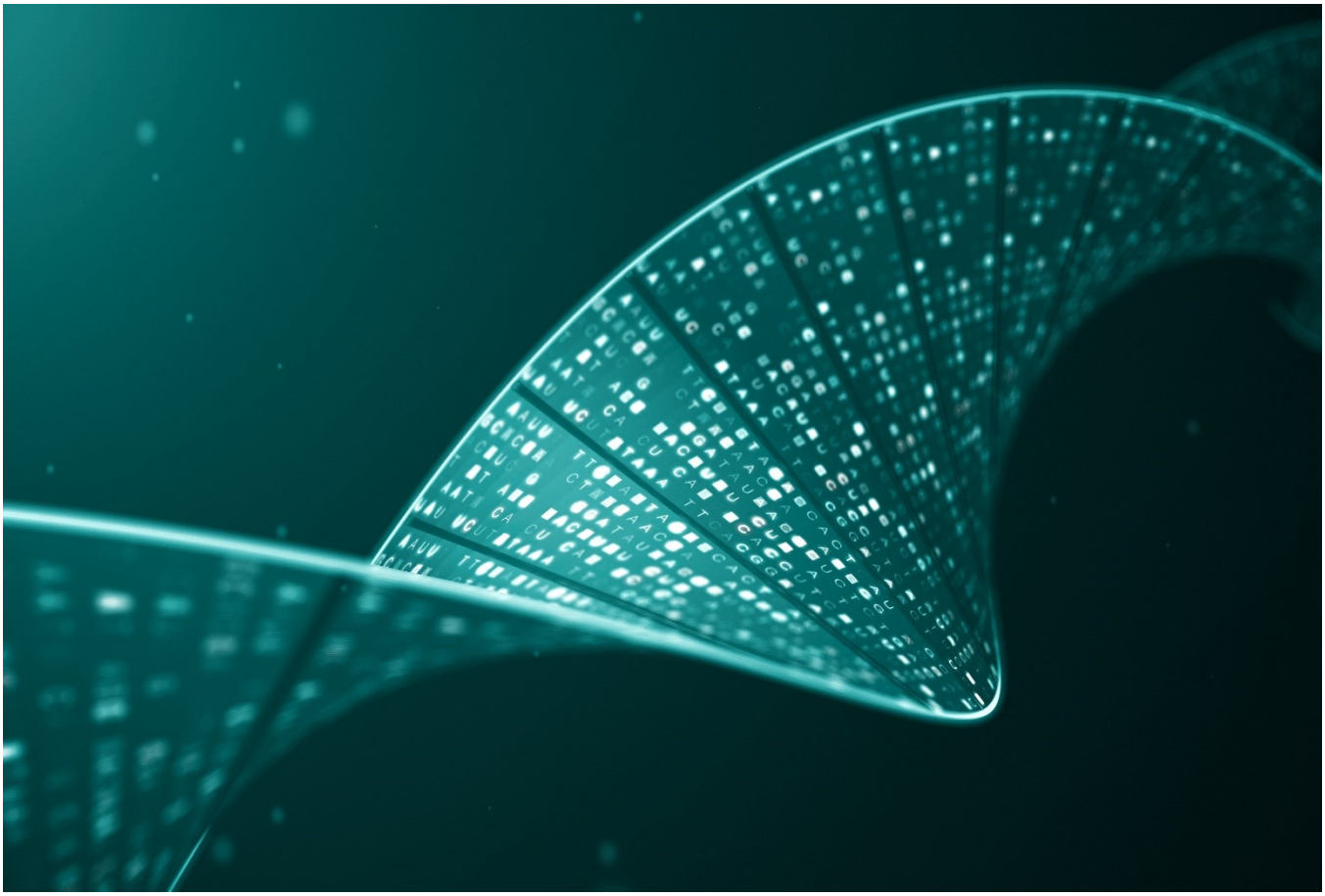
Menon Economics

RESEARCH PAPER

From genes to global finance:

Implications of the Cali fund for Norwegian businesses



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Preface

The Multilateral Mechanism and the Cali Fund is a milestone in the History of the Convention on Biological Diversity. For the first time there is a clear expectation to entities that use digital sequence information to contribute financially to the protection of biodiversity on a global scale.

On behalf of the Norwegian Ministry of Climate and Environment, Menon Economics has carried out the first national study of how the implementation of the Cali Fund may affect businesses. The paper was written by Øyvind N. Handberg, Emira Sopi and Henrik Lindhjem, and quality assured by Ståle Navrud.

The Ministry hopes that this publication will raise the national awareness of the Multilateral System and the Cali Fund in Norway as well as aid the further discussions on its implementation.

The Norwegian Ministry of Climate and Environment

Content

Abstract

This paper assesses how a global benefit-sharing mechanism for digital sequence information (DSI) maps onto Norwegian business activity. We combine accounting data for mapped industries with a business survey to estimate coverage, contribution levels, preferences and likely economic effects. Applying proposed definitions of relevant industries and the thresholds to Norwegian businesses, the Cali Fund would encompass about 190 Norwegian businesses, employing about 35,000 people, which is about one percent of total employment in Norway. If all businesses contribute, the total annual contributions may be in the order of about NOK 745 million per year when contributions are 1 percent of their profit base. The corresponding number if contributions instead are 0.1 percent of their sales base is NOK 300 million. A flexible option, based on each business's preferred payment choice assuming they aim to minimise their contribution, returns about NOK 230 million annualy. In macro terms these totals are small relative to the sizes of other Norwegian tax incomes, but they can be significant for selected businesses.

Incidence is concentrated on a few sectors. Fishing and aquaculture account for around half of the total. Chemicals contribute about 20 to 30 percent, with the remainder spread across pharmaceuticals, IT services, R&D, and other services. Within the chemical industry, Yara would constitute 40-75 percent of the contributions. The businesses are concentrated in Oslo and Bergen, reflecting headquarters and services.

The analysis does not include a review of actual DSI usages, and the estimates above implicitly assume that all relevant businesses contribute. The analysis also does not incorporate behavioural adjustment such as reduced DSI use. The estimates are therefore indicative, and these assumptions bias the totals upward rather than downward.

Survey responses from businesses show low awareness of the Cali Fund, mixed views across industries, and limited stated willingness to contribute on either base. Businesses that face price-sensitive customers and strong competition expect little scope to pass costs on to consumers. These features imply small aggregate effects and non-trivial distributional effects by sector and region. Results indicate that more information to businesses about the Cali Fund is necessary and that higher confidence in the use of the funds, especially in their effectiveness to reduce global biodiversity loss, may increase support.

Sammendrag

I dette notatet vurderer vi hvordan en global mekanisme for betaling for digital sekvensinformasjon (DSI), Cali-fondet, vil kunne påvirke norsk næringsliv. Vi kombinerer regnskapsdata for kartlagte næringer med en bedriftsundersøkelse for å estimere omfang, mulige bidrag og mulige økonomiske konsekvenser. Med foreslått design av fondet og gitt utarbeidede definisjoner av relevante næringer anslår vi at fondet vil omfatte om lag 190 norske bedrifter med totalt rundt 35 000 ansatte, om lag én prosent av samlet sysselsetting. Forutsatt at alle bedrifter bidrar, anslår vi samlede bidrag til fondet til rundt 745 millioner kroner per år ved en foreslått sats på 1 prosent av overskudd etter skatt og under 300 millioner kroner ved en foreslått sats på 0,1 prosent av omsetning etter skatt. Et fleksibelt alternativ, basert på den enkelte virksomhets foretrukne betalingsmåte under forutsetning av at de ønsker å minimere sitt bidrag, gir om lag 230 millioner kroner per år. Sammenlignet med samlede nasjonale skatteinntekter er summene relativt begrenset, men betalingene kan være betydelig for enkeltbedrifter.

Vi finner at bidragene er konsentrert på noen få næringer. Fiskeri og havbruk står for om lag halvparten av totalsummen. Kjemisk industri bidrar med om lag 20-30 prosent, mens resten fordeles på farmasi, IT-tjenester, FoU og andre tjenester. Innen kjemisk industri utgjør Yara anslagsvis 40-75 prosent av bidragene. Geografisk er bedriftene konsentrert i Oslo og Bergen, som reflekterer hovedkontor-lokasjoner.

Vi har ikke vurdert faktisk bruk av DSI, og anslagene forutsetter implisitt at alle relevante bedrifter bidrar. Vi modellerer heller ikke eventuelle atferdstilpasninger, som reduserer bruken av DSI. Anslagene må derfor forstås som indikasjoner, og forutsetningene trekker i retning av at totalsummene overvurderes.

Undersøkelsen blant norske bedrifter viser lav kjennskap til Cali-fondet, delte vurderinger på tvers av næringer og begrenset vilje til å bidra til fondet. Bedrifter som møter prissensitive kunder og sterk konkurranse forventer liten mulighet til å velte kostnader videre. Dette innebærer små samlede effekter og ikke-trivielle fordelingsmessige virkninger mellom sektorer og regioner. Resultatene indikerer at det er behov for mer informasjon til bedrifter om Cali-fondet, og at økt tillit til bruken av midlene – spesielt effektivitet i å redusere globalt tap av biologisk mangfold – kan øke støtten.

1 Introduction

Biodiversity loss is accelerating, with global consequences. Over the past decade, biodiversity finance has moved from awareness and valuation to accounting and policy uptake, yet a large funding gap remains (TEEB 2008; Natural Capital Coalition 2016; De Valck and Rolfe 2019; Deutz et al. 2020; Hutchinson and Lucey, 2024).

Local and regional incentives for conserving nature do typically not include the full value of genetic information provided by nature, leading to under-provision of conservation, especially in biodiversity hotspots. Such genetic information is a public good yielding benefits much beyond local and regional areas. Digital sequence information (DSI) enables innovation without physical access to genetic resources, creating a benefit-sharing gap that bilateral access-and-benefit sharing cannot necessarily close at scale (Halewood 2024; Raposo et al. 2024). Usages of DSI include production of medicines, cosmetics, crops, and chemicals.

Various payment schemes exist for other ecosystem services, e.g., for carbon storage and sequestration, but are not developed for information on genetic materials. The Cali Fund is a multilateral, standardised mechanism under the Convention on Biological Diversity (CBD) to channel predictable benefits from corporate use of DSI while preserving open databases, aligning incentives for conservation across countries (Oldham 2025; Oldham and Thambisetty 2024).

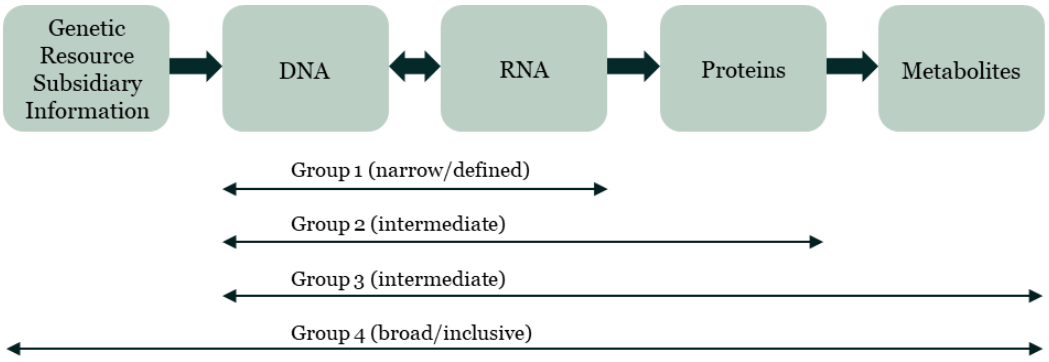
1.1 What is DSI and why is a global payment scheme relevant?

Digital Sequence Information (DSI) refers to the digital representation of genetic material—typically DNA,[1] RNA[2], or amino acid sequences[3] derived from biological organisms. Unlike physical genetic resources, DSI can be accessed remotely and manipulated digitally, making it a cornerstone of modern biotechnology. It is crucial to pharmaceutical development, agricultural innovation, biodiversity conservation, and the emerging field of generative biology, where machine learning is used to design novel biological products (Cowell et al., 2021).

Despite its growing importance, DSI remains ambiguously defined within international legal frameworks. As illustrated in Figure 1.1, proposed groupings vary in scope: from a narrow focus on nucleic acid sequences (DNA and RNA) to progressively broader categories that include proteins, metabolites4, and downstream subsidiary information.

[1] DNA, or deoxyribonucleic acid, is the molecule that carries the genetic instructions for the development, functioning, growth, and reproduction of all known organisms.
[2] RNA, or ribonucleic acid, is a vital single-stranded nucleic acid found in all living cells that helps to carry out essential functions, including creating proteins and regulating genes.
[3] An amino acid sequence is the specific, linear order of amino acids, connected by peptide bonds, that forms a protein or polypeptide chain. This order, also known as the protein's primary structure, is determined by the genetic code within a gene and contains the instructions for the protein's unique three-dimensional shape and function.
[4] Metabolites are small molecules, such as lipids, amino acids, and organic acids, that are intermediate or end products of the body's chemical processes, known as metabolism

Figure 1.1: Proposed subject matter groupings for data/information potentially constituting DSI to facilitate discussions concerning DSI scope and terminology. Source: Convention on Biological Diversity (2020).



It is widely acknowledged, however, that its use bypasses the physical transfer of genetic material, complicating traditional access and benefit-sharing (ABS) models established under the Convention on Biological Diversity (CBD) and its Nagoya Protocol (Brink & van Hintum, 2021). This has led to concerns about biopiracy and the inequitable exploitation of genetic resources from biodiversity-rich but economically disadvantaged nations (Nehring, 2022).

The exponential growth in DSI usage has created an economic and ethical disconnect between those who generate and use DSI and those whose ecosystems supply the underlying biological material (Laird et al 2020; Nehring 2022). A global payment mechanism is therefore essential to address the asymmetry in benefit-sharing, ensuring that source countries and communities receive benefits arising from the commercial use of biodiversity (Halewood, 2024).

As outlined in Raposo et al. (2024), the current model of open DSI access, largely enabled by the International Nucleotide Sequence Database Collaboration (INSDC)[5], has enabled global scientific collaboration but lacks mechanisms to channel monetary benefits back to providers. Without reform, this system risks perpetuating exploitation under the guise of open science.

1.2 The Cali Fund

At the fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP 15) in Montreal, Canada, in 2022, Parties agreed to establish a multilateral benefit-sharing mechanism for DSI with an associated fund (Decision 15/9). At COP 16 in Cali, Colombia in 2024, the mechanism was operationalized and the "Cali Fund" established (Decision 16/2). The decision keeps open access to public sequence repositories such as the International Nucleotide Sequence Database Collaboration (INSDC) and separates benefit-sharing from tracing individual sequences (Raposo et al. 2024; Halewood 2024). Corporate users are expected to contribute, subject to eligibility thresholds defined by assets, sales, and profits. A defined share of proceeds is directed to Indigenous Peoples and local communities.

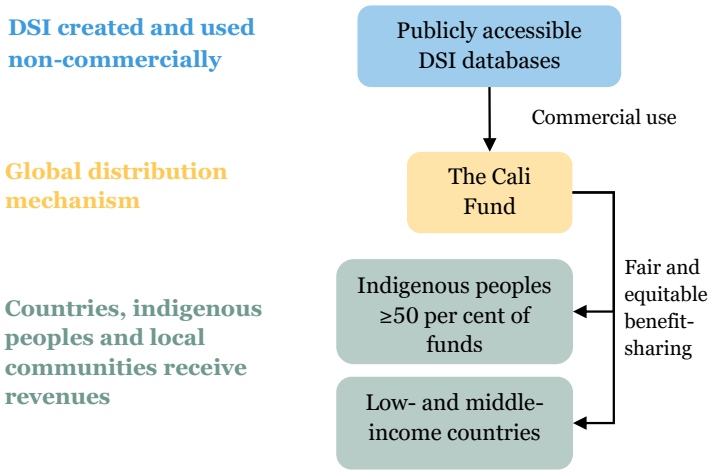
To operationalise the mechanism across countries, Parties pointed to the System of National Accounts (SNA) and existing economic classifications to identify beneficiaries of DSI use, notably the International Standard Industrial Classification (ISIC) for activities and the Central Product

[5] The International Nucleotide Sequence Database Collaboration (INSDC) is a global collaboration of independent governmental or non-profit organisations that manage nucleotide sequence databases capturing and preserving nucleotide sequence information and annotations to create a comprehensive collection that preserves the scientific record and enables broad sharing of such data.

Classification (CPC) for products and services (Oldham 2025; Halewood 2024). This anchors implementation in official statistics and allows comparable measurement of exposure by sector.

Under the mechanism, corporate users of DSI are expected to contribute either 0.1 percent of their total revenues or 1 percent of their profits to an UN-administered fund (UNEP, 2024). Half of the contributions are to be directed to Indigenous Peoples and local communities, recognizing their custodianship of biodiversity. Contributions are currently voluntary. The principal mechanisms of the Cali Fund are summarized in Figure 1.2. More information about the multilateral benefit-sharing mechanism and the Cali Fund is available in the Cali Fund Guide (CBD secretariat 2025) and updated information on activities is available at the Cali Fund website.[6]

Figure 1.2: Schematic overview of the Cali Fund mechanisms



A central question is: which businesses make use of DSI? This is not a straightforward question to answer without detailed investigations of individual businesses, their input factors and products and their value chains. Oldham (2025) discusses this question on a more general level and suggests which sectors may include relevant businesses within the framework of the United Nations System of National Accounts. These are summarized as:

- Pharmaceuticals
- Nutraceuticals / food and health supplements
- Cosmetics and personal care
- Animal and plant breeding
- Biotechnology R&D
- Basic chemicals incl. enzymes and nucleic acids
- Technical testing and analysis
- Diagnostics, lab equipment, reagents, supplies
- Information and digital services benefiting from DSI
- Beverages

[6] https://mptf.undp.org/fund/cal00.

