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Dividend Payouts and Government Support during Covid-19

An empirical analysis of dividend payouts in Norway during Covid-19

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Master thesis in Accounting and Auditing

NORWEGIAN SCHOOL OF ECONOMICS

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Abstract

The purpose of this master thesis is to investigate whether receiving emergency state aid to mitigate the negative economic effects of the Covid-19 pandemic impacted the likelihood of dividends in 2020. Further, we attempt to shed light on whether firms that received more compensation than necessary to survive were more or less likely than their counterparties to pay dividends. Through 2020 data on accounting figures and received compensation obtained from The Norwegian Tax Administration, we analysis the data through a logistic difference-in-difference regression model. We further investigate for heterogeneity in outcome across region and sector affiliation.

Our results show significant results indicating that receiving compensation decreased the likelihood of dividends during the pandemic. The results overall hold true despite heterogeneity in received compensation across sector and region affiliation. Also, we find that contrary to public criticism of the scheme, firms that received more compensation than necessary to survive were less likely to pay dividends in 2020, however the impact was not as negative for these firms as for their counterparties that did not receive more than necessary.

The results imply that while the compensation scheme had its shortcomings during the first stages of the pandemic, we find no evidence that the scheme contributed to an increase in the likelihood of dividends in 2020.

Keywords – Covid-19, Compensation schemes, Dividends

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1. Executive summary

As of March 2020, Covid-19 was recognized as a global health emergency by the World Health Organization (World Health Organization, 2020). In response, world-wide lockdowns were implemented, affecting the global economy greatly. The Norwegian government decided to impose strict infection control measures in response to the rapid rise in infection rates throughout the country. This severely affected businesses and the economy in general (Tjernshaugen et al., 2023).

As a result of the economic consequences of the lockdown measures, several economic state aid measures were swiftly implemented to mitigate the economic consequences for businesses. As a measure to avoid numerous layoffs and a spike in bankruptcies, the compensation scheme for businesses was introduced as a measure to help otherwise viable businesses weather the crisis. The scheme was designed to cover unavoidable fixed costs for businesses suffering from a significant drop in turnover. Application content had to be verified by an auditor or authorized accountant (Revisorforeningen, 2023).

While the compensation scheme was rapidly implemented and reached companies in need swiftly, it has been criticized and revised throughout the pandemic. In a series of articles in the media, it was revealed that half of the businesses that received compensation improved their results compared to 2019 (Fraser et al., 2021b). Combined with findings that the total amounts of dividends for firm that received compensation were higher in 2020 than the previous year, this sparked a discussion of whether the swift implementation of the scheme had come at the expense of fulfilling its original purpose of reaching firms in distress as a consequence of the pandemic (Fraser et al., 2021a). Considering the cost of these measures, with the compensation scheme alone having an estimated cost of NOK 30 billion in 2020, it is possible that inadequately designed government aid programs may have resulted in government funds being misallocated to causes where they would be more effective elsewhere (Ministry of Finance, 2020a).

In the final revision of the scheme referred to as compensation scheme four, restrictions on dividends were introduced to address criticism from previous versions. In addition, firms could be obligated to repay received compensation (Ismail, 2022). To the best of our knowledge, relatively few papers address the issue of how dividends were impacted by receiving

compensation. To address the identified research gap, the aim of this thesis is to answer the following research question:

What effect did the compensation scheme have on dividend payouts?

While firms that received compensation may have increased their dividends in total, there is, to our knowledge little evidence that receiving compensation increased the likelihood of dividends in 2020. Through this thesis we aim to contribute to this still limited research field by analyzing whether firms receiving compensation were more likely to make dividend payout in 2020. We also investigate if firms that recovered relatively well from the initial shock of the pandemic were more or less likely to pay dividends in 2020. To do this, we use a logistic difference-in-difference regression model to analyze whether the likelihood of dividends increased or decreased for firms that received compensation, as well as for firms that would have had to make a repayment under compensation scheme four.

From our analysis, the results show that during the first year of the pandemic, the effect of receiving compensation is a decrease in likelihood of paying dividends. This finding holds true despite the heterogeneity in compensation amounts received across different regions and sectors. Further analysis showed that firms that did quite well during the crisis and would therefore have been obliged to repay all or part of their compensation under the restrictions introduced in compensation scheme four, also had a decreased likelihood of paying dividends in 2020. We do however find that the decrease in likelihood was more severe for firms that would have had no repayment obligation under compensation scheme four. Further, we find no clear association between the amount of compensation distributed to different regions and sectors, and the magnitude of the decrease in likelihood of dividends.

While the compensation scheme that was valid in 2020 have been criticized for being too lenient and without proper restrictions imposed on the recipients, our findings show no evidence that receiving compensation made firms more likely to pay dividends. Hence, our findings do not indicate that firms used the funds received to finance dividends, as has been suggested through critics in the media. On the contrary, our findings would suggest that firms that received compensation generally struggled as a consequence of the pandemic and the lockdown measures, and thus chose to omit dividend payouts to a larger degree than firm that did not receive compensation.

