 180	- 3 151 015	- 2 482 849	- 2 097 204	- 1 862 098	- 1 362 014	- 944 617	- 568 408	- 215 212
75	- 5 155 511	- 4 487 346	- 3 819 180	- 3 151 015	- 2 750 115	- 2 482 849	- 1 862 098	- 1 362 014	- 944 617	- 568 408
80	- 5 823 677	- 5 155 511	- 4 487 346	- 3 819 180	- 3 418 281	- 3 151 015	- 2 482 849	- 1 862 098	- 1 362 014	- 944 617
85	- 6 491 843	- 5 823 677	- 5 155 511	- 4 487 346	- 4 086 447	- 3 819 180	- 3 151 015	- 2 482 849	- 1 862 098	- 1 362 014
90	- 7 160 008	- 6 491 843	- 5 823 677	- 5 155 511	- 4 754 612	- 4 487 346	- 3 819 180	- 3 151 015	- 2 482 849	- 1 862 098

Figure 38: Sensitivity analysis of salmon price and production cost, considering a WACC of 10 % for offshore facility (permits excluded). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

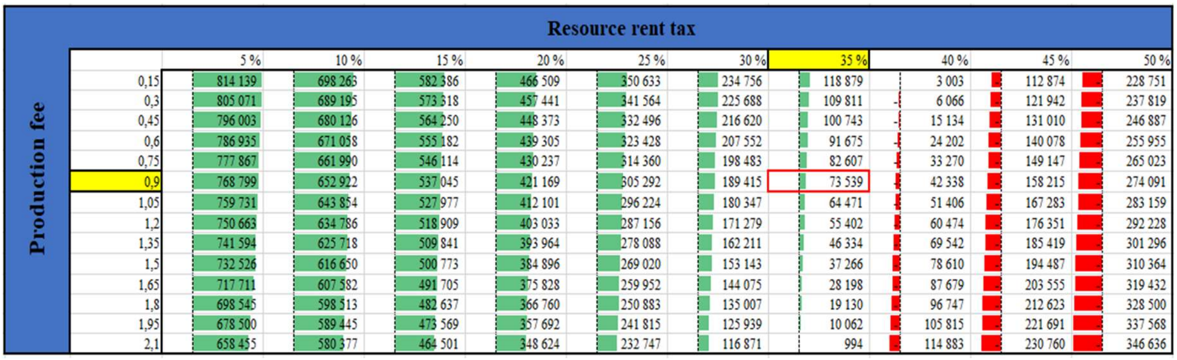


Number of permits

Price per permit

Price per permit	10	12	14	16	18	20	22	24	26	28
0	- 1 120 367	- 852 950	- 608 076	- 373 042	- 142 958	73 539	295 171	503 628	729 478	933 482
15 000 000	- 1 235 049	- 987 242	- 753 956	- 538 209	- 326 888	- 133 954	72 849	261 095	449 340	653 933
30 000 000	- 1 342 473	- 1 115 954	- 902 933	- 704 447	- 525 999	- 338 322	- 166 974	18 561	186 596	353 406
45 000 000	- 1 450 329	- 1 243 074	- 1 057 663	- 882 051	- 711 812	- 542 689	- 391 778	- 230 517	- 76 148	70 450
60 000 000	- 1 564 636	- 1 377 297	- 1 204 802	- 1 048 771	- 897 626	- 762 647	- 616 582	- 486 108	- 338 893	- 212 505
75 000 000	- 1 672 724	- 1 507 102	- 1 352 938	- 1 215 490	- 1 093 533	- 969 106	- 842 480	- 731 349	- 621 311	- 495 461
90 000 000	- 1 782 363	- 1 635 149	- 1 509 858	- 1 394 229	- 1 284 054	- 1 175 566	- 1 083 034	- 976 590	- 886 989	- 798 620
105 000 000	- 1 895 648	- 1 770 043	- 1 658 165	- 1 562 388	- 1 471 614	- 1 390 551	- 1 310 140	- 1 238 255	- 1 152 666	- 1 084 734
120 000 000	- 2 004 354	- 1 900 188	- 1 806 864	- 1 730 546	- 1 663 211	- 1 603 811	- 1 537 245	- 1 486 006	- 1 431 834	- 1 370 848
135 000 000	- 2 116 002	- 2 029 097	- 1 964 566	- 1 909 527	- 1 859 918	- 1 812 210	- 1 778 849	- 1 733 757	- 1 703 164	- 1 669 546
150 000 000	- 2 228 020	- 2 165 233	- 2 113 955	- 2 079 021	- 2 049 096	- 2 022 825	- 2 008 089	- 1 987 061	- 1 971 561	- 1 962 851
165 000 000	- 2 337 297	- 2 295 132	- 2 264 031	- 2 248 514	- 2 239 743	- 2 242 646	- 2 237 328	- 2 245 647	- 2 239 958	- 2 251 895
180 000 000	- 2 451 102	- 2 424 839	- 2 421 676	- 2 427 825	- 2 439 335	- 2 452 844	- 2 476 929	- 2 495 726	- 2 524 885	- 2 540 938
195 000 000	- 2 561 684	- 2 561 403	- 2 572 069	- 2 598 555	- 2 630 014	- 2 663 042	- 2 710 620	- 2 745 806	- 2 795 805	- 2 847 047

Figure 39: Sensitivity analysis of number of permits and price per permit, considering a WACC of 10 % for offshore facility (permits excluded). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.