Within relevant industries, the Cali Fund encompasses businesses that exceed at least two out of the three thresholds, as averaged over the preceding three years:

1) Total assets of at least USD 20 million,
2) Sales of at least USD 50 million, and
3) Profit of at least USD 5 million

The Cali Fund represents both a challenge and an opportunity. On the one hand, firms will need to assess their use of DSI and prepare for financial contributions that reflect their reliance on global biodiversity. On the other hand, aligning with this mechanism can enhance sustainability credentials and position leading countries in ethical bioeconomy practices (Oldham & Thambisetty, 2024). Beyond traditional biotech users, the convergence of AI and biotechnology, especially in fields such as synthetic biology[7] and enzyme design[8], firms involved in data-intensive innovation may find themselves involved in DSI usage. The Cali Fund thus signals a shift toward a more accountable and equitable framework for harnessing and sharing the benefits of nature's digital assets.

Norway as a Party to the Convention on Biological Diversity (CBD) has been a leading advocate for the establishment of a multilateral benefit-sharing mechanism for DSI with an associated financial engine that is the Cali Fund. Norwegian business statistics are organised in national activity codes that correspond to the International Standard Industrial Classification (ISIC) and can be linked to the Central Product Classification (CPC). The Cali outcome therefore justifies examining how the global parameters map onto Norwegian industries, firm populations, and national accounting frameworks, and what this implies for measured exposure and potential economic effects.

While the Cali Fund is a promising avenue towards raising global finance for protection of biodiversity, little is known about the implications of the Cali Fund and its modalities for various industrial sectors, whether businesses themselves are aware of DSI and the Cali Fund, and what their views are about this mechanism. In the literature on financing mechanisms for biodiversity there are very few studies that actually ask businesses about their views (Hutchinson and Lucey, 2024; Jonäll et al. 2024). There are a few exceptions, such as Chen et al. (2024) and Krause and Matzdorf (2019) on payments for ecosystem service credits, but none that we are aware of on DSI.

With Norway as a case, this is, to our knowledge, the first study that attempts to fill this knowledge gap and to draw lessons of relevance also for other countries that will also be expected to contribute to the Cali Fund.

1.3 Research questions

In this paper, we explore possible implications of the Cali Fund in Norway. The research questions are:

1) To what extent will enforcing the Cali Fund in Norway affect Norwegian industries?

We provide an overview of how many Norwegian businesses and what share of Norwegian economic activity falls within the relevant industries and above the set thresholds and assess if any industries and regions to a larger extent than others are above the thresholds. We also discuss the industries'

[7] Synthetic biology is an interdisciplinary field that uses engineering principles to design and build new biological parts, devices, and systems, or to redesign existing ones. It applies concepts from biology, engineering, computer science, and chemistry to create novel biological functionalities, with applications ranging from medicine and agriculture to energy and materials science.
[8] Enzyme design is the process of protein engineering that involves creating or modifying enzymes to perform specific functions, often for scientific, industrial, or medical applications, by enhancing their catalytic ability, stability, or specificity beyond what natural enzymes can do.

competitiveness[9], the potential effects on profit margins, and preferences for how such a scheme should be implemented.

2) What is the preference among Norwegian businesses for contributing to global biodiversity through a payment for DSI usage?

The businesses' preferences are understood as both general attitude towards the Cali Fund being introduced in Norway for their industry (and whether the attitude is sensitive to also corresponding industries in other countries are encompassed) and specific willingness to contribute to the fund. We also explore whether the preferences vary across industries, and to what extent they know about DSI use in their own company and about the Cali Fund.

Note that we do not investigate whether individual businesses actually use DSI but take as a starting point the general sector classification of Oldham (2025). To find out whether individual businesses actually make use of DSI is beyond the scope of this paper.

In the following chapter we describe the methods for discussing the research questions: analyses of accounting data and a survey among relevant businesses. In chapter 3 we present the results of each of these analyses, before we discuss and conclude on the implications in chapter 4.

[9] As this may affect to what extent the companies will be able to increase prices and shift the burden over to consumers.

2 Methods and data

2.1 Application of accounting data to identify relevant industries

Our method builds on the categorization of industries proposed in Oldham (2025). We map the ISIC classification[10] used there to the Norwegian NACE system.[11] These two systems are broadly consistent at the highest levels of aggregation. As a first step, we retained only the top-level industries (sections in the classifications) identified in Oldham's work.

Subsectors at the lower levels of the classification hierarchy are not perfectly aligned between ISIC and NACE. While the numerical codes may differ, the names of the industry groups tend to be similar. Based on this similarity, we manually identified and selected the industry groups that correspond most closely to those in Oldham's classification. This mapping formed the basis for our sample. See Appendix A for more detailed information on how we matched ISIC and NACE.

To operationalise the mapping, we used a proprietary database maintained by Menon containing all Norwegian companies, including financial accounts and employment data. We excluded the smallest and inactive businesses (see Appendix A) producing a final population of 4,860 businesses within the relevant industries.

2.2 Survey design and implementation

We developed a survey suitable for companies to answer, inspired by a previous carefully tested survey we carried out about company stated preferences for carbon taxation (Dugstad et al. 2023; 2024). To make the survey consequential[12] for businesses, we stated that the survey was conducted on behalf of the Ministry of Climate and Environment and that answers are important input into the government's implementation of biodiversity and business policy that may affect businesses. We asked the representative to answer on behalf of the company, rather than reflecting his or her own preferences. In designing the survey, we followed best practise guidance for stated preference surveys (Johnston et al., 2017), adapted to business rather than household or consumer survey.

The survey consisted of several parts. Initially, there were questions about the company's main products/services and its competitive situation. Then, we provided brief information about the UN Convention on biodiversity, DSI and the Cali Fund. They were asked whether they knew about the Cali Fund and their attitude to taking part in such a scheme, if all companies in Norway or world-wide were included. Next, we explained that without contributions to biodiversity finance, biodiversity loss globally is likely to continue and that everybody needs to contribute. This was followed by a key question about whether the company would be willing to contribute to the Cali Fund, and if so, how much. We also asked about reasons why they were or were not willing to contribute, and whether the company use DSI in its production of goods or services (or store or distribute DSI) or purchase goods where DSI has been used. We also had a series of questions investigating how the company would be affected positively (e.g. through ability to use this e.g. for corporate social responsibility purposes) or negatively. Finally, we asked about the role of the respondent in the company (department and

[10] The International Standard Industrial Classification of All Economic Activities (ISIC) is a United Nations industry classification system. Wide use has been made of ISIC in classifying data according to kind of economic activity in the fields of employment and health data. It is maintained by the United Nations Statistics Division.
[11] The Norwegian standard for classifying industries, adopted from EU's NACE Rev2. standard. This is primarily used by Statistics Norway for official statistics.
[12] In terms of the respondents' answers potentially influencing both the decision to implement a policy and in terms of the businesses having to pay, i.e. policy and payment consequentiality, respectively. The intention is to increase the realism in the businesses stated acceptance and willingness to pay to the fund.

leadership role etc), gender, age, education, whether the respondent thought he or she could influence the company's overall climate and environmental strategy. We also asked the company's consent to matching the company information with Menon's database of companies (cf section 2.1. above), and if not, we asked about basic information about assets, sales and profits. The full questionnaire is available as Appendix C (in English, translated from Norwegian).

The survey was distributed by email to a sample of 4,131 individuals. These individuals are typically contact persons or managers of businesses. We purchased the contact information from a third party, based on the NACE mapping carried out earlier. Only businesses within the relevant industries are included. The list of contacts includes but is not limited to the population of 4,860 businesses defined above; also smaller businesses are included.

We first launched a pilot survey with 245 respondents in June 2025, after which small changes were made to increase the response rate. We moved some questions further down so that the most important questions came earlier and introduced a neutral, biodiversity-unrelated incentive for respondents (i.e. a draw of box of Fair Trade Certified chocolates that e.g. could be shared in the reception area of the company). After these changes, the survey was soft-launched in the beginning of August 2025 with 600 respondents, followed by the main launch with all respondents later in August 2025. We also supplemented the email sampling with SMS recruitment to increase the sample size, but only a few extra responses were obtained by this channel.

Table 2.1 summarizes key numbers of the accounting data sample (first) row, the invited businesses to the survey and the resulting respondents to the survey. The overall response rate was 6 percent, comparable to other company surveys, e.g. as reported in Dugstad et al. (2023; 2024)[13].

Table 2.1: Overview of businesses and key characteristics in the sample for the accounting data analysis ("whole sample") and the survey. Median values are reported, with 95 percent confidence intervals in brackets.

Sample	No. of businesses	Sales (million NOK)	Profit (million NOK)	Total assets (million NOK)
Whole sample	4 860	5.9 [0.6, 476.0]	0.2 [-15.8, 84.8]	7.2 [0.3, 1 047.1]
No. of invited respondents to the survey[14]	4 131	19.7 [0.9, 854.3]	0.7 [-26.7, 75.2]	14.6 [0.7, 1 130.4]
No. of survey respondents[15]	247	14.0 [0.1, 1 223.8]	0.4 [-17.3, 30.1]	9.5 [0.0, 1 096.3]

[13] We contacted professional survey firms, which indicated similar response rates to the one obtained by us.
[14] This sample also includes businesses excluded in the accounting data analysis.
[15] Respondents could choose whether to link their accounting data to our database. Those who declined reported their own three-year averages, but the specific years they used are unknown. Their figures therefore represent a mix of accounting data and self-reported numbers and may deviate from the actual accounting records.

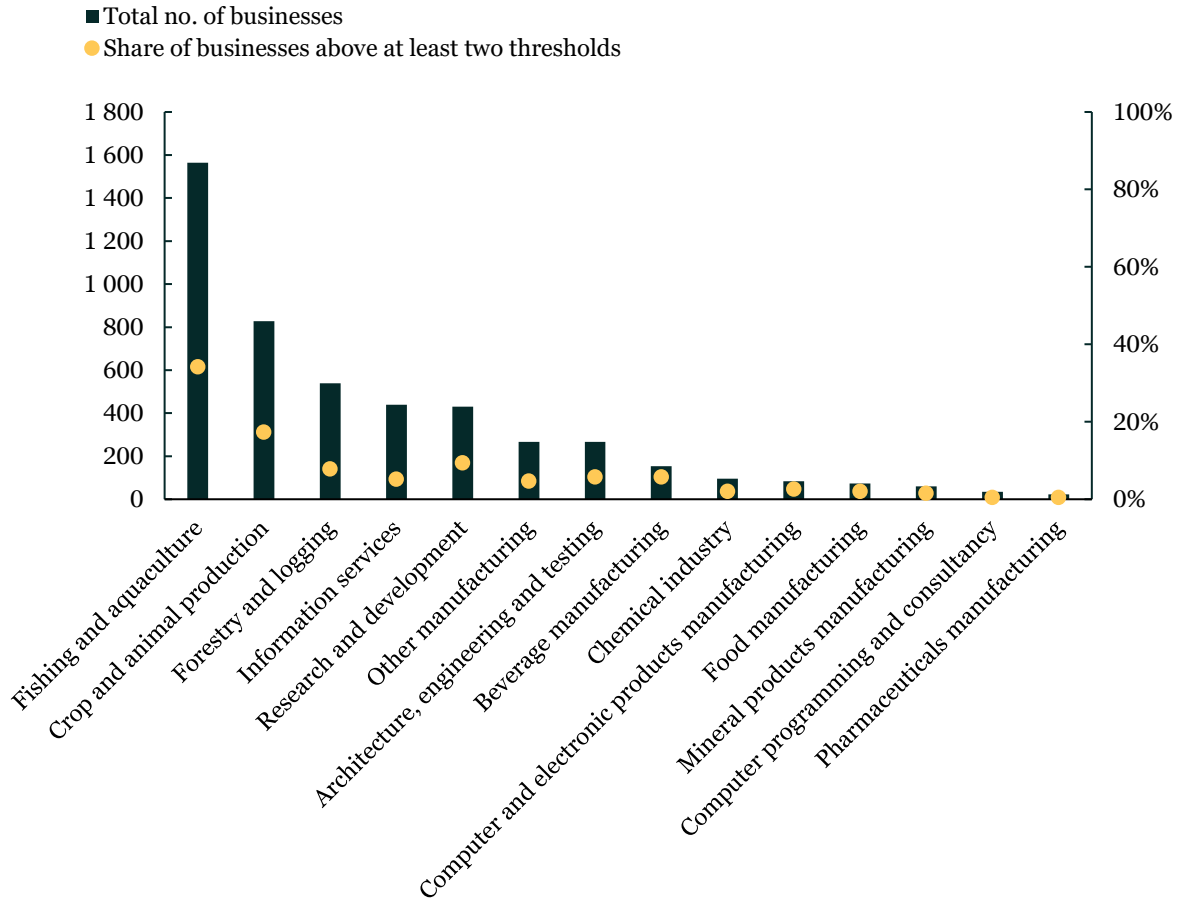
3 Results

3.1 Affected industries

The industries identified as relevant under the scope of the DSI regulation in Norway comprise 4,860 businesses, of which only 190 are above two of three thresholds (total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million). This section presents results for these businesses, based on Norwegian data from 2023.

Figure 3.1 illustrates the distribution of businesses across the relevant industries. The bars represent the number of businesses in each industry, while the yellow markers indicate the share of businesses above at least two thresholds.

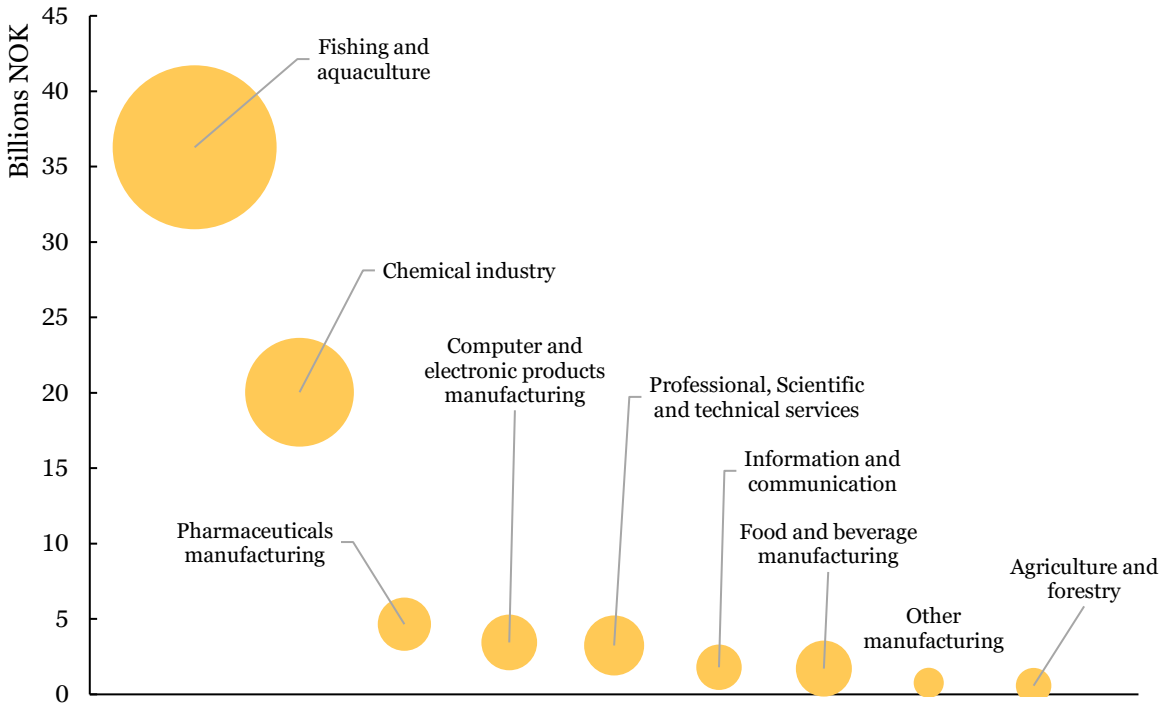
Figure 3.1: Number of businesses by industry in total (left axis) and share of businesses above at least two of three thresholds (right axis), which are: total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million. Source: Menon Economics.



Fishing and aquaculture accounts for about one-third of the relevant businesses above at least two thresholds, followed by crop and animal production (17 percent) and forestry (8 percent). Other industries each account for less than ten percent of the total, with several representing only marginal shares. Together, these industries employ more than 80,000 people in Norway, corresponding to approximately 3 percent of total employment in Norway (SSB, table 13470). Among the 190 businesses above the threshold, nearly 35,000 people are employed, corresponding to about one percent of total employment.

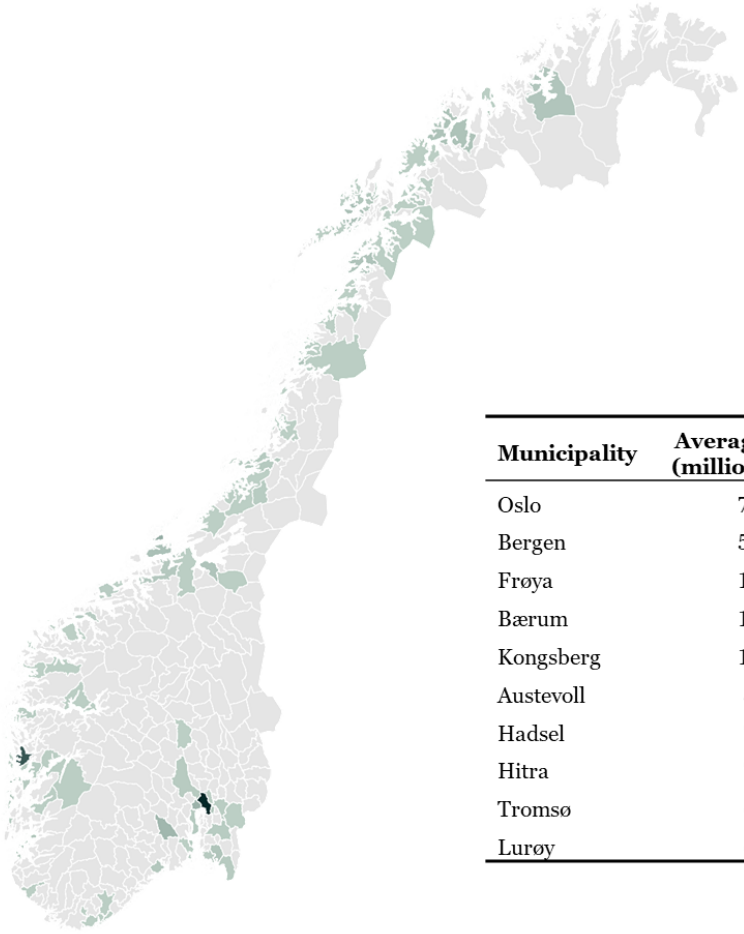
When shifting the focus from the number of businesses to their economic outcomes, a different pattern emerges. Figure 3.2 presents the distribution of profits across industries, while the size of each circle reflects the scale of sales. Fishing and aquaculture remain the largest sector, generating both the highest profits and the largest sales. In contrast, the chemical industry, which comprises only 96 businesses (2 percent of the total), records remarkably high profits and sales relative to its size. The remaining industries show more similar profit levels, although sales volumes vary somewhat across them.