The remaining chapters of the thesis is arranged as follows. In Chapter 2 we present background on the pandemic and its impact on the Norwegian economy. Chapter 3 provides more detail on the compensation scheme for businesses affected by Norway's lockdown restrictions during the pandemic. Chapter 4 discussed previous research on dividends in general and during the pandemic in particular. In Chapter 5 we discuss the research approach and hypotheses used to answer our research question, while also presenting the data along with descriptive statistics. The empirical models used for analysis is presented in Chapter 6, while the results are presented in Chapter 7. The findings are discussed in Chapter 8 before we conclude our thesis in Chapter 9.

2. The Covid-19 pandemic in Norway

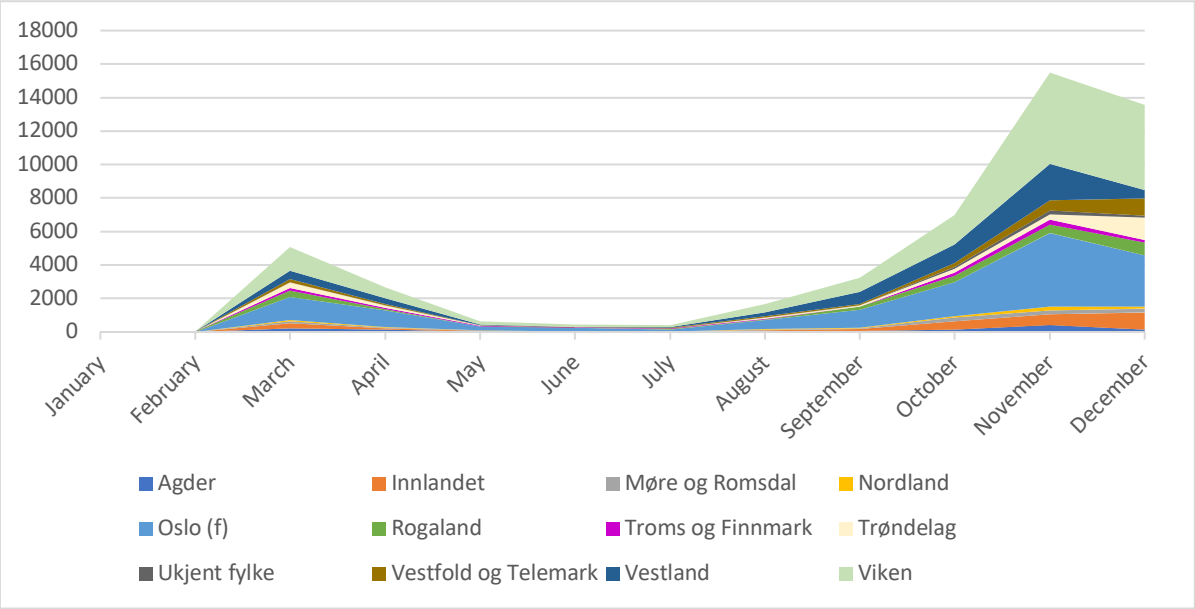
In order to evaluate the compensation scheme for businesses, a more thorough understanding of the consequences of the Covid-19 pandemic on society, businesses and the economy is crucial for understanding the government's response and the government support schemes implemented to mitigate the impact of the pandemic. In this chapter we describe the social and economic restrictions imposed by the government in the early phase of the pandemic in greater detail, while also discussing consequences for the overall economy.

The Covid-19 was first discovered in Wuhan, China in late 2019, before rapidly spreading to the rest of the world during the next few months, with the World Health Organization officially declaring the decease a pandemic in March of 2020 (World Health Organization, 2020). As a result, lockdowns were quickly implemented in countries around the globe. Norway's first Covid-19 case was confirmed on February 26th, 2020, with the first Covid-19-related death occurring on March 12th. As a response, the Solberg government implemented what the prime minister referred to as "the strongest and most intrusive measures ever implemented in Norway during peacetime" (Tjernshaugen et al., 2023). The lockdown measures included mandatory shutdowns of educational institutions, day-care centers, and businesses where physical customer service is required. As part of the effort to limit the spread of this virus, medical face masks were introduced as a requirement when out in public. There were also strict travel restrictions both domestically and internationally, with closed boarders for international travelers, while Norwegian citizens returning from overseas were required to quarantine upon arrival. All sporting and cultural events were also cancelled, and whenever possible, workers were encouraged to work from home (Tjernshaugen et al., 2023).

During the pandemic, the authority to impose infection prevention measures were split between regional and state authorities. This meant that local authorities in regions where infection rates were high had autonomy to implement stricter measures than those imposed by the government (Norwegian Institute of Public Health, 2022b). Figure 1 shows the number of reported cases of Covid-19 split by county in 2020. Oslo and Viken county had the highest number of reported cases through most of the pandemic, and as a result also the strictest measures. This resulted in longer lockdown periods in counties with high infection

rates, which in turn caused businesses in these counties to experience loss of income for longer periods.

Figure 1: Covid-19 cases reported by county in 2020



Source: (*Norwegian Institute of Public Health, 2022a*).