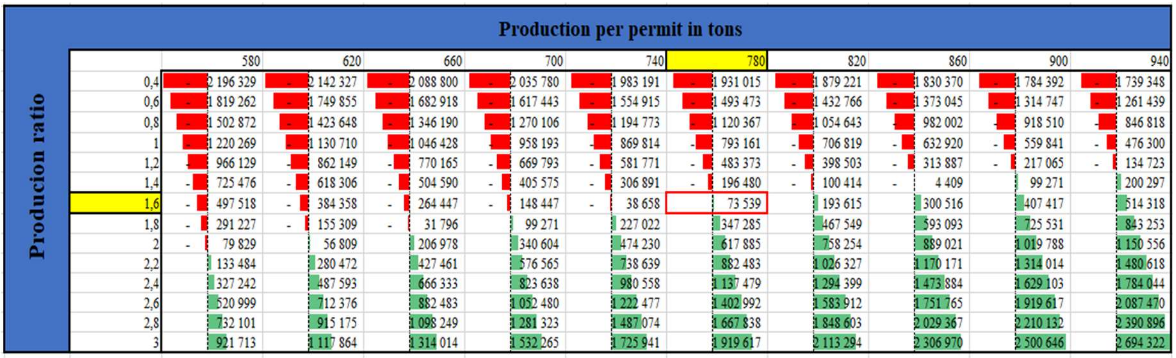


Resource rent tax

Production fee

Production fee	5 %	10 %	15 %	20 %	25 %	30 %	35 %	40 %	45 %	50 %
0,15	814 139	698 263	582 386	466 509	350 633	234 756	118 879	3 003	- 112 874	- 228 751
0,3	805 071	689 195	573 318	457 441	341 564	225 688	109 811	- 6 066	- 121 942	- 237 819
0,45	796 003	680 126	564 250	448 373	332 496	216 620	100 743	- 15 134	- 131 010	- 246 887
0,6	786 935	671 058	555 182	439 305	323 428	207 552	91 675	- 24 202	- 140 078	- 255 955
0,75	777 867	661 990	546 114	430 237	314 360	198 483	82 607	- 33 270	- 149 147	- 265 023
0,9	768 799	652 922	537 045	421 169	305 292	189 415	73 539	- 42 338	- 158 215	- 274 091
1,05	759 731	643 854	527 977	412 101	296 224	180 347	64 471	- 51 406	- 167 283	- 283 159
1,2	750 663	634 786	518 909	403 033	287 156	171 279	55 402	- 60 474	- 176 351	- 292 228
1,35	741 594	625 718	509 841	393 964	278 088	162 211	46 334	- 69 542	- 185 419	- 301 296
1,5	732 526	616 650	500 773	384 896	269 020	153 143	37 266	- 78 610	- 194 487	- 310 364
1,65	717 711	607 582	491 705	375 828	259 952	144 075	28 198	- 87 679	- 203 555	- 319 432
1,8	698 545	598 513	482 637	366 760	250 883	135 007	19 130	- 96 747	- 212 623	- 328 500
1,95	678 500	589 445	473 569	357 692	241 815	125 939	10 062	- 105 815	- 221 691	- 337 568
2,1	658 455	580 377	464 501	348 624	232 747	116 871	994	- 114 883	- 230 760	- 346 636

Figure 40: Sensitivity analysis of resource rent tax and production fee, considering a WACC of 10 % for offshore facility (permits excluded). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.



Production per permit in tons

Producion ratio

Producion ratio	580	620	660	700	740	780	820	860	900	940
0,4	- 2 196 329	- 2 142 327	- 2 088 800	- 2 035 780	- 1 983 191	- 1 931 015	- 1 879 221	- 1 830 370	- 1 784 392	- 1 739 348
0,6	- 1 819 262	- 1 749 855	- 1 682 918	- 1 617 443	- 1 554 915	- 1 493 473	- 1 432 766	- 1 373 045	- 1 314 747	- 1 261 439
0,8	- 1 502 872	- 1 423 648	- 1 346 190	- 1 270 106	- 1 194 773	- 1 120 367	- 1 054 643	- 982 002	- 918 510	- 846 818
1	- 1 220 269	- 1 130 710	- 1 046 428	- 958 193	- 869 814	- 793 161	- 706 819	- 632 920	- 559 841	- 476 300
1,2	- 966 129	- 862 149	- 770 165	- 669 793	- 581 771	- 483 373	- 398 503	- 313 887	- 217 065	- 134 723
1,4	- 725 476	- 618 306	- 504 590	- 405 575	- 306 891	- 196 480	- 100 414	- 4 409	99 271	200 297
1,6	- 497 518	- 384 358	- 264 447	- 148 447	- 38 658	73 539	193 615	300 516	407 417	514 318
1,8	- 291 227	- 155 309	- 31 796	99 271	227 022	347 285	467 549	593 093	725 531	843 253
2	- 79 829	56 809	206 978	340 604	474 230	617 885	758 254	889 021	1 019 788	1 150 556
2,2	133 484	280 472	427 461	576 565	738 639	882 483	1 026 327	1 170 171	1 314 014	1 480 618
2,4	327 242	487 593	666 333	823 638	980 558	1 137 479	1 294 399	1 473 884	1 629 103	1 784 044
2,6	520 999	712 376	882 483	1 052 480	1 222 477	1 402 992	1 583 912	1 751 765	1 919 617	2 087 470
2,8	732 101	915 175	1 098 249	1 281 323	1 487 074	1 667 838	1 848 603	2 029 367	2 210 132	2 390 896
3	921 713	1 117 864	1 314 014	1 532 265	1 725 941	1 919 617	2 113 294	2 306 970	2 500 646	2 694 322

Figure 41: Sensitivity analysis of production per permit and production ratio, considering a WACC of 10 % for offshore facility (permits excluded). The cell highlighted in the red box corresponds to the original NPV estimates for easy reference, considering our baseline highlighted in yellow.