Figure 3.2: Profits (y-axis) and sales (circle size) across industries, annual average of 2021-2023. Source: Menon Economics.



In 2023, these industries generated sales of more than NOK 480 bn, equivalent to 0.05 percent of total national sales. Figure 3.3 illustrates how sales are distributed across Norwegian municipalities for the selected industries above the threshold. The 4,860 businesses are in 82 different municipalities, while the highest concentration of sales is found in Oslo and Bergen.

Figure 3.3: Average sales for the businesses above threshold, 2021-2023. Source: Menon Economics.

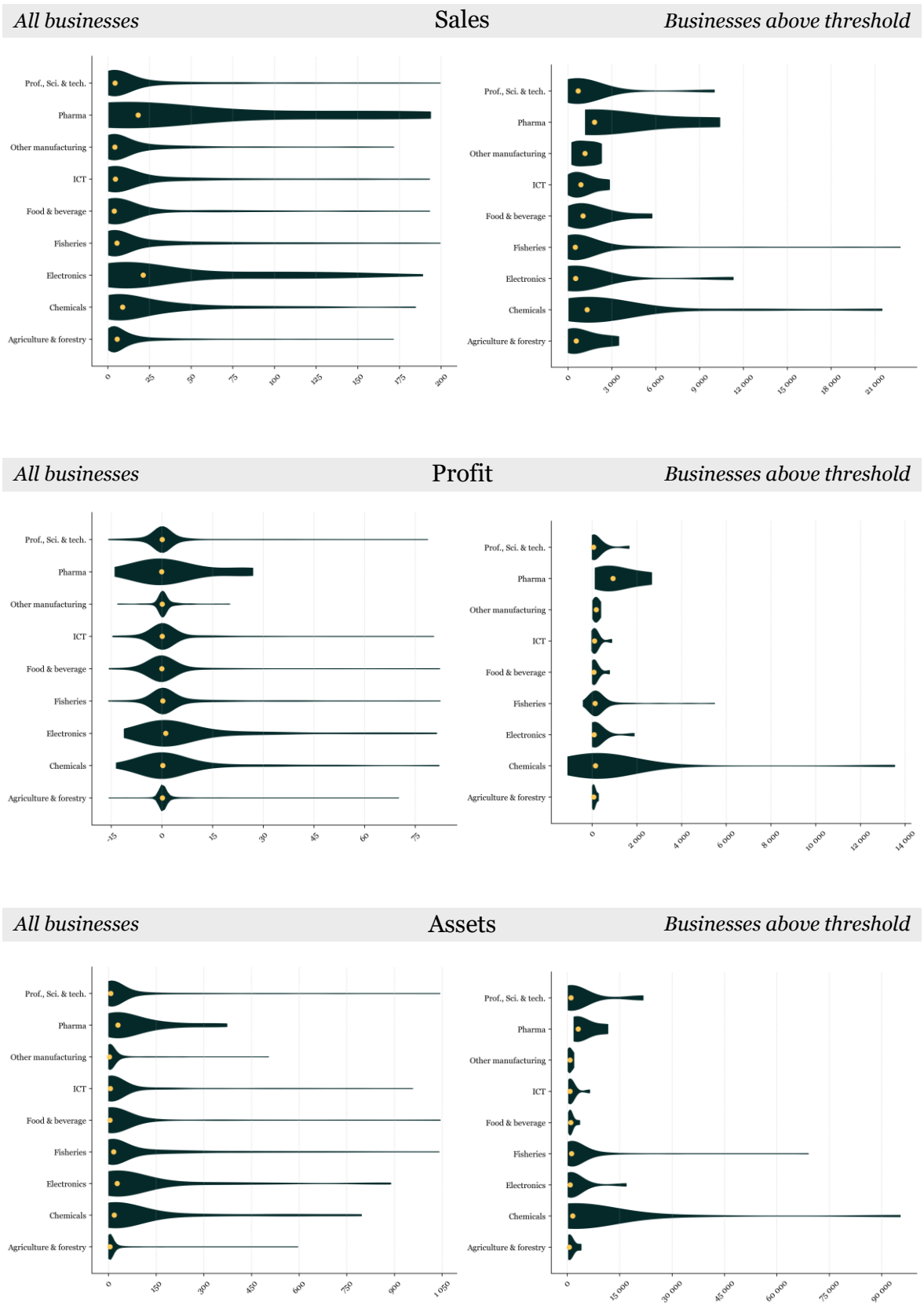


Municipality	Average sales (million NOK)
Oslo	78
Bergen	56
Frøya	16
Bærum	13
Kongsberg	11
Austevoll	8
Hadsel	7
Hitra	7
Tromsø	6
Lurøy	6

Figure 3.4[16] shows the median and distribution of the threshold variables sales, profits and total assets, for all businesses within the relevant industries (left) and for the businesses above threshold (right). The figure shows long tails on the right side for most variables, meaning most businesses have relatively low levels of sales, profits and assets, and a few businesses have far higher levels. Since at least two of the three thresholds must be met, some businesses still fall below one of the thresholds. For example, in fisheries and aquaculture and in the chemical industry, this group includes businesses with negative profits.

[16] The figure for all businesses excludes the top 5 percent for sales, and the top and bottom 2.5 percent for profit and assets. For above-threshold businesses, the full sample is shown.

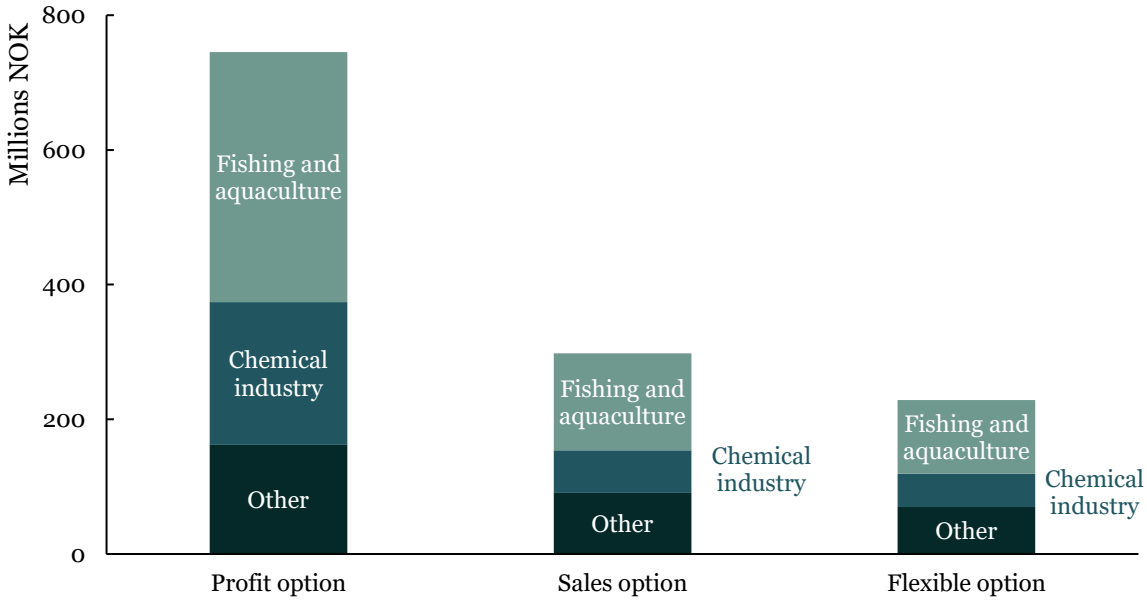
Figure 3.4: Distribution and median (yellow dot) sales, profits and assets for Norwegian businesses within the relevant industries, in total and for those businesses above two of three thresholds (i.e. total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million). Numbers in NOK million. Averages of 2021-2023. Source: Menon Economics.



Note: "Prof., Sci. & tech." is professional services, science and technology. "ICT" is Information and Communication Technology.

For industries exceeding two or more thresholds, the amounts collected into the DSI fund under the different payment options are illustrated in Figure 3.5. Consistent with the decision at COP 16 in Cali (Decision 16/2), the options considered are 1 percent of profit or 0.1 percent of sales. A flexible option is also included, showing revenues to the DSI fund based on each business's preferred payment choice, assuming they aim to minimise their contribution.

Figure 3.5: Revenues collected into DSI under different payment options for industries above threshold, 2021-2023. Source: Menon Economics.



The profit option generates the highest contribution from Norwegian businesses, with 50 percent stemming from fishing and aquaculture. Under this option, a total of NOK 745 million could potentially be collected into the DSI fund, whereas the sales option would generate less than NOK 300 million. The flexible option yields the smallest amount, with 136 of 190 industries opting to pay based on sales and 54 choosing the profit-based option. In total, the flexible option would contribute approximately NOK 230 million to the fund. This is the most realistic fund contribution, as companies are likely to adapt to the requirements in order to minimise their payment (as with other taxes and contributions).Table B.1: Summary statistics: Number of businesses in each industry respectively above and under two of the three thresholds (total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million).

3.2 Survey of company preferences

In this section, we present the empirical findings from the survey on Norwegian businesses' attitudes and preferences towards contributing to the Cali Fund. The analysis is structured around four dimensions:

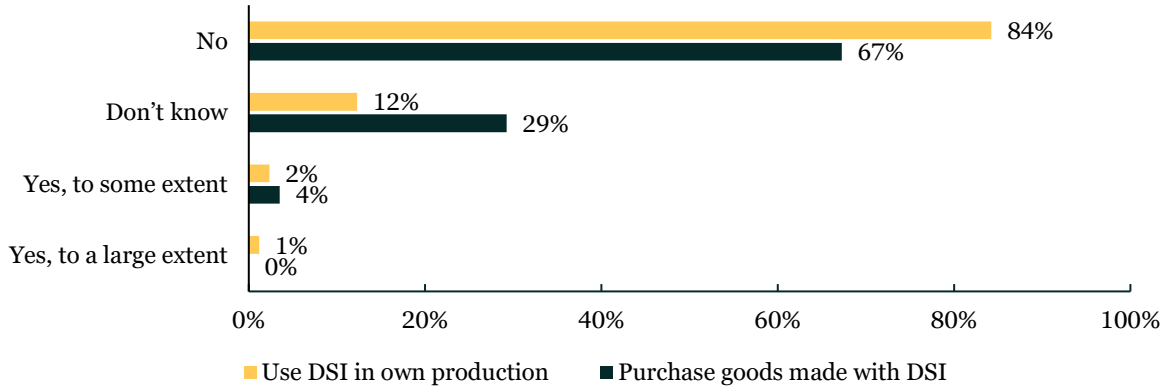
(i) background characteristics of the firms in relation to DSI,
(ii) general preferences towards the fund, including whether attitudes differ between national and international implementation scenarios and across industries,
(iii) willingness to contribute financially, with attention to heterogeneity between industries, and

(iv) implications for the industries, including competitiveness, prices and profit margin, as well as preferences for how the scheme should be implemented in practice.[17]

A first observation is that almost all respondents were unfamiliar with the Cali Fund prior to the survey. 96 percent indicated that they had not heard about it beforehand. As most had no prior information, their stated preferences should be interpreted with caution as they are based solely on the information provided during the survey. The provided information and the full set of questions are available in Appendix C.

Figure 3.6 shows that businesses in the sample report limited exposure to DSI. The majority indicate that their company neither uses DSI in production nor purchases any goods or services in which DSI is involved. Only a small proportion report some use, while a notable share answer "Don't know" to both questions. These findings suggest that direct and indirect exposure to DSI is limited in the sample, and that many respondents are unfamiliar with its role in production and supply chains. This context is important when interpreting subsequent attitudes towards the Cali Fund and points to a need for more information to industries.

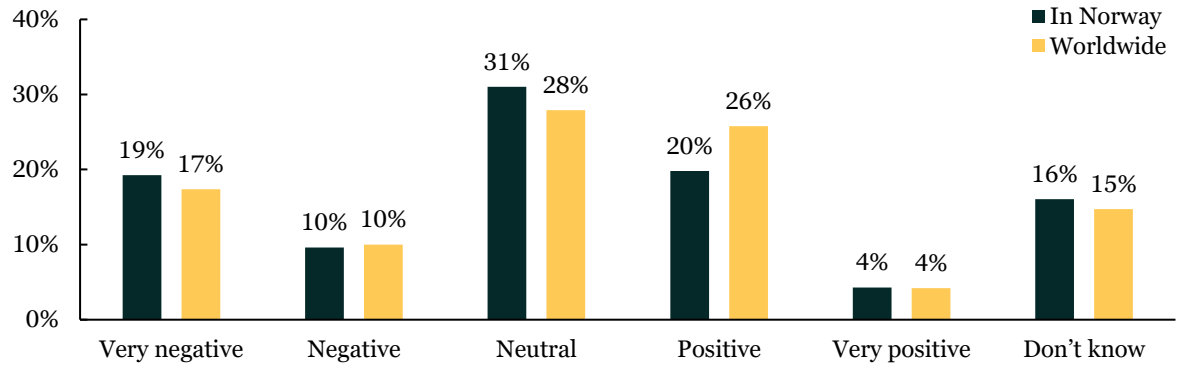
Figure 3.6: Reported use of DSI in own production and reported purchase of goods and services involving DSI. N = 171.



Despite limited exposure to DSI among the businesses in the sample, respondents were asked about their preferences regarding the establishment of the Cali Fund. To capture potential differences in how such a scheme is perceived, preferences were measured under two scenarios: one limited to Norway and one applied globally. As shown in Figure 3.7, responses are dispersed across positive, negative, neutral and "don't know" categories, indicating heterogeneous preferences overall. The results also show that businesses are somewhat more positive towards the fund under a global scheme than under a national one. Other than this difference, the patterns of response do not show notable variation between the national and global cases.

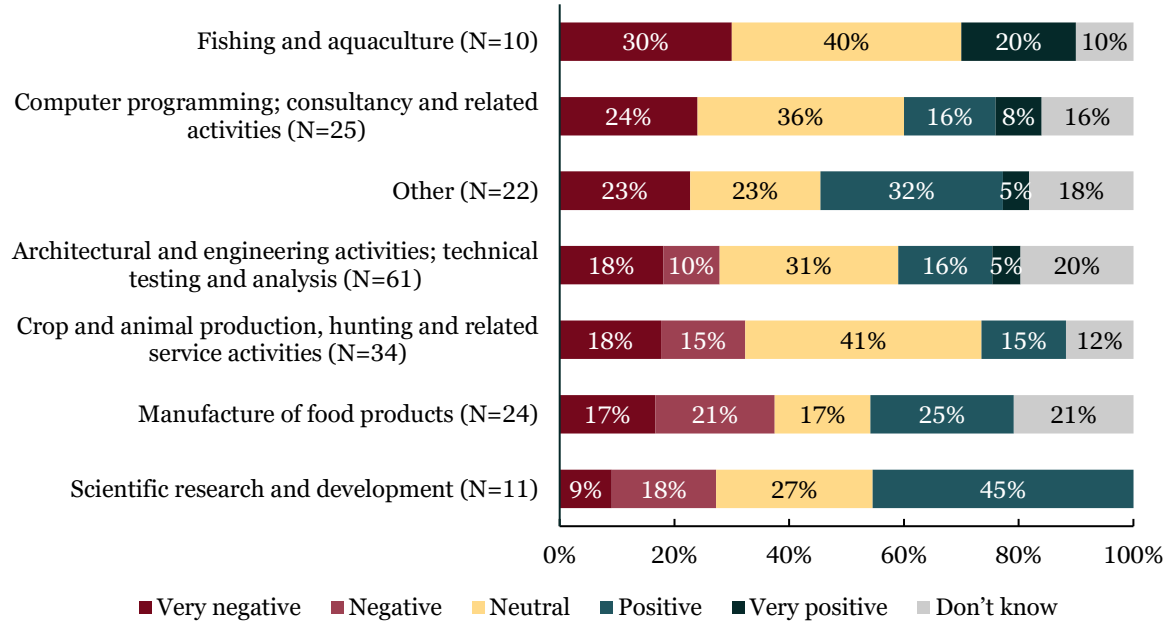
[17] Background information on the respondents, including gender, age, position, is provided in Appendix D.

Figure 3.7: Preferences towards the Cali Fund under national and global implementation scenarios. N = 187 (Norway), N = 190 (Worldwide).



Preferences in the national scenario also vary somewhat across industries, as shown in Figure 3.8. In most industries, neutral and negative responses dominate, while the share of positive answers remains modest, as could be expected. A few industries stand out with relatively higher levels of support, such as scientific research and development and food manufacturing, while others, including fishing and aquaculture, are more sceptical. These differences should, however, be interpreted with caution given the small number of businesses in several of the industries. For the international implementation scenario, the distribution of responses by industry is broadly similar, and a detailed breakdown is provided in Appendix D.

Figure 3.8: Preferences towards the Cali Fund in the national implementation scenario, by industry.[18]



Another important aspect of the survey was to identify the willingness of businesses to contribute to the Cali Fund. Respondents were therefore asked directly whether they would contribute. As shown in

[18] The category «Other» includes the following industries: Other manufacturing, forestry and logging, information service activities, manufacture of beverages, manufacture of computer, electronic and optical products, and manufacturing of basic pharmaceutical products and pharmaceutical preparations.

Figure 3.9, the share answering yes is only 13 percent, while the majority indicate that they would not contribute. A large group also report that they are uncertain.