As a consequence of these measures, Norway's economy was deeply affected. Social distancing measures and uncertainty about how the pandemic would develop also result in income losses for businesses not directly affected by lockdowns due to ripple effects caused by the pandemic. For instance, as a result of many workers being temporarily laid off, people decreased their spending due to uncertainty about their future economic situation. For example, in a survey conducted by Intrum in 2020, 44 percent of respondents from Norway reported cutting spending on non-essential items, and one in six reported saving more money each month than before the pandemic (Intrum, 2020). By the end of April 2020, 421 000 people, which constitutes more than 15 percent of the workforce in Norway were registered as fully or partially laid off, with workers in the travel and transportation sector as well as service industries having the highest rate of unemployment (NAV, 2020).

Even though the Covid-19 pandemic was first and foremost a health-crisis, it still constitutes one of the most extensive financial policy responses in modern times. The political financial response to the pandemic has been extensive both in Norway and in the rest of the world.

According to The Norwegian Tax Administration, a total of approximately NOK 6.5 billion was paid out from March to August 2020 from the compensation scheme alone, before including grants from other schemes (The Norwegian Tax Administration, 2023). Mainland GDP[1] was also affected, and fell 4,7 percent from March to April, marking a decline of 11.3 percent from the pre-measure month of February (Statistics Norway, 2022a). From February 2020 to November 2021, Brasch et al. (2022) calculated the reduction in GDP in 2019-rates to NOK 214 billion. This constitutes a decrease of 8.6 percent points when compared to the expected GDP curve. They highlight the severely affected services industries as the main reason for the decrease, while also pointing out that the composition of GDP changed during the pandemic because standard production activities were replaced by activities aimed at reducing the impact of the pandemic. Despite this being crucial to reduce the long-term effects of the pandemic, it did not result in the same value creation and welfare as during normal activity (Brasch et al., 2022, p. 5).

The lockdown measures impacted businesses in industries differently based on their operations. As discussed, industries that rely heavily on customer service were subject to mandatory shutdowns. According to Statistics Norway, the change in value added was most severe for industries based on in-person services such as Accommodation and food services and Wholesale and retail trade. For Arts, entertainment and recreation strict social distancing measures lead to a cancellation of events across the industry. In addition, Wholesale and retail trade and Accommodation and food services were amongst the sectors most severely impacted by the pandemic in terms of value added (Statistics Norway, 2022a, p. 20).
Some of the hardest hit industries could also apply for other schemes that targeted different industries directly, such as a separate compensation scheme for cancelled or deferred cultural, sport and voluntary events (Ministry of Finance, 2020a).

Overall, the Norwegian society was adversely affected by the pandemic. There may be repercussions for years to come, and the true impact of the pandemic on society and the economy may not be apparent for some time.

[1] Gross domestic product

3. Government support schemes in Norway

This chapter describes the different state aid packages implemented to mitigate the economic impact of the pandemic and subsequent lockdown. The primary objective was to ensure that economic activity and employment rates did not decrease more than necessary, and to help otherwise profitable businesses through the pandemic (Ministry of Finance, 2020a). First, a general introduction to the different packages is presented, followed by a more detailed explanation of the compensation scheme. Finally, we will discuss criticism and challenges associated with the compensation schemes.

Since companies faced various challenges due to the pandemic, a variety of support packages was developed to address different needs for support. Amongst the support packages, salary subsidies were introduced to reengage laid-off employees as a compensation for unemployment ("Lønnstøtteordningen"). Also, a guarantee for loans scheme was introduced where the state guaranteed for loans provided to companies suffering from liquidity issues ("Lånegarantiordningen"). For companies struggling to pay taxes and duties, an arrangement for deferral of taxes and duties was introduced ("Utsettelsesordningen"). There were also some schemes targeting specific sectors, such as the compensation schemes for cancelled or postponed cultural, sporting, and voluntary events ("Kulturordningen" and "Frivillighets- og idrettsordningen) and a support scheme specific for the media industry to cover income losses ("Medieordningen").
Finally, a compensation scheme to compensate for fixed unavoidable costs for businesses suffering from income loss ("Kompensasjonsordningen for næringslivet") was introduced and is the focus of this thesis (Ministry of Finance, 2020a).

One of the points that were stressed was that the schemes needed to be implemented quickly, and that the funds had to reach the applicants shortly after an application was approved (Office of the Auditor General of Norway, 2021). Even if these measures were introduced to provide a social and financial safety net for people and businesses, they also introduce difficult dilemmas regarding how they should be designed to reach their intended recipients. There has been public discussion as to whether the schemes were designed in a way that

excluded some companies that should have received grants, and also whether the controls were effective enough to ensure that non-viable firms did not receive funds.

3.1 The Compensation Scheme for Companies

The compensation scheme for companies was introduced on March 27, 2020. It was designed to prevent unnecessary bankruptcies and preserve employment during the crisis. The purpose was to compensate companies for fixed, unavoidable costs experienced by otherwise viable firms with significant decrease in turnover due to the virus outbreak and the subsequent lockdown measures (Ministry of Finance, 2020c). By definition, turnover refers to the income from sales of goods delivered and services performed (Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 2-2 (1)).

Originally, the scheme was planned to apply from March through August 2020, but has since been extended and modified three times. For compensation to be eligible, companies had to meet certain requirements[2]. All taxable companies registered in Norway were eligible. There were however some exceptions, such as firms without any employees and firms that had entered bankruptcy proceedings (Lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 4).

3.1.1 Compensation Scheme 1 - March 2020 to August 2020

To be eligible to receive compensation under the first compensation scheme, a significant drop in turnover was required. In the first month of March, a drop in turnover of 20 percent or more was considered a significant drop. For the remaining months of April through August, this was adjusted to require a drop of at least 30 percent or more (Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 2-3 (1)). The percentage decrease was applied in the formula along with fixed, unavoidable costs and an adjustment factor to calculate the amount of compensation.

[2] Compensation requirements are provided by Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, §§ 2-1–-2-6

In the calculation of fixed, unavoidable costs[3], a number of costs are included, such as rent, insurance and utilities, net interest rates, as well as other expenses which cannot be easily adjusted based on business activity (Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 3-2). For companies that were not subject to mandatory shutdowns, the fixed, unavoidable costs were adjusted by a standard deductible. The size of the deductible was however moderate, and constituted NOK 10 000 for the month of March, NOK 5 000 for April, and no deductible in the following months (Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 3-1 (3)). The resulting amount was scaled by an adjustment factor of 0.8 for the months of March, April and May. For June and July, the adjustment factor was set to 0.7, while for August it was 0.5. To account for mandatory shutdowns affecting some firms while not affecting others, companies subject to mandatory shutdowns had a higher adjustment factor of 0.9 for March, April, and May (Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 3-1).

The following equations summarize the calculation of compensation, and illustrate the differences between companies that were subject to mandatory shutdown and those that were not:

Equation 1: Mandatory shutdown

*Decrease in turnover (%) * fixed, unavoidable costs* adjustment factor*

Equation 2: No mandatory shutdown

*Decrease in turnover (%) * (fixed, unavoidable costs-deductible) * adjustment factor*

[3] A fixed, unavoidable costs are costs that can be allocated to the items presented in Forskrift til lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall, 2020, § 3-2 (2).

3.1.2 Compensation Scheme 2 - September 2020 to February 2021

From August 2020 to February 2021, a second compensation scheme was implemented, which was essentially a continuation of the first scheme. However, there are some differences between these two schemes, such as the calculation of compensation being based on a two-month period under the second scheme. The comparison period are the same two-month periods as the grant period, but for the prior year (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder til og med februar 2021, 2020, § (1-1)).

As compared to the first compensation scheme, changes were made to the adjustment factor. For the first period from September 1st to October 31st, the adjustment factor was 0.7, while for the remainder of the period it was increased to 0.85. Also, businesses that were subject to mandatory shutdowns no longer had a higher adjustment factor compared to other firms. Finally, the deductible was removed for all firms (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder til og med februar 2021, 2020, § 3-1 (2)).

3.1.3 Compensation Scheme 3 - March 2021 to October 2021

The third revision of the compensation scheme came in March 2021. As the most critical phases of the pandemic had passed, this revision introduced several changes compared to the two previous schemes. A 30 percent reduction in net turnover was applied to compensation calculations until August 2021, while a 40 percent reduction was applied from September 2021 onwards (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020, tilskuddsperioder etter februar 2021, 2021, § 2-3 (1)). As a result of this change, the eligibility criteria was tightened, making it harder for firms to receive compensation. Large and medium sized companies in financial difficulty, with high debt ratio and low equity prior to the pandemic

were no longer eligible to apply[4] (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020, tilskuddsperioder etter februar 2021, 2021, § 2-5 (3)).

A major difference from the second compensation scheme was introduced, where only firms with an estimated deficit during the entirety of the period under compensation scheme three were eligible to apply. For firms defined as small enterprises, subsidies could not exceed 90 percent of the estimated deficit, while for medium and large companies it could not exceed 70 percent (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020, tilskuddsperioder etter februar 2021, 2021, § 3-1 (3)).

3.1.4 Compensation Scheme 4 - November 2021 to February 2022

The last compensation scheme was applicable between November 2021 and February 2022, with monthly grant periods for November, December, January, and February (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § (1-1)). Compared to September-October 2021, the drop in turnover was adjusted once again from 40 percent to 30 percent (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 2-3 (1)).

The most significant changes from the prior schemes were the restrictions on dividends and the possibility of a repayment obligation of received compensation. Under this scheme, firms that received funds could not make dividend payouts or other arrangements to circumvent

[4] High debt ratio is defined as debt constituting more than 7.5 times total equity and a ratio of EBITDA to net interest expenses of less than 1. Low equity is defined as total equity being less than half of share capital and share premiums.

the dividend restriction unless a repayment of received funds under this scheme was made first (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 3a-3). For limited liability companies this concerns all dispositions that are affected by Aksjeloven §§ 8-1 and 16-9, or Skatteloven § 10-11. It includes for example bonuses, when used to bypass the dividend restriction (Høylie, 2022). In addition, firms that had made, or decided to make dividend payouts were not eligible. Hence, if a company decided to pay dividends before submitting an application, it would not be eligible to apply (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 2-6 (1)). The dividend restrictions are effective throughout 2023, which means if a company wish to keep the grant, dividend payments are effectively prohibited until 2024 (Høylie, 2022).