Figure 3.9: Willingness to contribute to the Cali Fund. N = 190.

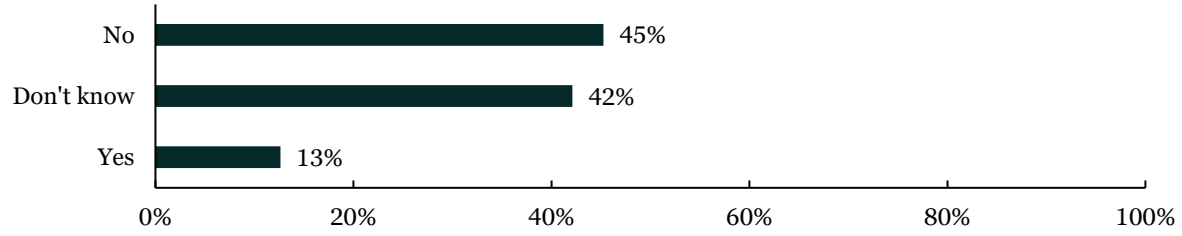
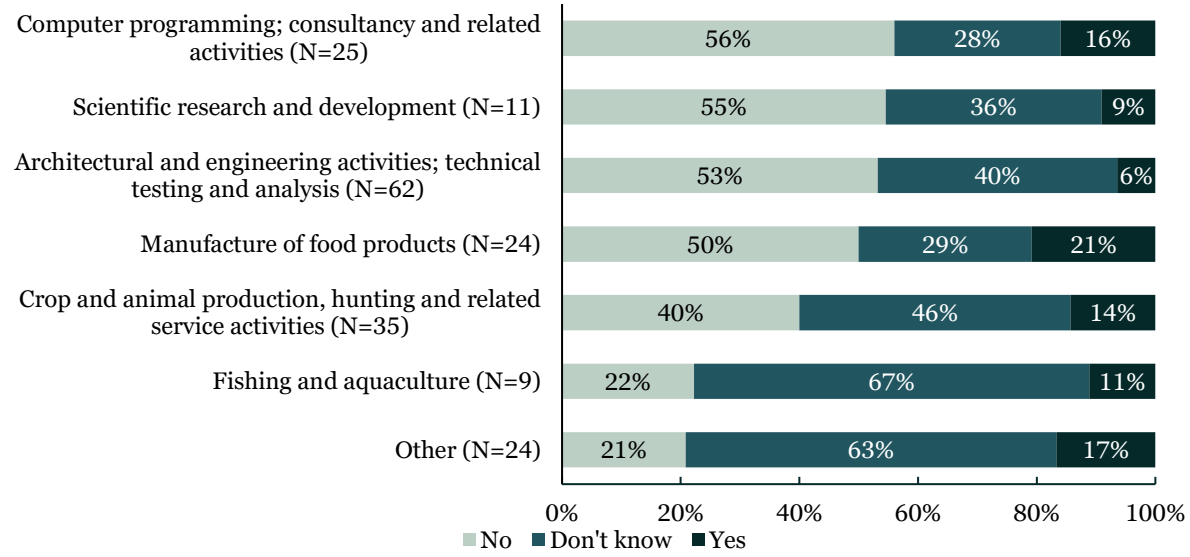


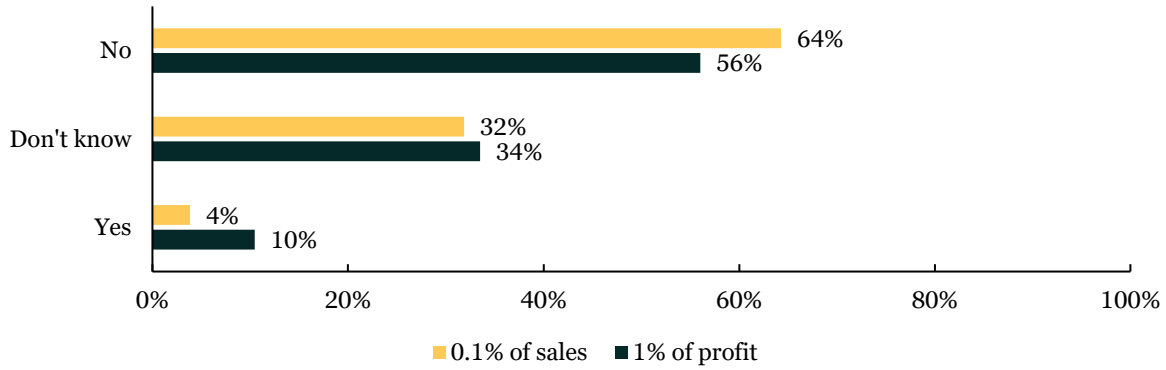
Figure 3.10 shows willingness to contribute broken down by industry. Across all sectors, reluctance and uncertainty dominate. Only small minorities in any group report a willingness to contribute, and no industry stands out with broad support for the fund. This should be understood in the context that 96 percent of the sample had heard about the Cali Fund before the survey.

Figure 3.10: Willingness to contribute to the Cali Fund by industry.



To explore the question further, respondents were asked about their willingness to pay fixed contributions as proposed in the Cali Fund, either 1 percent of profit or 0.1 percent of sales. Responses in Figure 3.11 reveal that acceptance, again, is limited in both cases. Once again, only small minorities express a willingness to contribute, while most businesses answer no. A sizable share also indicate uncertainty. Additional breakdowns, by industry are presented in the appendix. The distributions are similar across industries, and there are no systematic differences between them.

Figure 3.11: Willingness to pay fixed contributions of 0.1 percent of sales or 1 percent of profit. N = 182 (sales), N = 191 (profit)



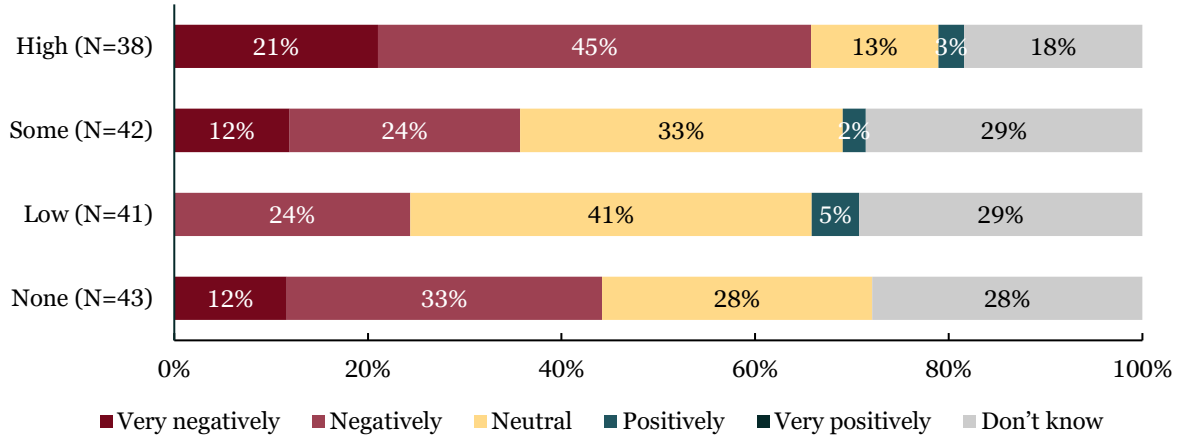
Among businesses rejecting both fixed contribution options, the most frequently cited reasons relate to cost and responsibility. The three most common arguments are scepticism that measures financed by the fund would reduce biodiversity loss, the view that businesses already pay sufficient taxes and fees for the use of natural resources, and concerns that additional costs could not be passed on through higher prices. Several businesses also stress that they do not use DSI and therefore should not be expected to contribute, while others emphasise that financing biodiversity measures should be the responsibility of the state rather than private business. A detailed overview of these reasons is provided in appendix D.

Firms that expressed willingness to contribute most often referred to the importance of supporting a common good such as biodiversity. This motivation was cited by nearly all respondents in this group.

Beyond stated preferences and willingness to contribute, it is also relevant to assess the potential implications of the Cali Fund for competitiveness and profitability. Even modest contributions may have differentiated effects across businesses, depending on the competitive conditions in which they operate. A share of respondents also report that their business already holds certifications or labels, most commonly related to environmental standards. Still, almost half state that they have no such certifications, suggesting that for many businesses the Cali Fund would represent a new type of requirement.

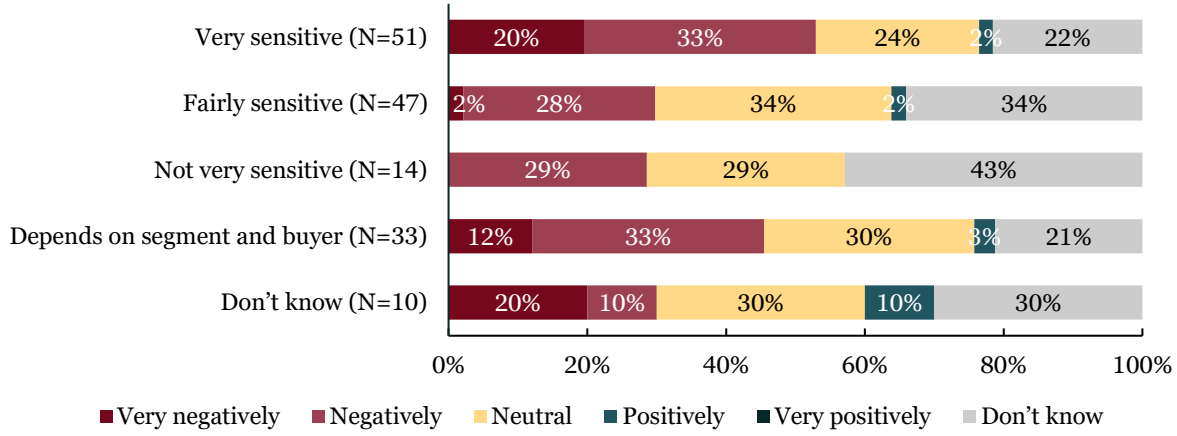
One aspect of this was to ask respondents how they expect the scheme to influence profitability when competing with businesses elsewhere in Europe. Figure 3.12 shows that perceptions vary systematically with the intensity of competition. Among businesses reporting highly competitive pressure, the majority expect a negative impact on profitability, while only a small minority foresee positive effects. For businesses facing some or low competition, neutral and "don't know" responses are more prevalent, and the share expecting negative outcomes is lower. The same pattern emerges for competition outside Europe as well, see Appendix D for the figure.

Figure 3.12: Businesses self-reported expectations of the Cali Fund's effect on profitability, by perceived level of competition with European businesses.



Competitiveness, however, is not only shaped by rival businesses but also by market conditions on the demand side. Another perspective is how expectations about profitability vary with the perceived price sensitivity of customers. Figure 3.13 shows that expectations of a negative impact on profitability are most pronounced among businesses that perceive their customers as highly price sensitive. By contrast, those reporting that their customers are less sensitive are more inclined to give neutral responses or state that they do not know. Positive expectations remain rare across all groups.

Figure 3.13: Expected effect of the Cali Fund on business profitability, conditional on reported customer price sensitivity.

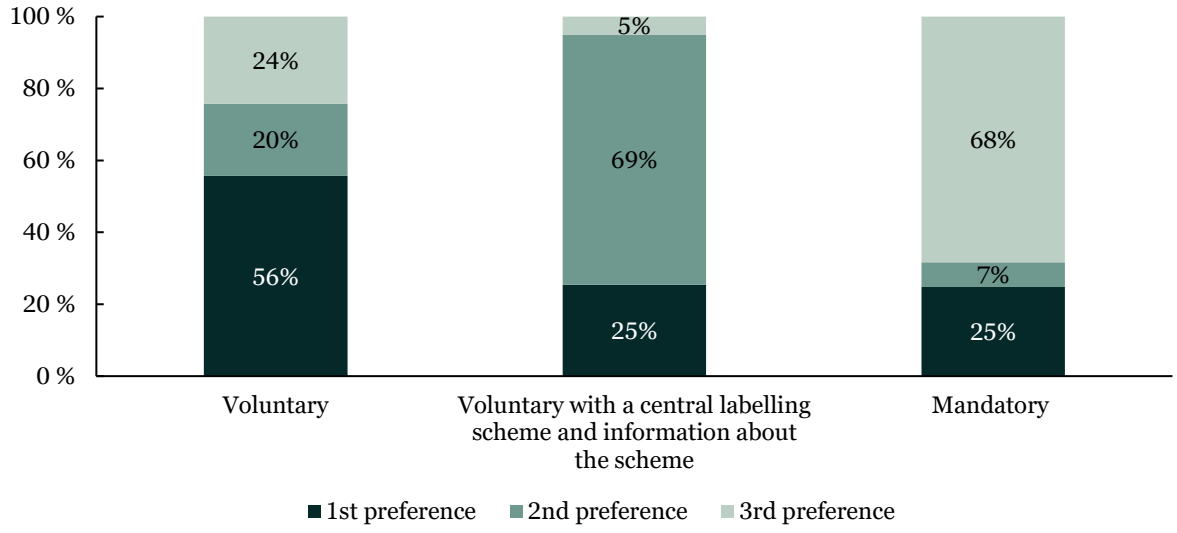


While these results point to limited scope for recovering contributions through pricing strategies that can move the burden to consumers, the survey also explored whether businesses saw potential value in participation through other channels, such as marketing or branding. As presented in Appendix D, the majority of respondents do not expect to highlight contributions in marketing the company or its products, and even fewer believe that it could justify charging higher prices. Around half of respondents reject these possibilities, while only small minorities consider them relevant to any significant extent.

A final dimension of the analysis concerns preferences for how the scheme should be implemented in practice. Figure 3.14 shows a clear preference for voluntary arrangements, with more than half of respondents selecting this as their first choice. A voluntary scheme combined with a central labelling system and information is the most frequent second choice, while mandatory implementation is most

often ranked last, a view reinforced by the open text responses. Many businesses emphasise that new financial burdens should not be imposed on businesses already facing high costs and regulatory requirements, and several argue that biodiversity measures should be funded through the state or directed at businesses with greater environmental impact.

Figure 3.14: Reported preferences for how Cali Fund should be implemented in Norway, by first, second and third preferences. N = 140.



4 Discussion and conclusions

Our analyses of accounting data and a survey among relevant businesses in Norway provide new and relevant information about the size and potential impacts of the Cali Fund in Norway. In the following we summarize key results and discuss i) the size of the total contributions and who contributes, ii) reception and attitudes among businesses and iii) potential impacts for Norwegian industries.

4.1 Potential size of Norwegian contributions to the Cali Fund is NOK 0.2-0.7 bn per year

Applying suggested definitions of relevant industries and the thresholds to Norwegian businesses, the Cali Fund would encompass about 190 Norwegian businesses, employing about 35,000, which is about one percent of total employment in Norway. Assuming that all of these businesses contribute, total contributions may be in the order of NOK 230-745 million per year, depending on whether the calculation is based on profits, sales or a mix of the two. If the contributions are calculated based on profits, total contributions would be more than two-times larger than if they are calculated based on sales (NOK 300 vs. 745 million). A flexible option where each business can apply the option that is most profitable reduces the total contributions to NOK 230 million. This is a the more likely level, since most businesses are likely to try to minimise tax payments and other contributions to comply with rules and expectations. In comparison, estimated incomes from the Norwegian petroleum tax and mainland corporate tax in 2024 were about NOK 357 bn and NOK 136 bn (Prop. 1 LS (2024-2025)). The recently implemented resource rent tax in aquaculture generated about NOK 900 million for 2024, initially estimated to generate NOK 4-17 bn, demonstrating the ability of businesses to restructure and adapt to reduce tax burdens.[19]

By industry, fishing and aquaculture accounts for about half of the contributions, the chemical industry accounts for about 20-30 percent of the contributions, dependent on if the contributions are calculated on profit or sales. The remaining 20-30 percent is spread on other industries, where pharma and IT services, R&D and other services are the largest contributors. For the chemical industry, Yara constitutes 40-75 percent of the contributions. The businesses are concentrated in Oslo and Bergen, reflecting headquarters and services, and in Frøya (midwest coast, near Trondheim), reflecting fishing and aquaculture.

The accounting analysis implicitly assumes that all businesses within the defined industries will be contributing. All businesses do not necessarily use DSI, even the businesses that use DSI will not necessarily voluntarily contribute. Also, the analysis does not account for adaptation by the businesses, e.g., reduced DSI usage or restructuring to avoid thresholds. The estimates must therefore be understood as indicative.

4.2 The reception among businesses is not necessarily negative, but willingness to contribute is low

Our survey reveals that awareness of DSI and the Cali Fund is low. Almost all of the businesses report that they had not heard about the mechanism before the survey. Only 3-4 percent report to use DSI in its own production or further up in their supply chain.

[19] https://www.nrk.no/nordland/staten-skulle-fa-inn-milliarder-i-lakseskatt-_-fikk-inn-knappe-900-mill.-1.17194790.

The general attitude towards the fund is mixed. The businesses express general scepticism towards more or increased taxes. At the same time, 24-30 percent of the surveyed businesses are positive or very positive and about 30 percent are neutral. The businesses within fishing and aquaculture are the most negative. 4 percent of the surveyed businesses state willingness to contribute with the sales base and 10 percent with the profit base, and about 1/3 don't know if they are willing to contribute. Almost all those willing to contribute state the motivation as supporting a common global good.

Among businesses reporting highly competitive pressure, the majority assume it will have a negative impact on profitability, while only a small minority expect that it can have positive effects. Expectations of a negative impact on profitability are most pronounced among businesses that perceive their customers to be highly price sensitive. By contrast, those reporting that their customers are less sensitive are more inclined to give neutral responses or state that they do not know. The survey results point to some, but limited, potential for credible labelling to create commercial value of Cali Fund contributions.

4.3 Impacts on the Norwegian economy depends on competitiveness

Impacts follow from the choice of base (sales, profits or mixed), margin structure, and the competition the businesses face. A profit base concentrates contributions on businesses with high returns, and the size of contributions will be sensitive to business cycles. A sales base would function like a low *ad valorem* tax that weighs relatively more on high volume, low margin activities. In both cases total contributions are relatively modest, but they may significantly impact selected businesses.