Along with the dividend restriction, a repayment obligation for firms with a surplus of NOK 50 000 or more was introduced, where firms would be obligated to repay the amount of compensation received that exceeded NOK 50 000. The repayment obligation would be limited upwards to the compensation in the respective grant period applicable under scheme four (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 3a-2 (1)). For the fiscal year ending December 31st, 2021, the surplus refers to the operating profit before tax for the fiscal year to which the grant period belongs and compensation received by the company during the grant period of November and December 2021. In addition, any negative operating income before tax that the company had for the fiscal year ending December 31st, 2020, should be deducted (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 3a-2 (2)).

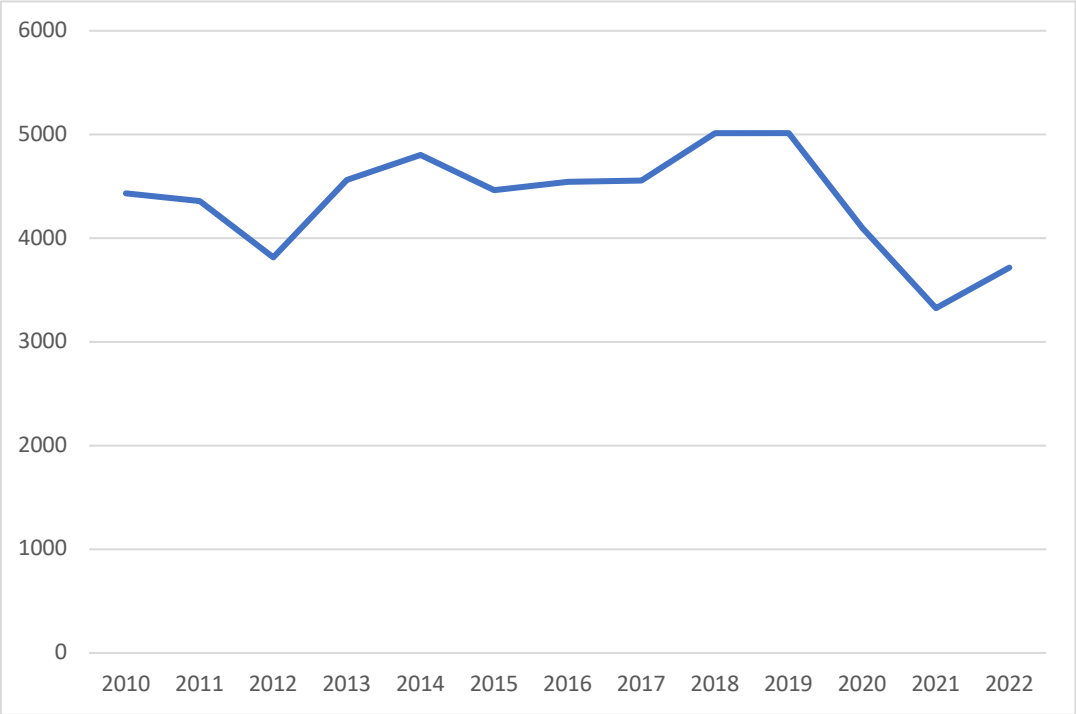
From the discussion above, it is clear the compensation scheme became more complex over time with several restrictions being introduced in the different phases of the pandemic. By the time compensation schemes three and four were introduced, the government decided to downgrade the scheme, making it harder for companies to receive compensation. The compensation scheme was discontinued after compensation scheme four (Bøe & Lier, 2022).

3.1.5 The scheme is subject to criticism and challenges

In light of the rapid implementation of mandatory business shutdowns and other societal restrictions, it was imperative to mitigate the economic effects of these measures quickly after they were announced. The compensation scheme has thus been subject to criticism which could be a result of the time pressure under which it was designed. The main objective of the scheme was to prevent bankruptcies in uncertain economic times, and to prevent the loss of jobs, although some have argued that its requirements were too lenient. The criticism and challenges of the compensation scheme is thus discussed in this section.

The Norwegian Tax Administration developed a comprehensive application arrangement to address the compensation scheme in record time. One of the unique aspects of the application arrangement is that the solution is based on built-in intelligence, which checked applicants against the criteria for being granted support. Approximately 90 percent of applications were automated, while approximately 10 percent was handled by a case manager (The Norwegian Tax administration, n.d.) As a result of the large degree of automatization, it has been pointed out that some non-viable companies and unaffected businesses may have been able to receive compensation even though they were non-viable. The large degree of automation made more thorough, individual assessments of firm viability difficult, which in turn could have led to applicants being approved that would have been ineligible if a more thorough assessment been made. Additionally, the only mechanism in place to sort out weak financial firms was those undergoing bankruptcy proceedings, which were not eligible for support. This has been criticized as being too narrow, as firms in financial difficulty before the crisis could still receive compensation as long as bankruptcy proceedings had not been initiated (Kampevoll & Seibt, 2020). Figures from Statistics Norway on bankruptcies for limited companies in Figure 2 illustrates this concern, as it is evident that the number of bankruptcies decreased steadily from 2019 to 2021. This could indicate that government schemes enabled otherwise non-viable firms to continue operating in 2020 and 2021.