The industries in question - fishing and aquaculture, chemical industries, pharma and to some extent the service industries - operate in a global market, meaning that cost increases relative to competitors in other countries reduces competitiveness. Premium product producers to consumers, such as within cosmetics, are more limited in Norway than in other countries. For such products, the potential to pass costs on to consumers is higher than for intermediate goods. Norwegian salmon may have a brand that allow producers to take a price premium with limited substitution effects, but this is also uncertain.

The surveyed businesses have a preference for voluntary implementation of the Cali Fund in Norway. A quarter prefers mandatory implementation, rather than voluntary or voluntary with central labelling. The relatively low preference for voluntary with label could reflect the believed lack of potential to pass costs on to consumers.

DSI is a global commodity and the relevant Norwegian industries compete regionally and globally. This points to a need for a globally coordinated mandatory Cali Fund. Biodiversity loss is accelerating, and a global solution will take time, so short-term national action is warranted. At the same time our survey indicates that voluntary contributions are likely to be low in Norway.

Our study provides initial indications on the impacts of implementing the Cali Fund, but it also exposes important knowledge gaps. The accounting estimates rely on assumptions about participation and do not observe actual DSI usage or take into account behavioural responses and adaptations, so results should be read as indicative. Further work could explore methods to document DSI usage, and how to coordinate stricter rather than voluntary implementation of the Cali Fund across industries and countries. It is also likely that more certainty and confidence in the international mechanism, and especially the distribution and use of the funds to ensure the effective contribution to stemming biodiversity loss, will increase the support for the Cali Fund among businesses. It is clear from other studies, that support for and acceptance of environmental regulation (e.g. carbon taxation) depends on how the collected funds are used (e.g., Dugstad et al. 2023; 2024; Lindhjem et al., 2021).

References

Brink, M., & van Hintum, T. 2022. Practical consequences of digital sequence information (DSI) definitions and access and benefit-sharing scenarios from a plant genebank's perspective. Plants, People, Planet, 4(1), 23–32.

CBD secretariat. 2025. Guide to the Cali Fund: sharing the benefits of genetic data from nature. Montreal: Secretariat of the Convention on Biological Diversity (CBD), United Nations Environment Programme (UNEP) and United Nations Development Programme (UNDP).

Chen, C., Matzdorf, B., & Davis, M. 2024. Companies' preferences and willingness to pay for ecosystem services credits through an online-marketplace. Ecosystem Services, 69, 101653.

Convention on Biological Diversity. 2020. Digital sequence information on genetic resources: concept, scope and current use - CBD/DSI/AHTEG/2020/1/3. https://www.cbd.int/doc/c/fef9/2f90/70f037ccc5da885dfb293e88/dsi-ahteg-2020-01-03-en.pdf.

Cowell, C., Paton, A., Borrell, J. S., Williams, C., Wilkin, P., Antonelli, A., Baker, W. J., Buggs, R., Fay, M. F., Gargiulo, R., Grace, O. M., Kuhnhäuser, B. G., Woudstra, Y., & Kersey, P. J. 2022. Uses and benefits of digital sequence information from plant genetic resources: Lessons learnt from botanical collections. *Plants, People, Planet*, 4(1), 33–43.

De Valck, J., & Rolfe, J. 2019. Comparing biodiversity valuation approaches for the sustainable management of the Great Barrier Reef, Australia. Ecosystem Services, 35, 23–31.

Deutz, A., Heal, G. M., Niu, R., Swanson, E., Townshend, T., Li, Z., Delmar, A., Meghji, A., Sethi, S. A., & Tobin-de la Puente, J. 2020. Financing Nature: Closing the Global Biodiversity Financing Gap. Paulson Institute; The Nature Conservancy; Cornell Atkinson Center for Sustainability.

Dugstad, A., Grimsrud, K. M., & Lindhjem, H. 2024. Carbon pricing acceptance–the role of revenue recycling among households and companies in Norway. Climate Policy, 24(10), 1365–1380.

Dugstad, A., Grimsrud, K., & Lindhjem, H. 2023. Aksept for økt klimaavgift blant norske bedrifter. Praktisk økonomi & finans, 39(4), 352–367.

Halewood, M. 2024. New rules for sharing benefits from the use of digital sequence information. The Nucleus, 67, 5–9.

Hutchinson, M. C., & Lucey, B. 2024. A bibliometric and systemic literature review of biodiversity finance. Finance Research Letters, 64, 105377.

Jonäll, K., Baeckström, Y., Elliot, V., & Arvidsson, S. 2025. The biodiversity–finance nexus: a future research agenda. Current Opinion in Environmental Sustainability, 72, 101504.

Krause, M. S., & Matzdorf, B. 2019. The intention of companies to invest in biodiversity and ecosystem services credits through an online-marketplace. Ecosystem Services, 40, 101026.

Laird, S., Wynberg, R., Rourke, M., Humphries, F., Ruiz Muller, M., & Lawson, C. 2020. Rethink the expansion of access and benefit sharing. Science, 367(6483), 1200–1202.

Lindhjem, H., A. Bruvoll og K. Grimsrud. 2021. Øremerking kan styrke aksepten for klimaavgifter. Samfunnsøkonomen, 4, 64–80.

Natural Capital Coalition. 2016. Natural Capital Protocol. London: Natural Capital Coalition.

Nehring, R. 2022. Digitising biopiracy? The global governance of plant genetic resources in the age of digital sequencing information. Third World Quarterly, 43(8), 1970–1987.

Oldham, P. 2025. The Cali Fund: Sectors, products and services. SSRN working paper.

Oldham, P., & Thambisetty, S. 2024. The Pandemic Access and Benefit Sharing System: Four elements of a trusted system.

Panwar, R., Ober, H., & Pinkse, J. 2022. The uncomfortable relationship between business and biodiversity: Advancing research on business strategies for biodiversity protection. Business Strategy and the Environment, 32(5), 2554–2566.

Prop. 1 LS (2024–2025). Skatter og avgifter 2025. Oslo: Finansdepartementet.

Raposo, D., et al. 2024. Policy brief: DSI data governance practices to support benefit-sharing and science. https://doi.org/10.5281/zenodo.12755428.

Rands, M. R. W., Adams, W. M., Bennun, L., Butchart, S. H. M., Clements, A., Coomes, D., Entwistle, A., Hodge, I., Kapos, V., Scharlemann, J. P. W., Sutherland, W. J., & Vira, B. 2010. Biodiversity conservation: Challenges beyond 2010. Science, 329(5997), 1298–1303.

Redford, K. H., Huntley, B. J., Roe, D., Hammond, T., Lovejoy, T. E., da Fonseca, G. A. B., Rodríguez, C. M., & Cowling, R. M. 2015. Mainstreaming biodiversity: Conservation for the twenty-first century. Frontiers in Ecology and Evolution, 3, 137.

Smith, T., Beagley, L., Bull, J. W., Milner-Gulland, E. J., Smith, M., Vorhies, F., & Addison, P. F. E. 2020. Biodiversity means business: Reframing global biodiversity goals for the private sector. Conservation Letters, 13(1), e12690.

TEEB. 2008. The Economics of Ecosystems and Biodiversity: An Interim Report. European Commission; United Nations Environment Programme.

Thomas, J. 2024. UN puts AI titans on the hook for billions of dollars of biopiracy payments.

United Nations. 2021. System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). New York: United Nations.

United Nations Environment Programme (UNEP). 2024. How a groundbreaking agreement could raise billions to protect the web of life.

Appendices

Appendix A: Details on methods to match and sample industries

The table below presents the industries identified by Oldham (2025) as DSI Sectors, which form the foundation of our analysis.

Table A.1: Overview of DSI industries and ISIC classification.

Industry	ISIC Division(s)	ISIC Class(es) example	Notes
Pharmaceuticals	Div 21	2100	Manufacture of pharmaceuticals, medicinal chemical and botanical products
Nutraceuticals / food and health supplements	Div 10	1079	Other food products n.e.c.
Cosmetics and personal care	Div 20	2023	Soaps, detergents, perfumes, toilet preparations
Animal and plant breeding	Div 01-03	Groups 11-15; plus support services; inputs in Div 20: 2012, 2021	Crop and animal production; include fertilizers and pesticides manufacturers as enabling inputs
Biotechnology R&D	Div 72	7210	Research and experimental development on natural sciences and engineering; includes DNA sequencing
Basic chemicals incl. enzymes and nucleic acids	Div 20	2011	Enzymes and nucleic acids produced within basic chemicals; linkage via CPC codes
Technical testing and analysis	Div 71	7120	Testing and analysis services
Diagnostics, lab equipment, reagents, supplies	Div 23, 26, 32	2310; 2651; 3250; 3290	Lab glassware; measuring/testing instruments; medical and dental instruments; other manufacturing n.e.c.
Information and digital services benefiting from DSI	Div 62, 63	6219; 6310	AI/ML and other programming services; data processing, hosting, and cloud infrastructure
Beverages (for review)	Div 11	1101-1105	Spirits, wine, beer, malt, soft drinks

Limitations in classification alignment

We matched these industries from ISIC with the Norwegian NACE system. A key challenge in this manual process is that even when category names appear identical, their scope or content may differ, since the two systems follow different structural logics.

Another challenge concerns the versions of the classification systems. Oldham (2025) uses both ISIC Rev. 4 and the forthcoming Rev 5, while our data are based on the current Norwegian NACE, which corresponds to ISIC Rev. 4. Although many category names remain consistent across versions, changes in content such as expanded or restructured categories make direct comparisons difficult in some cases.

For these reasons, our sample cannot be regarded as a perfect match to Oldham's framework, even though it served as our main point of reference.

Defining the final sample

Accordingly, we included only those businesses whose NACE codes matched the industry categories identified through the manual mapping to Oldham's ISIC-based classification. Using the most recent data from 2023, we obtained an initial sample of 20,416 businesses.

We subsequently excluded six businesses registered as Norwegian-registered foreign entities. In addition, we excluded companies classified as inactive, defined as having no employees and average annual sales below NOK 500,000 over the past three years. The final sample used in the analysis consists of 4,860 businesses, meaning that 76 percent of the initial sample of 20,416 were excluded.

The figure below illustrates our mapping from ISIC to NACE.

Table A.2: Overview of ISIC and NACE matching.

Industry	ISIC Division	ISIC Detail	NACE Division	NACE Detail
Animal and plant breeding	Division 1: Crop and animal production, hunting and related services	Groups 11-13: Crops by type and plant propagation.	01 Crop and animal production, hunting and related service activities	01.1 Growing of non-perennial crops 01.2 Growing of perennial crops 01.3 Plant propagation
Animal and plant breeding	Division 1: Crop and animal production, hunting and related services	Group 14: Animal production.	01 Crop and animal production, hunting and related service activities	01.4 Animal production
Animal and plant breeding	Division 1: Crop and animal production, hunting and related services	Group 15: Mixed farming.	01 Crop and animal production, hunting and related service activities	01.5 Mixed farming
Animal and plant breeding	Division 1: Crop and animal production, hunting and related services	Group 16: Support activities to agriculture and post-harvest crop activities.	01 Crop and animal production, hunting and related service activities	01.6 Support activities to agriculture and post-harvest crop activities
Animal and plant breeding	Division 2: Forestry and logging	Group 21-24 Silviculture, non-wood forest products and support services to forestry	02 Forestry and logging	02.1 Silviculture and other forestry activities 02.2 Logging 02.3 Gathering of wild growing non-wood products 02.4 Support services to forestry
Animal and plant breeding	Division 3: Fishing and aquaculture	Group 31-33: Fishing, Aquaculture and support services.	03 Fishing and aquaculture	03.1 Fishing 03.2 Aquaculture
Pharmaceuticals	Division 21: Manufacture of basic pharmaceutical products and pharmaceutical preparations	Class 2100: Manufacture of pharmaceuticals, medicinal chemistry and botanical products	21 Manufacture of basic pharmaceutical products and pharmaceutical preparations	21.1Manufacture of basic pharmaceutical products 21.2 Manufacture of pharmaceutical preparations
Nutraceuticals (food and health supplements)	Division 10: Manufacture of food products	Class 1079: Manufacturing of other food products n.e.c.	10 Manufacture of food products	10.890 Manufacturing of other food products n.e.c.
Cosmetics	Division 20: Manufacture of chemical products	Class 2023: Manufacture of soap and	20 Manufacture of chemicals and chemical products	20.4 Manufacture of washing, cleaning and

		detergents, cleaning and polishing preparations, perfumes and toilet preparations.		polishing preparations
Animal and Plant Breeding	Division 20: Manufacture of chemical products	Class 2012: Manufacture of fertilizers and nitrogen compounds.	20 Manufacture of chemicals and chemical products	20.15 Manufacture of fertilisers and nitrogen compounds.
Animal and Plant Breeding	Division 20: Manufacture of chemical products	Class 2021: Manufacture of pesticides and other agrochemical products	20 Manufacture of chemicals and chemical products	20.2 Manufacture of pesticides, disinfectants and other agrochemical products
Biotechnology	Division 21: Manufacture of chemicals and chemical products	Class 2011: Manufacture of basic chemicals. (note: with reference to entities producing enzymes and/or nucleic acids)	20 Manufacture of chemicals and chemical products	20.11 Manufacture of industrial gases 20.12 Manufacture of dyes and pigments 20.13 Manufacture of other inorganic basic chemicals 20.14 Manufacture of other organic basic chemicals 20.15 Manufacture of fertilisers and nitrogen compounds
Laboratory equipment associated with the sequencing and use of digital sequence information on genetic resources, including reagents and supplies	Division 23: Manufacture of other non-metallic mineral products	Class 2310: Manufacture of glass and glass products.	20 Manufacture of chemicals and chemical products	23.1 Manufacture of glass and glass products
Laboratory equipment associated with the sequencing and use of digital sequence information on genetic resources, including reagents and supplies	Division 26: Manufacture of computer, electronic and optical products	Class 2651: Manufacture of measuring, testing, navigating and control equipment	20 Manufacture of chemicals and chemical products	26.51 Manufacture of instruments and appliances for measuring, testing and navigation
Laboratory equipment associated with the sequencing and use of digital	Division 32: Other manufacturing	Class 3250: Manufacture of medical and dental instruments and supplies.	32 Other manufacturing	32.5 Manufacture of medical and dental instruments and supplies

sequence information on genetic resources, including reagents and supplies				
Laboratory equipment associated with the sequencing and use of digital sequence information on genetic resources, including reagents and supplies	Division 32: Other manufacturing	Class 3290: Other manufacturing n.e.c.	32 Other manufacturing	32.99 Other manufacturing n.e.c.
Beverages	Division 11: Manufacture of Beverages	Class 1101 to 1105 for spirits, wines, beer, malt, soft drinks	11 Manufacture of beverages	11.01-11.07 11.01 Distilling, rectifying and blending of spirits 11.02 Manufacture of wine from grape 11.03 Manufacture of cider and other fermented fruit beverages 11.04 Manufacture of other non-distilled fermented beverages 11.05 Manufacture of beer 11.06 Manufacture of malt 11.07 Manufacture of soft drinks and bottled waters
Information, scientific & technical services including artificial intelligence	Division 62: Computer programming, consultancy and related activities	Class 6219: Other computer programming activities (note: includes - machine learning, artificial intelligence, databases, and distributed ledger or blockchain)	62 Computer programming, consultancy and related activities	62.9 Other information technology and computer service activities
Information, scientific & technical services including artificial intelligence	Division 63: Computing infrastructure, data processing, hosting, and other information service activities	Class 6310: Computing infrastructure, data processing, hosting and related activities.	63 Computing infrastructure, data processing, hosting and other information service activities	63.1 Computing infrastructure, data processing, hosting and related activities

Biotechnology	Division 72: Scientific research and development	Class 7210: Research and experimental development on natural sciences and engineering. (note: includes DNA sequencing)	72 Scientific research and development	72.1 Research and experimental development on natural sciences and engineering
Biotechnology	Division 71: Architectural and engineering activities; technical testing and analysis	Class 7120: Technical Testing and Analysis.	71 Architectural and engineering activities; technical testing and analysis	71.2 Technical testing and analysis

Appendix B: Detailed results on affected industries

Table B.1: Summary statistics: Number of businesses in each industry respectively above and under two of the three thresholds (total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million).

	Number of industries		Average employees	
	Under threshold	Above threshold	Under threshold	Above threshold
01 Crop and animal production, hunting and related service activities	826	1	17	10
02 Forestry and logging	534	5	5	44
03 Fishing and aquaculture	1 455	109	5	84
10 Manufacture of food products	70	4	12	98
11 Manufacture of beverages	148	6	10	307
20 Manufacture of chemicals and chemical products	75	21	12	314
21 Manufacture of basic pharmaceutical products and pharmaceutical preparations	19	4	31	530
23 Manufacture of non-metallic mineral products	58	2	13	345
26 Manufacture of computer, electronic and optical products	71	12	19	370
32 Other manufacturing	265	2	8	247
62 Computer programming; consultancy and related activities	35	0	5	0
63 Information service activities	430	10	10	151
71 Architectural and engineering activities; technical testing and analysis	265	2	13	1 038
72 Scientific research and development	419	12	13	363

Note: The thresholds, as averaged over the preceding three years: 1) Total assets of at least USD 20 million, 2) Sales of at least USD 50 million, and 3) Profit of at least USD 5 million

Table B.2: Summary statistics: Median values of annual sales, profits and total assets for each business per industry, with 95 percent confidence intervals in brackets.

	Sales (million NOK)		Profit (million NOK)		Total assets (million NOK)	
	Under threshold	Above threshold	Under threshold	Above threshold	Under threshold	Above threshold
01 Crop and animal production, hunting and related service activities	6.9 [0.6, 82.4]	3468.2	0.1 [-1.8, 6.9]	14.8	5.1 [0.2, 64.5]	596.2
02 Forestry and logging	4.5 [0.6, 49.8]	295.1 [15.6, 1949.3]	0.2 [-0.9, 10.0]	70.1 [12.7, 263.7]	3.0 [0.2, 120.8]	485.5 [356.8, 3720.3]
03 Fishing and aquaculture	5.9 [0.6, 214.2]	497.7 [1.1, 8352.7]	0.2 [-14.3, 36.0]	131.2 [-110.2, 2181.1]	15.1 [0.5, 675.4]	1237.0 [267.9, 15319.2]
10 Manufacture of food products	4.1 [0.6, 271.2]	468.8 [40.4, 2176.8]	0.0 [-11.0, 13.0]	151.2 [69.2, 313.4]	5.2 [0.2, 147.6]	748.5 [474.8, 1032.0]
11 Manufacture of beverages	4.1 [0.7, 222.6]	1439.1 [735.4, 5446.9]	-0.0 [-11.6, 12.2]	67.0 [5.2, 687.3]	4.5 [0.4, 326.9]	1164.9 [387.7, 3392.2]
20 Manufacture of chemicals and chemical products	8.9 [0.7, 241.6]	1303.3 [313.0, 17045.0]	0.1 [-116.4, 31.7]	145.5 [-554.6, 8121.8]	16.3 [0.4, 487.1]	1576.0 [417.4, 63885.3]
21 Manufacture of basic pharmaceutical products and pharmaceutical preparations	23.4 [0.6, 318.2]	1814.8 [1224.6, 9750.3]	-0.5 [-47.5, 25.8]	934.3 [171.9, 2545.4]	29.7 [0.9, 338.4]	3111.5 [1987.9, 10977.9]
23 Manufacture of non-metallic mineral products	6.6 [0.9, 152.8]	1155.2 [673.3, 1637.1]	0.2 [-5.8, 5.4]	81.9 [23.2, 140.6]	5.1 [0.4, 115.0]	814.5 [519.2, 1110.0]
26 Manufacture of computer, electronic and optical products	21.3 [0.7, 171.0]	524.4 [14.9, 8680.1]	0.7 [-24.9, 29.4]	88.7 [12.2, 1501.2]	20.0 [0.5, 244.3]	846.0 [269.4, 13642.8]
32 Other manufacturing	4.1 [0.6, 157.4]	1271.3 [303.7, 2238.9]	0.1 [-4.4, 8.7]	301.9 [226.8, 377.1]	2.5 [0.2, 105.1]	1051.2 [271.3, 1831.0]
62 Computer programming; consultancy and related activities	4.0 [0.8, 32.4]	874.9 [1.4, 2813.2]	0.1 [-8.5, 3.1]	101.8 [-12.9, 730.2]	2.5 [0.3, 31.5]	770.7 [394.5, 5343.3]
63 Information service activities	5.3 [0.6, 233.3]	5365.8 [954.5, 9777.1]	0.1 [-43.7, 26.4]	844.2 [79.4, 1609.1]	5.6 [0.2, 551.9]	10893.1 [780.4, 21005.8]
71 Architectural and engineering activities; technical testing and analysis	4.3 [0.6, 232.7]	664.3 [5.4, 2135.3]	0.2 [-9.0, 20.5]	57.4 [-1.6, 500.6]	3.9 [0.2, 178.0]	1046.5 [366.7, 16544.8]
72 Scientific research and development	4.8 [0.6, 176.3]	3468.2	-0.1	14.8	9.4 [0.3, 510.1]	596.2

Note that for some businesses the number of businesses is particularly low (see Tabel B.1) for these, the 95% CI is not reported.

Table B.3: Sensitivity test: "Over regular threshold" refers to the number of businesses in each industry respectively above and under two of the three thresholds (total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million). "Over 2/3 threshold" refers to the number of businesses in each industry respectively above and under two of the three thresholds at 2/3 level (total assets of at least USD 13.3 million, annual sales of at least USD 33.3 million, and annual profit of at least USD 3.3 million). Over 50 % threshold refers to the number of businesses in each industry respectively above and under two of the three thresholds (total assets of USD 10 million, annual sales of USD 25 million, and annual profit of USD 2.5 million).

NACE	Whole sample	Over regular threshold	Over 2/3 threshold	Over 50 % threshold
01 Crop and animal production, hunting and related service activities	827	1	2	2
02 Forestry and logging	539	5	6	7
03 Fishing and aquaculture	1 564	109	155	184
10 Manufacture of food products	74	4	5	5
11 Manufacture of beverages	154	6	8	11
20 Manufacture of chemicals and chemical products	96	21	22	25
21 Manufacture of basic pharmaceutical products and pharmaceutical preparations	23	4	4	6
23 Manufacture of non-metallic mineral products	60	2	2	2
26 Manufacture of computer, electronic and optical products	83	12	12	16
32 Other manufacturing	267	2	2	5
62 Computer programming; consultancy and related activities	35	0	0	0
63 Information service activities	440	10	16	21
71 Architectural and engineering activities; technical testing and analysis	267	2	4	8
72 Scientific research and development	431	12	19	24
Total	4 860	190	257	316
Share of whole sample		5%	5%	7%

Note: The thresholds, as averaged over the preceding three years: 1) Total assets of at least USD 20 million, 2) Sales of at least USD 50 million, and 3) Profit of at least USD 5 million. 2/3 thresholds thus imply total assets of at least USD 13.3 million, sales of at least USD 33.3 million, and profit of at least USD 3.3 million, and 50% thresholds thus imply total assets of at least USD 10 million, sales of at least USD 25 million, and profit of at least USD 2.5 million.

Table B.4 lists the specific businesses within the relevant industries that fulfil two of the three regular thresholds (in white), fulfil two of the three thresholds if they had been 2/3 of the set level (in light grey) and fulfil two of the three thresholds if they had been 50 percent of the set level (in dark grey). Columns two-four lists average sales, profits and total assets over the years 2021-2023, as reported to the Norwegian Brønnøysund Register Centre. Note again that we do not investigate whether or not individual businesses actually use DSI but take as a starting point the general sector classification of Oldham (2025), as discussed in chapter 3.1.

Table B.4: Name, average sales, profits and assets for businesses above two of three thresholds, and with lower set thresholds (2/3 and 50 percent). Numbers in million NOK.

Name, average sales, profits and assets for businesses above two of three thresholds (total assets of USD 20 million, annual sales of USD 50 million, and annual profit of USD 5 million)			
Business	**Sales**	**Profit**	**Assets**
Mowi Markets Norway AS	227 300	5 900	59 900
Yara Norge AS	214 800	12 600	140 700
Mowi ASA	191 800	54 800	690 100
Elkem ASA	126 100	27 100	324 600
Salmar Farming AS	123 100	30 300	303 300
Kongsberg Maritime AS	113 000	18 800	168 700
Ge Healthcare AS	103 800	26 600	116 100
DNV AS	100 100	16 500	215 400
Mowi Seawater Norway AS	66 600	- 4 000	193 900
Ringnes AS	57 400	7 700	35 500
Cermaq Norway AS	53 200	16 000	97 700
Borregaard AS	51 200	7 000	73 000
Nordlaks Oppdrett AS	51 200	18 200	50 300
Lerøy Midt AS	47 000	7 100	67 500
Nova Sea AS	40 100	10 400	67 200
Gartnerhallen Sa	34 700	100	6 000
Coca-Cola Europacific Partners Norge AS	33 900	900	22 900
Yara International ASA	33 800	135 300	953 100
Finn No AS	28 400	8 700	16 800
Lerøy Aurora AS	28 200	4 500	49 100
Seashore Sjø AS	27 400	1 500	19 800
Cts Nordics AS	27 300	1 300	9 600
Grieg Seafood Finnmark AS	25 400	3 800	29 300
Wacker Chemicals Norway AS	25 100	6 500	24 200
Sintef AS	25 000	1 000	29 200
Lerøy Vest AS	25 000	2 500	38 700
Mills AS	23 000	2 300	9 400
Laerdal Medical AS	22 900	3 800	18 700
Lerøy Midt Sjø AS	22 700	800	53 300
Inovyn Norge AS	22 400	1 100	28 900
Grieg Seafood Rogaland AS	21 600	3 400	21 600
Sjøtroll Havbruk AS	21 100	2 400	32 700
Salmar Finnmark AS	21 000	4 100	78 700
Viken Skog Sa	20 700	2 800	16 200
Aker Biomarine Antarctic AS	19 900	- 1 200	63 100
Fresenius Kabi Norge AS	19 600	1 300	19 100
Nordlaks Havbruk AS	19 100	- 900	92 200
Salmar Namdal AS	18 700	6 300	64 000

Holmøy Havbruk AS	18 500	2 200	14 900
Linde Gas AS	18 200	4 100	15 800
Orkla Home & Personal Care AS	18 100	2 000	25 000
Kongsberg Discovery AS	17 800	5 100	23 800
Iff N&H Norway AS	16 900	3 000	26 900
Pharmaq AS	16 700	7 000	29 900
Glava AS	16 600	1 400	11 300
Firda Sjøfarmer AS	16 400	2 400	8 400
Ringnes Supply Company AS	16 400	500	10 400
Nordox AS	16 300	1 400	14 500
Lerøy Aurora Sjø AS	15 300	700	37 600
Måsøval AS	15 300	1 900	38 300
Tidal Music AS	15 000	- 200	14 100
Advania Norge 24 AS	13 700	1 400	7 900
Kronos Titan AS	13 000	- 100	7 600
Omya Hustadmarmor AS	12 800	1 100	15 500
Hansa Borg Bryggerier AS	12 400	800	12 900
Lerøy Vest Sjø AS	12 000	- 1 600	38 600
Cegal AS	12 000	800	6 800
Ineos Rafnes AS	11 900	800	50 500
Abbott Diagnostics Technologies AS	11 900	11 700	32 300
Institutt For Energiteknikk	11 700	100	8 900
Nova Sea Havbruk AS	11 000	900	26 700
Norce Norwegian Research Centre AS	10 800	800	10 500
Eide Fjordbruk AS	10 600	1 400	14 100
Nippon Gases Norge AS	10 200	3 900	24 900
Eidsfjord Sjøfarm AS	9 700	2 000	21 800
Erko Seafood AS	9 200	1 300	10 800
Lingalaks AS	9 200	1 300	13 400
Ellingsen Seafood AS	9 200	2 100	13 600
Nordland Havfiske AS	9 100	1 600	12 400
Sjøtroll Havbruk Sjø AS	9 100	- 1 100	33 800
Bjørøya AS	8 700	1 400	13 200
Salmar Settefisk AS	8 700	1 400	36 600
Nergård Havfiske AS	8 400	1 700	19 500
Grieg Seafood Finnmark Sjø AS	8 400	400	16 900
Fagerland Multiservice	8 300	100	3 500
Prestfjord AS	8 300	1 000	25 100
Arcus Norway AS	8 200	-	7 200
Unger Fabrikker AS	8 100	300	5 800
Wilhelmsen Chemicals AS	7 800	- 200	5 200
Fiven Norge AS	7 600	1 500	5 600
Sintef Ocean AS	7 600	200	10 600
Washington Mills AS	7 300	1 100	7 500
Lerum AS	7 200	200	3 400
Dnv Business ASsurance Norway AS	7 200	400	2 500
Grieg Seafood Rogaland Sjø AS	7 100	1 000	12 300
Nofima AS	7 000	-	4 900
Indra Navia AS	6 900	600	5 400
Rogaland Fjordbruk AS	6 900	1 500	6 300
Stiftelsen Norges Geotekniske Institutt	6 800	400	7 200

Kobbevik Og Furuholmen Oppdrett AS	6 600	1 000	7 800
3b-Fibreglass Norway AS	6 500	200	5 000
Sintef Energi AS	6 500	400	10 400
Prima Protein AS	6 400	800	5 600
Aquagen AS	6 400	2 000	14 000
Nordsjø Fjordbruk AS	6 300	600	5 100
AS Bolaks	6 200	400	8 400
Tysnes Fjordbruk AS	6 000	1 100	6 700
Flakstadvåg Laks AS	6 000	1 300	6 600
Emilsen Fisk AS	5 900	2 900	13 100
Fluorsid Noralf AS	5 900	500	3 100
Salaks Produksjon AS	5 800	600	10 600
Lovundlaks AS	5 800	1 600	12 700
Blom Fiskeoppdrett AS	5 700	200	7 100
Norwegian Fishfarming Technologies AS	5 700	100	3 700
Rec Solar Norway AS	5 700	- 10 900	6 200
Letsea AS	5 600	300	3 200
Flir Unmanned Aerial Systems AS	5 600	1 100	5 000
Roxar Flow Measurement AS	5 500	-	8 900
Nordland Data AS	5 500	200	4 700
Norbit Ems AS	5 500	400	4 000
Lofoten Sjøprodukter AS	5 200	1 000	7 400
Volstad AS	5 200	2 800	8 600
Egil Kristoffersen & Sønner AS	5 100	3 800	16 200
Kleiva Fiskefarm AS	5 100	600	7 800
Kongsberg Seatex AS	5 000	500	8 500
Gratanglaks AS	5 000	800	7 100
Gildeskål Forskningsstasjon AS	4 900	1 100	6 300
Refsnes Laks AS	4 600	700	4 600
Ambita AS	4 500	700	3 700
Green Mountain AS	4 200	2 400	64 100
Northern Lights Salmon AS	4 100	1 100	4 200
Øyfisk AS	4 100	900	5 900
Seløy Sjøfarm AS	3 900	600	6 400
Sunnhordland Fjordbruk AS	3 900	1 000	4 100
Arnøy Laks AS	3 600	600	4 700
Nordlaks Smolt AS	3 500	600	10 800
Erviks Laks Og Ørret AS	3 400	1 000	5 700
Stiftelsen Sintef	3 400	1 800	29 500
Kobbvåglaks AS	3 300	1 000	7 300
Eidesvik Laks AS	3 300	600	5 200
Nortek AS	3 200	700	2 300
Sørrollnesfisk AS	3 100	800	4 300
Medistim ASA	3 000	1 000	3 600
Fjelberg Fjordbruk AS	3 000	1 300	5 100
Statskog Sf	3 000	1 400	39 500
Kappa Bioscience AS	2 900	700	4 700
Dahl Fiskeri AS	2 800	500	16 500
Fylkesnes Fisk AS	2 800	700	4 500
Røvær Fjordbruk AS	2 800	800	3 300
Hardhaus AS	2 800	800	11 400

Ballangen Sjøfarm AS	2 800	700	5 500
Optinose AS	2 500	2 200	2 300
Lerøy Seafood Group ASA	2 500	11 000	135 700
Selsøyvik Havbruk AS	2 200	500	3 000
Grieg Seafood ASA	2 100	4 500	68 100
Alsaker Fjordbruk AS	2 100	5 300	18 400
Nordfjord Laks AS	2 100	600	2 200
Sjurelv Fiskeoppdrett AS	1 900	700	2 600
Libas AS	1 800	600	7 500
Cermaq Group AS	1 700	3 500	17 000
Aker Biomarine ASA	1 400	1 200	52 300
Eros AS	1 200	700	7 800
Norda ASA	1 200	700	7 500
Akvafarm AS	1 100	900	3 900
Frøy AS	700	700	39 600
Stangeskovene AS	700	700	4 900
O. Husby Fiskebåtrederi AS	700	1 400	2 700
Fiven ASA	600	2 300	12 100
Hellesund Fiskeoppdrett AS	600	1 300	3 800
Eide Family AS	500	2 000	2 900
Roxar AS	400	800	23 200
Grieg Maturitas Ii AS	400	7 800	50 800
Lerøy Havfisk AS	300	3 500	27 400
Norbit ASA	300	1 100	8 400
Firda Seafood Group AS	200	3 100	11 800
Agra Foods AS	200	3 200	10 400
Bolaks Group AS	200	1 000	17 900
The Resource Group Trg AS	100	4 100	112 000
Sundt AS	100	4 400	51 400
Torghatten Aqua AS	100	600	5 000
AS Kistefos Træsliberi	100	700	4 400
Hafslund Vekst AS	100	4 900	217 000
Laco AS	100	5 200	16 900
Bjørøya Holding AS	100	1 200	3 500
Bifrost Og Draupne AS	-	5 000	17 200
Babord Catch AS	-	900	4 200
Rolv Haugarvoll AS	-	1 300	7 200
Refsnes Fiskeindustri AS	-	2 000	2 800
Vartdal Invest AS	-	4 200	12 700
Vigner Olaisen AS	-	3 200	5 800
Gåsø Næringsutvikling AS	-	3 900	40 900
Partrederiet Karoløs Ans	-	1 300	5 600
Bjarøy Gruppen AS	-	2 100	5 600
Austevoll Seafood ASA	-	10 500	62 600
Haugland Gruppen AS	-	1 600	11 600
Cermaq Norway Holding AS	-	43 100	128 600
Valinor AS	-	700	7 500
Gigante Havbruk AS	-	1 000	4 000
TC Holding AS	-	1 500	2 800
Occasione By Olaisen AS	-	1 600	2 200