Figure 2: Bankruptcies between 2010-2022



Source: (*Statistics Norway, 2023e).*

The first three compensation schemes have been criticized primarily for not having enough restrictions and being too favorable to larger companies (Ismail, 2021). Moreover, much of the criticism has been related to the first compensation schemes being too lenient with too few restrictions to prevent firms that performed well overall from receiving compensation. This debate was in particular connected to a series of articles in the Norwegian newspaper E24, which showed that approximately half of companies receiving compensation improved their annual results in 2020 compared to 2019. They also found that over half of the companies receiving compensation in 2020 would have been able to avoid losses even if they would have been obliged to repay the whole amount (Fraser et al., 2021b). Following the discussion on the repayment obligation introduced in compensation scheme four, these findings have sparked debate of the changes being too little too late. It is also questionable whether repayment requirements are contrary to the original purpose, and whether it will affect the weakest in the industry if the company achieves a positive result. It provides an unfortunate incentive if profits result in demands for repayment for companies that have cut costs and restructured operations to avoid layoffs of employees and survive the pandemic. Furthermore, repayment requirements can weaken the company's ability to make new investments or restructure their operations and limit their ability to build up reserves. In

support of the suggestion, it was noted in the proposition that companies could repay grants if the grant received was redundant, and that this should be the responsibility of the board of the individual company in consultation with their auditor (Prop. 49 L (2021-2022, p.10)).

Furthermore, in another article, E24 examined dividends for firms receiving compensation, finding that the total amount of dividends for recipient firms increased in 2020 compared to 2019 (Fraser et al., 2021a). Despite restrictions on dividends being imposed in compensation scheme four, critics have again argued that the changes were made too late, as no such restrictions were imposed under the first three schemes. It was encouraged, however, that dividends and bonuses should be exercised with moderation by those who were compensated through the scheme (Ministry of Finance, 2020b). The dividend restrictions in compensation scheme four have also been criticized for being easily adaptable by simply delaying dividends (Fraser et al., 2021a).

Lastly, some have argued that loans instead of compensation could have been a better option given the experience of the financial crisis. Professor of economics Magne Mogstad promotes this viewpoint in an article in E24, while also suggesting that compensation should have been limited to smaller firms, where larger firms should have been excluded from the compensation scheme and offered government loans instead (Fraser et al., 2021a).
The solution of providing loans instead of compensation is also suggested by Næss (2021). He argues that if loans were provided instead, jobs would have been protected and bankruptcies would have been prevented. According to Næss, this would avoid the issue of the compensation schemes possibly benefiting owners as opposed to employees and the firms as a whole.

Overall, the design of the scheme and the challenges of implementing a nationwide government support scheme under high pressure has been subject to much criticism. The primary discussion is related to the adequacy of the implemented control systems and the lack of earlier adjustments, as well as how impactful adjustments actually were once implemented.

4. Literature review

The purpose of this section is to provide an overview of existing literature on compensation schemes during Covid-19, as well as dividend payouts during times of economic crisis and during Covid-19 specifically. As far as we know, Norwegian research on this topic is still relatively limited. When data is available for the entire period affected by Covid-19, more extensive research may be more relevant. However, there have been several studies addressing the effect of Covid-19 on dividends in other countries, which we use as the focus of our review. The literature review concludes with a discussion of how our thesis may contribute to the existing literature.

4.1 Dividends in Norway during Covid-19

As mentioned, it appears that there is a limited amount of literature discussing Covid-19's influence on dividends in Norway. However, as discussed in Section 3.1.5, some examinations have shown that companies that received compensation during the first year of the pandemic had higher dividend payouts in aggregate than they did the previous year. To some, this could appear to suggest that these firms may have received grants beyond the intentions of the legislators, however, empirical research to address this does not appear to have been conducted.

On the contrary, in a master thesis from Norwegian School of Economics, findings indicate that the probability of companies paying dividends in 2020, regardless of their size, is significantly negatively impacted by the amount of compensation received from the Norwegian compensation scheme. Furthermore, they find that regardless of company size, companies that received more compensation paid out significantly less dividends after receiving the compensation than they did before (Juskaite & Yasemin Balci, 2022).

Beyond this, we were unable to find relevant research of the effect of the compensation scheme on dividend payouts for Norway specifically. Therefore, we focus our literature review on studies conducted in other countries that could provide valuable insight into our thesis.

4.2 Research on dividends during crisis in other countries

Other countries' literature on Covid-19's effect on dividends focuses mainly on two different approaches: characteristics of companies that pay dividends during the period and changes in dividend behavior during this period. We discuss both perspectives, starting with a general discussion on characteristics of dividend paying firms. Finally, we discuss the concept of dividend smoothing to provide some background as to why companies may choose to uphold dividends even in times of uncertainty.