Name, average sales, profits and assets for businesses above two of three thresholds at 2/3 of the set level (total assets of USD 13.3 million, annual sales of at least USD 33.3 million, and annual profit of at least USD 3.3 million)			
Addcon Nordic AS	5 200	200	3 300
Stiftelsen Norsk Institutt For Naturforskning	5 100	100	5 500
Norsk Institutt For Vannforskning	5 000	-	3 800
Braathe AS	4 900	200	4 800
Kvarøy Fiskeoppdrett A/S	4 600	400	11 300
Steinvik Fiskefarm AS	4 500	400	3 400
Fiskeri- Og Havbruksnæringens Forskningsfinansiering AS	4 500	-	9 700
Geno Sa	4 200	-	3 500
Tombre Fiskeanlegg AS	4 200	- 400	8 800
Aass Bryggeri AS	4 100	200	3 500
Salatmestern AS	4 100	100	1 800
Troland Lakseoppdrett AS	4 000	400	2 500
Macks Ølbryggeri AS	4 000	200	3 800
Visma It & Communications AS	3 800	300	1 800
Emilsen Havbruk AS	3 800	300	9 200
Ewos Innovation AS	3 800	100	5 700
Frøy Akvaservice AS	3 800	100	6 300
Osland Havbruk AS	3 600	100	6 800
Austevoll Melaks AS	3 600	300	3 800
Lerøy Sjøtroll Kjærelva AS	3 600	200	8 600
Helgeland Smolt AS	3 500	300	10 800
Oceaneering ASset Integrity AS	3 400	400	4 500
Akvafuture AS	3 300	400	6 000
Edelfarm AS	3 100	400	5 500
Langøylaks AS	3 100	500	3 600
Si Osl 01 AS	3 000	500	4 900
Sinkaberghansen Havbruk AS	3 000	400	4 800
Auksjonen.No AS	2 900	400	2 700
Sulefisk AS	2 800	500	3 800
Econnect Energy AS	2 600	500	3 500
Wenberg Fiskeoppdrett AS	2 600	400	6 300
Norsk Analyse AS	2 600	500	1 700
Telavåg Fiskeoppdrett AS	2 500	400	2 700
Ramoen AS	2 500	400	4 900
Nye Giske Havfiske AS	2 200	400	5 400
Benchmark Genetics Salten AS	2 200	400	6 200
Rosund Drift AS	2 200	500	4 700
Tomma Laks AS	2 100	500	1 900
Toftøy Fjordbruk AS	2 000	400	2 100
AS Havstrand	1 900	400	2 800
Eiendomsverdi AS	1 900	600	1 600
Cetus AS	1 800	400	9 400
Fjon Bruk AS	1 800	400	2 100
Støttfjord Holding AS	1 800	1 200	1 500
E. Karstensen Fiskeoppdrett AS	1 500	400	2 900
Marø Havbruk A/S	1 500	400	2 700
Østerbris AS	1 500	500	6 600
Kransvik AS	1 500	400	4 300
Gerda Marie AS	1 400	400	6 800

Digitale Medier 1881 AS	1 400	800	1 900
Havbryn AS	1 400	400	2 800
Br. Aandahl AS	1 300	900	1 600
Smaragd AS	1 200	400	5 700
Seacalx AS	1 100	400	1 700
Vega Sjøfarm AS	1 100	400	1 800
Kolbjørn Ervik & Sønner AS	1 100	400	2 200
Knester AS	1 000	400	7 800
Xellia Pharmaceuticals AS	800	400	6 800
AS Øylaks	700	500	2 800
AS Værdalsbruket	200	400	3 000
Liegruppen Fiskeri AS	200	500	6 900
Gunnar Klo Holding AS	100	400	2 200
Ytterstad Fiskeriselskap AS	100	400	13 600
Grieg Kapital AS	-	400	8 400
Edelfisk AS	-	800	2 100
Tm Holding AS	-	400	1 900
Frøy Kapital AS	-	500	26 000
Name, average sales, profits and assets for businesses above two of three thresholds at 50 percent of the set level (total assets of USD 10 million, annual sales of USD 25 million, and annual profit of USD 2.5 million)			
Sb Skog AS	7 800	100	1 100
Babord Seafood AS	4 100	-	1 200
Benchmark Genetics Norway AS	3 500	300	3 300
Tuboscope Norge AS	3 500	- 700	2 700
Norsun AS	3 500	- 2 300	2 600
Vistin Pharma AS	3 400	200	3 700
Huddly AS	3 300	- 1 700	7 200
Google Norway AS	3 300	- 300	3 200
Becton Dickinson Norway AS	3 100	100	2 000
Voss Production AS	3 100	- 100	8 200
Abyss AS	3 000	-	6 300
Engesund Fiskeoppdrett AS	3 000	-	3 000
Elhub AS	2 900	300	8 900
Polarfeed AS	2 900	-	1 500
Måsøval Drift AS	2 900	- 200	2 300
Onyx Centersource AS	2 800	500	1 300
Grans Bryggeri AS	2 800	100	3 100
Hepro AS	2 800	-	1 600
Inission Løkken AS	2 800	200	2 200
Tytlandsvik Aqua AS	2 800	200	6 400
Osland Genetics AS	2 800	200	2 700
Photocure ASA	2 800	- 300	10 200
Ortopediteknikk AS	2 800	200	1 300
Kiwa AS	2 800	-	1 500
Varde Fiskeoppdrett AS	2 700	100	1 700
Holmøy Maritime AS	2 700	100	10 800
Nemko Group AS	2 600	300	5 500
Seashore Land AS	2 400	300	7 000
Skretting Aquaculture Innovation AS	2 400	300	1 300
ASker Contract Manufacturing AS	2 300	300	3 000
Eurofins Environment Testing Norway AS	2 300	300	1 200

Isqueen AS	2 200	300	4 400
Arcus-Gruppen AS	1 900	300	17 000
AS Knutshaugfisk	1 900	300	4 600
Neo Monitors AS	1 900	300	1 100
Fjord Drift AS	1 800	300	2 000
Clampon AS	1 700	300	1 400
Prophylaxia AS	1 600	300	3 800
Pega Nordic AS	1 500	300	5 300
Mettler-Toledo Cargoscan AS	1 500	300	1 200
Stormgeo AS	1 400	300	7 200
Fjord Marin Holding AS	1 400	300	1 600
Arcticzymes AS	1 300	500	1 300
Br Birkeland Fiskebåtrederi AS	1 200	300	2 500
Gunnar Langva AS	1 200	300	4 500
Talbor AS	1 200	400	2 200
Byggfakta Docu AS	1 000	300	1 300
Benonisen Fiskeri AS	1 000	300	5 600
AS Sæbjørn	800	300	1 200
Havfisk AS	800	300	4 200
Finnøy Fisk AS	800	300	1 900
Topas Kystfiske AS	700	300	2 300
Korshavn Havbruk AS	600	300	1 500
Liegruppen AS	200	300	4 300
Arcticzymes Technologies ASA	100	300	4 300
Rosund Holding AS	-	300	1 300
Teigebris AS	-	400	7 500
Norway Fresh AS	-	300	2 600
Giske Havfiske AS	-	300	1 400

Appendix C: Survey questionnaire[20]

Survey on How Businesses May Be Affected by the Global Fund to Protect the World's Biodiversity under the Global Biodiversity Framework

On behalf of the Ministry of Climate and Environment, Menon Economics is conducting a survey on how the commitments in the international biodiversity framework can be implemented in Norway and how this may affect Norwegian businesses. Your answers are important as input to the government's biodiversity and business policy.

The survey will take approximately 8 minutes to complete. All answers will be anonymized. As a thank you, you will be entered into a draw for a large box of confectionery.

Please answer on behalf of your company where possible.

The survey concerns DSI (digital sequence information). DSI is digitized information about genetic material (e.g., DNA). Simply put, DSI is nature's digital gene bank. DSI is used, among other things, in vaccines and medicines; to improve food, feed, and livestock; in fertilizers and nitrogen compounds; in cosmetics; and in other biotechnological and pharmaceutical processes.

1. Who are the typical buyers of your company's products and/or services? [multiple answers possible]
    a. Private consumers
    b. Public sector entities
    c. Other companies
    d. Other, please specify

2. To what extent does your company compete with foreign companies? [multiple answers possible]

    a. Competition with companies in Europe [None, low, some, high, don't know]
    b. Competition with companies outside Europe [None, low, some, high, don't know]

The biodiversity underlying DSI typically originates from tropical countries, including rainforests. At the UN Convention on Biological Diversity conference in Colombia in autumn 2024, the Cali Fund was established. This is a global fund to ensure the fair sharing of benefits from the use of DSI.

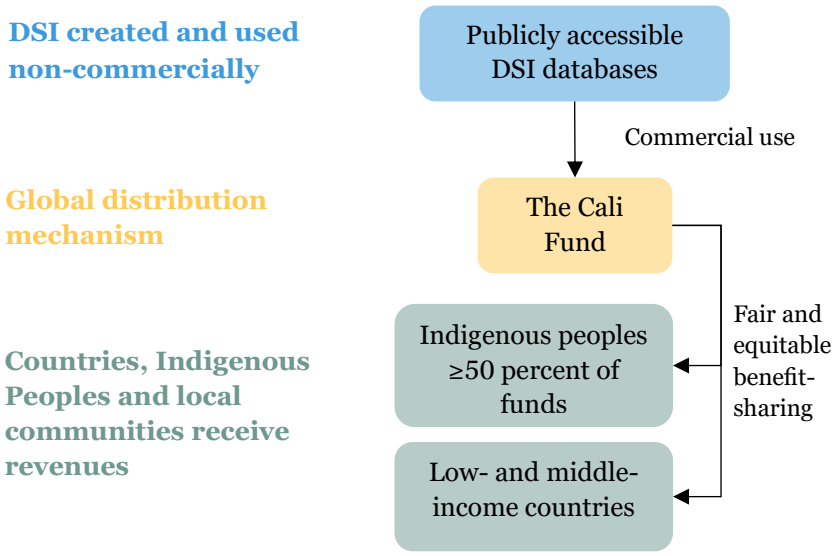
The following sectors are highlighted as potentially benefiting directly or indirectly from DSI, and may therefore be subject to obligations to contribute to the fund:

- Pharmaceutical industry
- Food and dietary supplements
- Cosmetics
- Animal and plant breeding
- Biotechnology
- Laboratory equipment related to sequencing and the use of digital sequence information on genetic resources

[20] Translated from Norwegian, the language used in the survey

- Information, research, and technology services related to digital sequence information on genetic resources, including artificial intelligence

Users of DSI (including storage and distribution of such information) are expected to contribute to the fund. Revenues will be allocated to the stewards of biodiversity. The scheme is intended to help reduce global biodiversity loss. The fund is administered under the UN, with the World Bank as the organizer. Half of the fund's revenues will be allocated to Indigenous Peoples. All UN member states except the United States and the Vatican are parties to the Convention on Biological Diversity.



The scheme is, in principle, voluntary, but the Ministry of Climate and Environment will consider policies to encourage DSI users to contribute. This survey is part of the basis for assessing how the scheme may be implemented in Norway.

3. Before this survey, had you heard about the Cali Fund established in 2024?
    a. Yes
    b. No
4. What is your company's view on all companies in your sector in Norway being included in such a scheme?
    a. Very positive
    b. Positive
    c. Neutral
    d. Negative
    e. Very negative
    f. Don't know
5. What is your company's view on all companies in your sector worldwide being included in such a scheme?
    a. Very positive
    b. Positive
    c. Neutral
    d. Negative
    e. Very negative
    f. Don't know

If the Cali Fund does not receive contributions, the world's biodiversity loss will continue. Everyone must therefore contribute, including businesses.

Imagine that the scheme is introduced voluntarily in Norway, and it is certain and credible that the revenues are used for biodiversity conservation.

6. Would your company be willing to contribute to the Cali Fund?
    a. Yes
    b. No
    c. Don't know

It is currently proposed that companies voluntarily contribute either 1% of profits after tax or 0.1% of revenues after tax.

7. Would your company be willing to pay 1% of profits after tax to the Cali Fund? [Yes, No, Don't know]
    a. [If No:] If the scheme allows smaller contributions, would your company be willing to pay any share at all of profits after tax? [Yes, please specify a number between 0.1 and 1%, No, Don't know]
    b. [If Yes:] If the scheme is expanded to larger contributions, what is the maximum percentage of profits after tax your company would be willing to contribute to the Cali Fund? [Open field: specify between 1.1 and 100%, Don't know]

As an alternative to 1% of profits after tax, companies could instead pay 0.1% of revenues after tax.

8. Would your company be willing to pay 0.1% of revenues after tax to the Cali Fund? [Yes; No; No, would rather pay from profits as above; Don't know]
    a. [If No:] If the scheme allows smaller contributions, would your company be willing to pay any share at all of revenues after tax? [Yes, please specify a number between 0.01 and 0.09%, No, Don't know]
    b. [If Yes:] If the scheme is expanded to larger contributions, what is the maximum percentage of revenues after tax your company would be willing to contribute to the Cali Fund? [Open field: specify between 0.09 and 100%, Don't know]
9. [If No to 7 and 8.] You answered that your company would not contribute 1% of profits or 0.1% of sales to the Cali Fund. What are the up to two most important reasons?
    a. It would negatively affect profitability too much
    b. It would not be possible to cover the cost through higher prices
    c. Improved reputation among customers and employees would have little impact
    d. I do not believe that competitors will contribute
    e. I do not believe the money will be used for the specified purpose
    f. I do not believe measures financed by the fund will reduce biodiversity loss
    g. It is unclear what the company's contribution will actually be used for
    h. We already pay enough taxes and fees for the use of natural resources
    i. Other, please specify: _____
10. [If Yes to 7 or 8.] You answered that your company would contribute to the Cali Fund. What is the most important reason?
    a. Important to contribute to a common good such as biodiversity
    b. It can be used in the company's marketing
    c. It provides a competitive advantage
    d. Other, please specify: _____

11. Does your company use genetic information or other DSI (or store or distribute DSI) in its production of goods or services?
    a. Yes, to a large extent
    b. Yes, to some extent
    c. No, the company does not use DSI
    d. Don't know
12. Does your company purchase goods or services in which DSI has been used?
    a. Yes, to a large extent
    b. Yes, to some extent
    c. No, the company does not purchase goods or services made with DSI
    d. Don't know
13. How do you assess that the scheme could affect your company's profitability?
    a. Very positively
    b. Positively
    c. Neutral
    d. Negatively
    e. Very negatively
    f. Don't know
14. If the scheme is introduced and your company contributes:
    a. Would you use this in your company's marketing?
        i. Yes, to a large extent
        ii. Yes, to some extent
        iii. No
        iv. Unsure/Don't know
    b. Would you use this in marketing of products and/or services?
        i. Yes, to a large extent
        ii. Yes, to some extent
        iii. No
        iv. Unsure/Don't know
    c. Would you be able to charge a higher price for the now more nature-friendly products/services?
        v. Yes, to a large extent
        vi. Yes, to some extent
        vii. No
        viii. Unsure/Don't know
15. In other ways, how could your company capitalize on the scheme?
16. How do you assess that it would be most appropriate to introduce such a scheme? [rank]
    a. Voluntary
    b. Voluntary with a central labelling scheme and information about the scheme
    c. Mandatory
17. How price-sensitive do you consider your customers to typically be? [Very sensitive, fairly sensitive, not very sensitive, depends on segment and buyer, don't know]
18. Do your company's products, services, or operations have one or more certifications or labels (e.g., Fairtrade, Nordic Swan, Eco-Lighthouse)? [multiple answers possible]
    a. Yes, environmental
    b. Yes, labor conditions or other social aspects
    c. Yes, other, please specify: _____
    d. No
19. What is your role in the company?
    a. Senior management
    b. Middle management

    c. Secretary
    d. Finance/Accounting
    e. HR
    f. Marketing
    g. Owner
    h. Board member/Chair
    i. CEO/Managing Director
    j. Other position/role, please specify: _____
20. To what extent do you influence the company's overall climate and environmental strategy?
    a. No influence
    b. Very little influence
    c. Some influence
    d. Great influence
    e. Very great influence
21. Are you male or female?
    a. Female
    b. Male
22. How old are you?
    a. Under 20
    b. 20-30
    c. 30-40
    d. 40-50
    e. 50-60
    f. Over 60
    g. Prefer not to say
23. What is your highest completed education?
    a. Primary school (7-10 years)
    b. Upper secondary school
    c. Vocational certificate
    d. 3-4 year university degree (Bachelor's)
    e. 5-year university degree (Master's/Professional degree)
    f. PhD/Doctorate
    g. Other, please specify: _____
    h. Unsure/Don't know
24. May we link your survey responses to publicly available accounting information about your company (sales, profit, employees, etc.)? Your responses will be treated confidentially and not shared with the Ministry of Climate and Environment or others. [Yes, No]
    a. [If No:] What has been your company's average profit after tax over the past three years?
    b. [If No:] What has been your company's average total assets over the past three years?
    c. [If No:] What has been your company's average sales over the past three years?
25. What address should the possible prize box of confectionery be sent to?
26. Do you have any final comments you would like to add? [free text]

Appendix D: Additional survey results

Figure D.1: Gender distribution among survey respondents. N= 164.

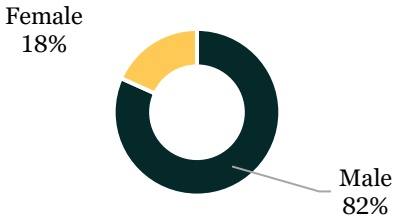


Figure D.2: Age distribution among survey respondents. N = 164.

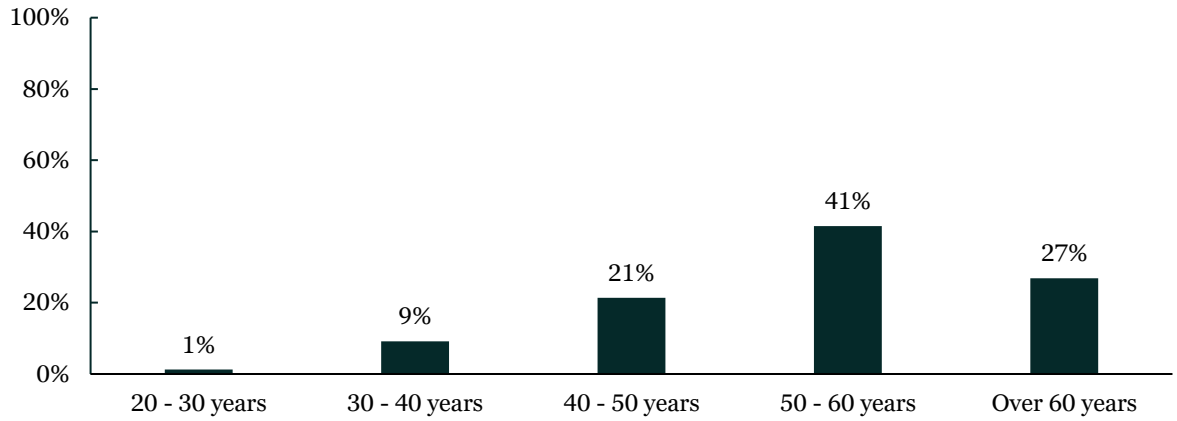


Figure D.3: Educational background of survey respondents. N = 163.

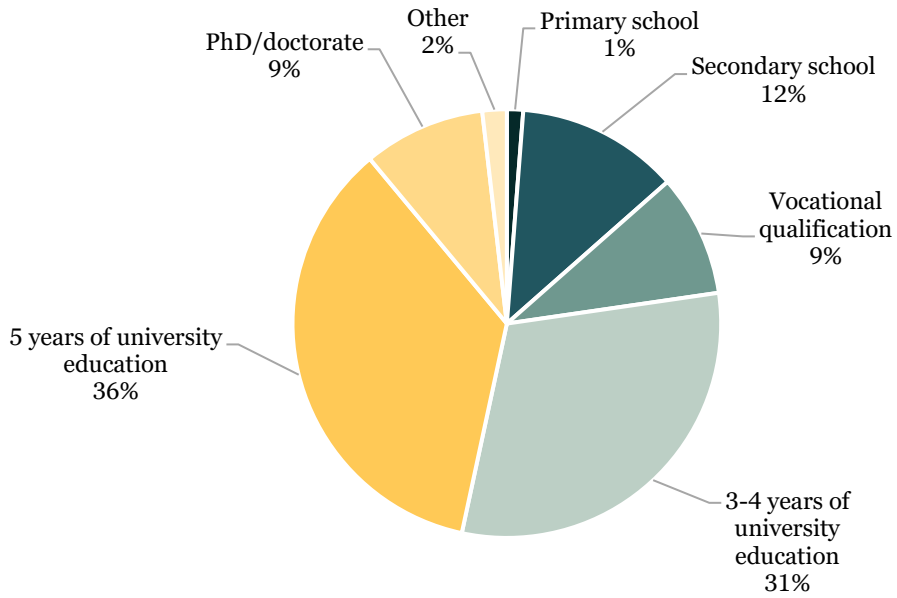


Figure D.4: Reported position of survey respondents. N = 160.[21]

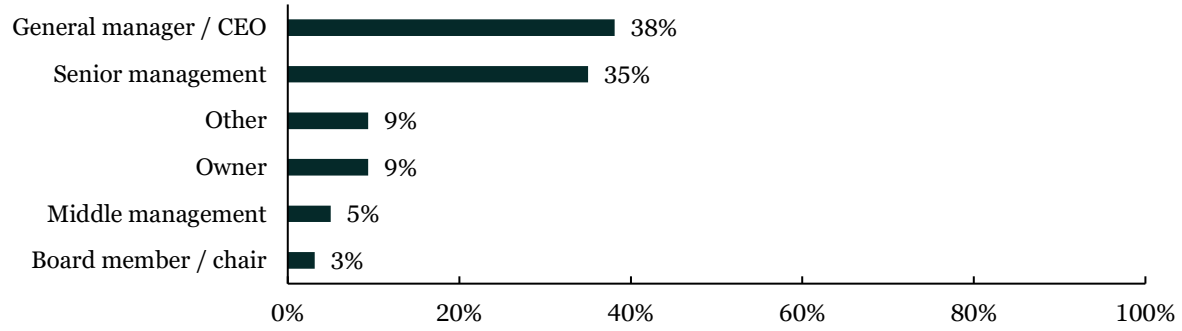


Figure D.5: Reported influence on company strategy for climate and environmental measures. N = 162.

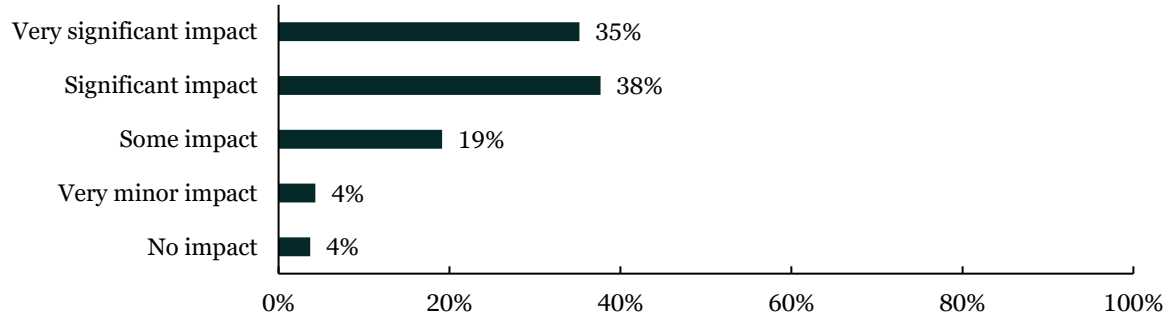
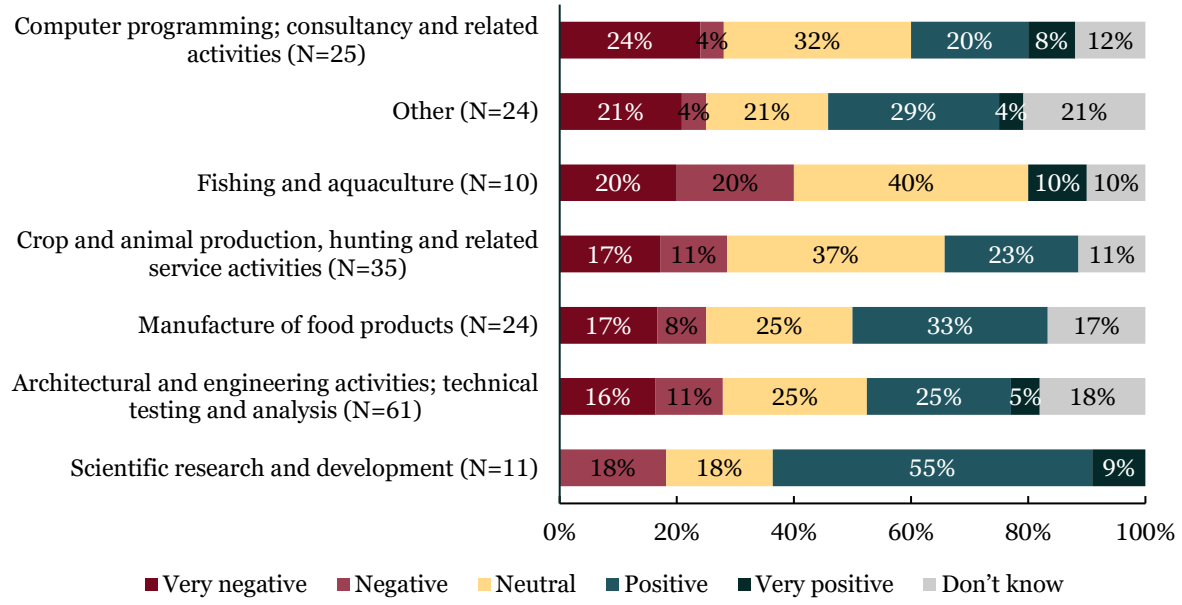


Figure D.6: Preferences towards the Cali Fund in the international implementation scenario, by industry. [22]



[21] The category «Other» includes positions such as sustainability manager, HR, advisor, and administrative staff.
[22] The category «Other» includes the following industries: Other manufacturing, forestry and logging, information service activities, manufacture of beverages, manufacture of computer, electronic and optical products, and manufacturing of basic pharmaceutical products and pharmaceutical preparations.

Figure D.7: Main reasons given for rejecting fixed contribution options to the Cali Fund. Percent of respondents selecting each reason (multiple responses allowed).

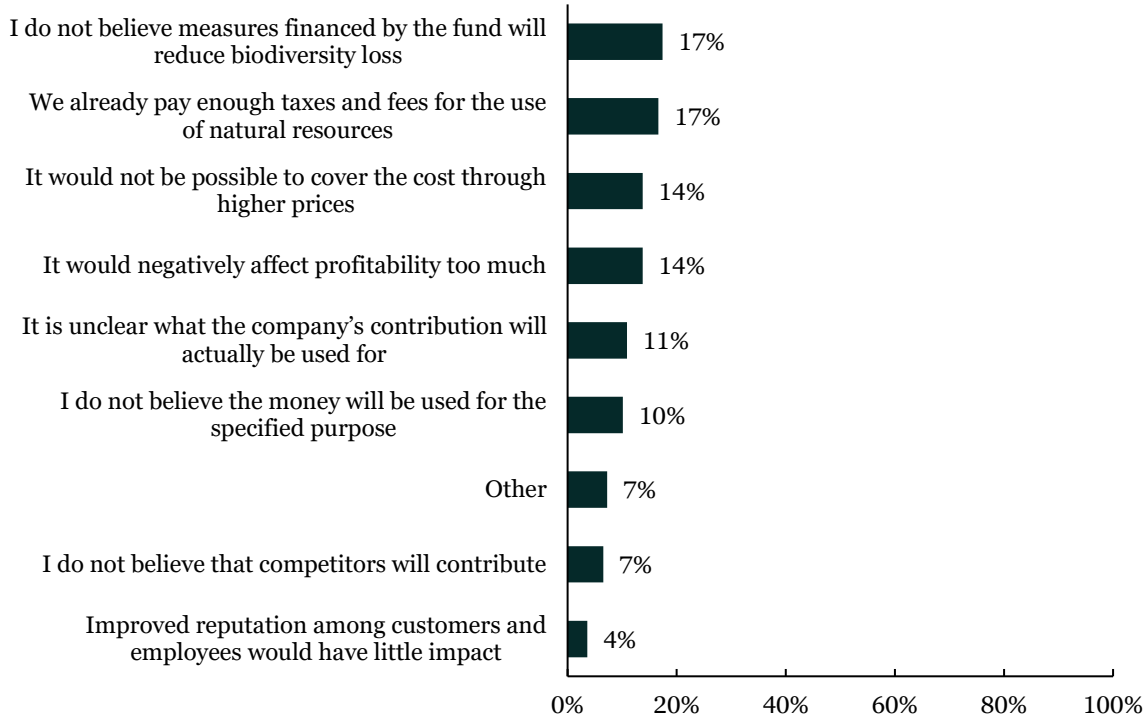


Figure D.8: Willingness to pay 1 percent of profit to the Cali Fund, by industry.

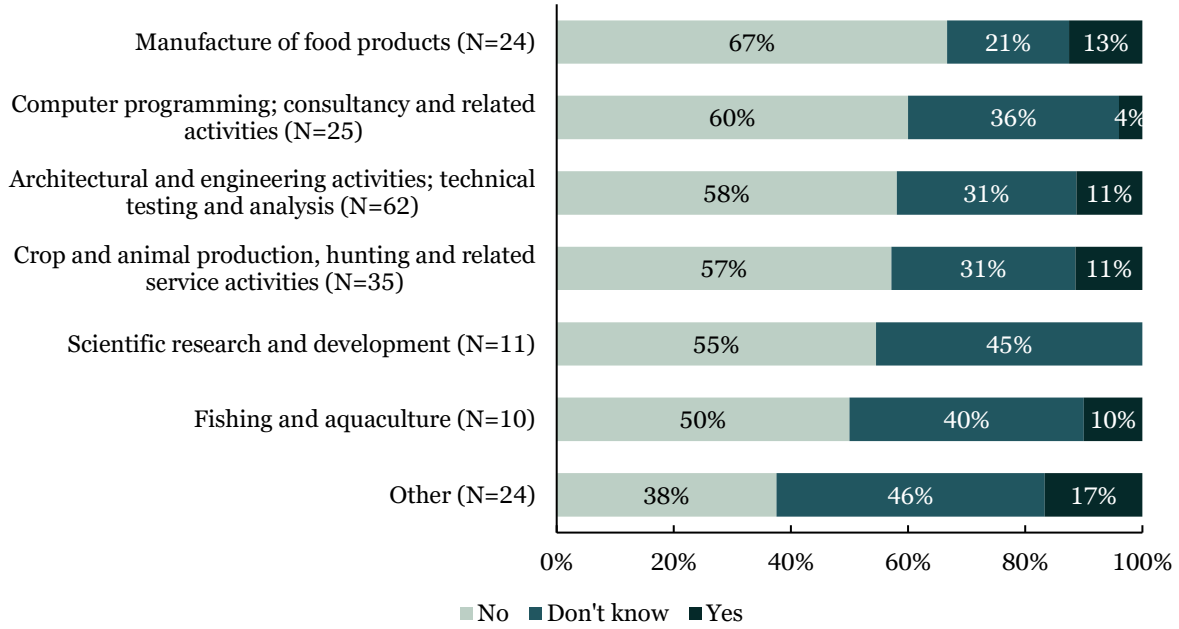


Figure D.9: Willingness to pay 0.1 percent of sales to the Cali Fund, by industry.

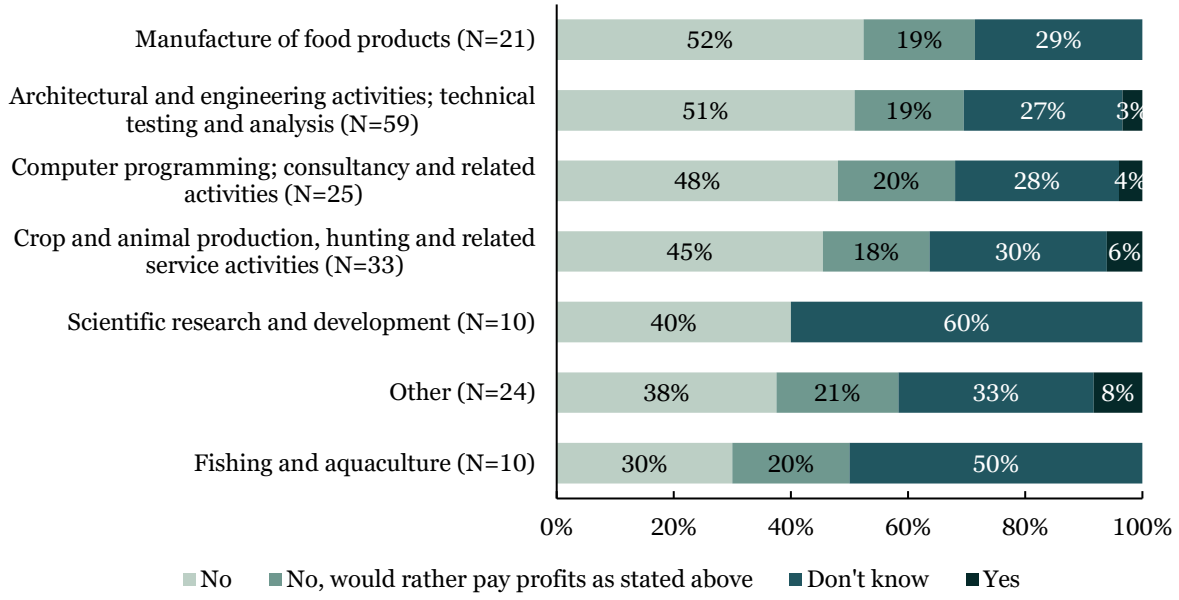


Figure D.10: Businesses self-reported expectations of the Cali Fund's effect on profitability, by perceived level of competition with businesses outside of Europe.

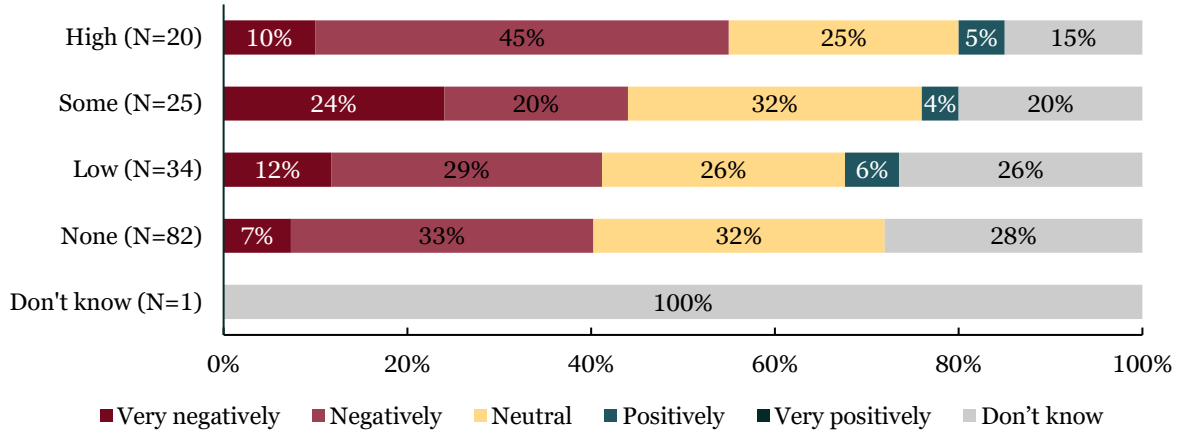
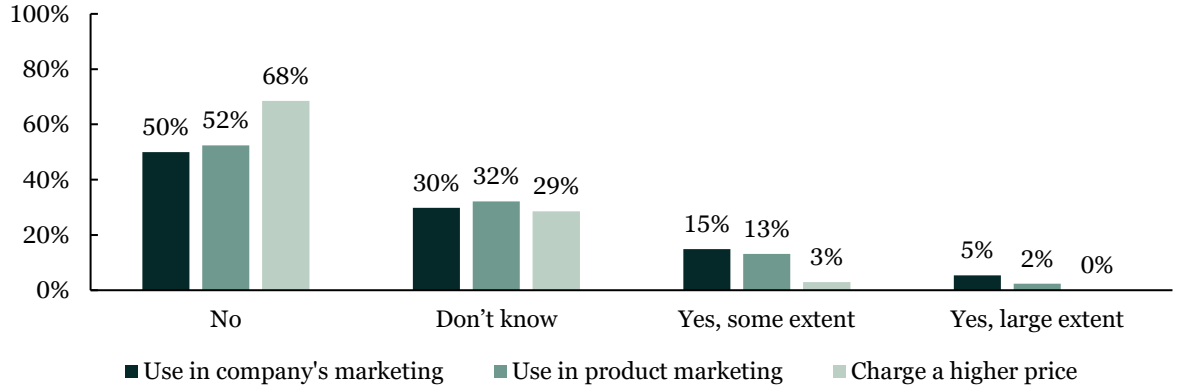


Figure D.11: Expected use of participation in the Cali Fund for marketing and pricing, conditional on the scheme being introduced and the businesses contributing financially. N = 168.



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