Research on the determinants of dividends has found several firm characteristics that influence whether a firm will pay dividends or not. In a recent study of United States listed firms conducted pre-Covid, Brawn & Šević (2018) found that while firm size is the main determinant of whether a firm will pay dividends or not, industry grouping, age of the firm and the relative volatility of the firm are also significant determinants. In their sample, they find that while the percentage of dividend payers is 43.1 percent of the stocks investigated, their combined market value is 78.5 percent of the market aggregate, which is a clear indication of the importance of size. Also, how likely a company is to pay dividends varies significantly between industries. These findings compliment those of Fama & French (2001), who find that profitability, investment opportunities and size are important characteristics that affect the decision to pay dividends. In general, dividend payers tend to be more profitable than those who have never paid dividends, while "former payers", firms that used to pay dividends but no longer do so, tend to be in economic distress. They also find that while larger and more profitable firms are more likely to pay dividends, it is less likely for firms with more investments.

When it comes to how companies view dividends in extraordinary circumstances Brav et al. (2005), through surveys and field interviews, find that managers have a strong desire to avoid dividend cuts, except in such circumstances. The Covid-19 pandemic would certainly fall into a category describing extraordinary circumstances, and several studies of dividends during the pandemic has been conducted. A recent study on changes in dividends conducted on annual data of companies from the Pakistan Stock Exchange indicate that companies were significantly more likely to omit or reduce their dividends during the pandemic when compared to pre-Covid trends from 2015-2019. They also find evidence corroborating Brawn

& Šević (2018), Fama & French (2001) and Brav et al. (2005) that firm-level characteristics affect the firm's dividend policy. Companies with higher profitability, asset turnover and size were more likely to continue dividend payouts. On the contrary, companies with a higher debt ratio were more likely to opt for dividend omissions. Their findings also suggest that dividend omission was the preferred choice for dividend policy during Covid-19 in comparison to dividend reduction, maintaining the same dividend level or increasing dividend payouts (Ali et al., 2022).

Similarly, a study of publicly traded companies in the United States examines the prevalence of, and factors associated with firms opting for dividend cuts or omissions during Covid-19. The findings provide evidence that omissions or cuts in dividends were higher during the pandemic year of 2020 compared to any other quarter since 2015, for all industries. Overall, the results show that firms cut dividends at three to five times higher frequencies during Covid-19 than during any other quarter from 2015. Also of interest is that dividend omissions were much rarer than reductions. By applying regression modelling, they find that net income and debt are determinants of whether a firm cuts dividend or not in all periods in the data, but the economic significance is found to be much larger during the pandemic (Krieger et al., 2021).

In the same strain of literature, Ali (2022) examined how Covid-19 affect corporate dividend policies in the G-12[5] countries. Their findings show that while dividend cuts and omissions are significantly higher during Covid-19, the majority of firms still maintain or even increase their dividends. By applying logit regression, they provide evidence that important determinants of a company's dividend policy during the pandemic were profitability, earnings prospects, size and leverage. Their findings suggest that despite the negative influence of the pandemic, omissions were much rarer than dividend reductions. Still, the proportion of dividend cuts and omissions were significantly higher during the pandemic than in the prior years.

There is no mention of the impact of government aid packages in the above-mentioned papers, despite the fact that they examine dividend changes during Covid-19. Studies on this topic is limited, however, a study conducted in Poland on a sample of 457 Polish companies

[5] The G-12 countries in this study consist of thirteen countries: Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States.

considers the effect of government support on dividend payouts. Their results indicate that receiving government support had a significant negative impact on the likelihood of a company paying dividends in 2020, which is in line with the findings of Juskaite & Yasemin Balci (2022) in their thesis from Norwegian School of Economics. The researchers also examined the characteristics of companies that received support and paid dividends and found these companies to be of average age and size. Finally, they found that companies with higher profitability were more likely to pay dividends (Kluzek & Schmidt-Jessa, 2022).

In another strain of literature that investigates corporate dividend policies, the concept of dividend smoothing is central. It was first introduced in a seminal article by John Lintner in 1956 and is widely known as a strategy employed by managers to avoid adverse reactions from market participants and shareholders when setting dividend levels. According to Lintner, shareholders prefer smooth dividend incomes, and firms are therefore concerned with the stability of their dividends, as they believe the market puts a premium on stocks from firms with a stable dividend policy. Further, Lintner found that companies seem to base their current dividend on their previous dividends, and that they are hesitant to make changes that could be perceived as negative, even when their financial state indicates that they should (Lintner, 1956). This work has been extended in several studies. Brav et al. (2015) found that the reluctance to forgo dividends can be strong enough that managers are willing to raise external capital or forgo positive net present value investments to avoid negative changes in dividends. Further, Michaely et al. (1995) investigate market reactions to initiations and omissions of dividend payments and their effect on the firms' returns. They found that omission announcements are associated with larger drop in share prices than their positive counterpart of an announcement of dividends. They argue that this implies a market overreaction to omission announcements, which could explain why companies may choose not to decrease or omit dividends even during the pandemic. As far as what characterizes firms that smooth their dividends, Leary & Michaely (2011) found that dividend smoothing firms have many of the same characteristics as discussed for whether firms pay dividends or not. Firms that smooth the most are typically significantly larger, more profitable, and followed by more analysts. Also interestingly, they found that firms that smooth more tend to pay more dividends. These findings suggest that smoothing is more prevalent when agency costs are high.

In more recent years, Cejnek et al. (2021) investigate whether dividend smoothing also occurs in times of economic crisis. Their paper examines dividend smoothing by using dividend futures to estimate the risk-return characteristics of dividend claims with different maturities. They found that overall, dividend smoothing appears to break down in disaster states, and that dividends substantially decreased during the early stages of the pandemic and did not recover until the end of the year. Also, firms who cut their dividends by at least 50 percent experienced a substantial and significant increase in their exposure to market risk, and high-risk companies were more likely to omit dividends (Cejnek et al., 2021).

4.3 Our contribution to existing literature

Based on the discussed literature, our knowledge of the mechanisms behind dividend policies during the pandemic is still rather limited, especially when considering the effect of government support schemes. Preliminary findings have shown that firms receiving compensation have a lower probability of dividends in Poland, while other research found that without accounting for state-aid programs, many firms chose to increase or maintain their dividends during Covid-19. As such, these findings could be perceived as contradictory, and show that this topic requires further attention from the research community before any conclusions can be made. Through our thesis, we aim to extend the existing literature by conducting one of the first studies assessing the impact of state-aid programs on dividends during Covid-19 in Norway. We find it is important to determine whether such schemes have an impact on dividends, informing the development of improved schemes in the future in case similar crisis arise. This could help to avoid unproductive spending and indirectly financing owners unintentionally through state schemes with insufficient demands and restrictions placed upon recipients.

While the above literature provides some insight into dividend behavior during Covid-19, most are conducted without accounting for the effect of state-aid. Also, these studies were conducted in different countries, where government support schemes vary, and where country-specific factors and differences in data may yield different results regarding dividend policies. While Kluzek & Schmidt-Jessa (2022) found that a firm receiving government support during Covid-19 had a significant negative effect on the likelihood of a company making dividend payouts, their data is quite limited, with 457 companies in total, and 199 of these being recipients of state-aid. Further, only 26 of the firms within their

sample that received state-aid made a dividend payout. As a result of a larger dataset, we are more likely to find results that are more representative of the population being studied, while simultaneously allowing us to conduct more detailed and thorough analyses, such as investigating subgroups of interest within a population. In addition, a larger dataset could produce more reliable and robust results, as well as more stable estimates. We also consider that the country-specific differences between Norway and Poland could yield different results, making a direct comparison challenging. We aim to contribute to this research gap by investigating how compensation impacted the likelihood of dividends in Norway, an economy much different from that of Poland. In our efforts to find comparable literature on dividends for firms that received more than needed from government schemes during Covid-19, we did not find any comparable literature. Consequently, we intend to add to the literature by investigating this research gap.

5. Research approach

In order to answer our research question *"What effect did the compensation scheme have on dividend payouts?*" we investigate the likelihood of a dividend payout for companies that received compensation. Furthermore, we wish to investigate whether the likelihood is different dependent on whether a firm received compensation beyond what was necessary to survive, as opposed to those that did not. We first present our research hypotheses before we give a more thorough explanation of how repayment was the regulated under compensation scheme four and present our classification of firms that received compensation beyond necessary. The rest of the chapter is focused on data management and descriptive statistics of the data.

5.1 Research hypotheses

To inform our investigation into the effect of the compensation scheme in Norway on dividend payouts, we formulate two hypotheses. Our first objective is to investigate how receiving compensation impacts the likelihood of dividends for all compensation recipients before we proceed to classify recipients into groups.

The compensation scheme was designed to be tied to the magnitude in drop in turnover and would cover fixed, unavoidable costs based on an adjustment factor. In light of this, it would be reasonable to expect that firms that received compensation performed worse overall compared to the previous year. However, from the discussion in Section 3.1.5, it appears that compensation was distributed not only to companies that needed it, but also firms that made it through the year without experiencing losses in 2020 overall. In this setting, the fact that firms that received compensation overall paid out a larger total dividend than the previous year raises the question of what effect compensation had on dividends. One could argue that even in times of economic uncertainty, companies may choose to maintain their dividends to signal financial strength (Bhattacharya, 1979).

Given that dividends are a result of a firm's surplus and considering the uncertainty of the situation and the severity of the lockdown measures, we would expect firms to be more likely to omit dividends in 2020. Based on this discussion, we formulate our first hypothesis as follows:

H1: *Receiving compensation impacts a firm's likelihood of making a dividend payout.*

By first establishing the effect and direction of receiving compensation on dividends we aim to discarding or confirm whether parts of the criticism of the scheme are justified, and it will be instructive for proceeding with further analyses.

Furthermore, we wish to investigate whether the amount of compensation received could impact a company's likelihood of dividends. In Section 5.2.1 we discuss the basis for categorizing firms into categories of companies that received compensation beyond necessary, and those that did not. Specifically, we investigate how a company receiving compensation beyond necessary or not impacts their likelihood of making a dividend payout.

Following the objective of the restrictions on dividend in Compensation Scheme four discussed in Section 3.1.5, one would assume that the government was concerned with the possibility of companies receiving compensation beyond necessary and using these funds to finance dividends. Following the same logic, companies that did not receive compensation beyond necessary should be more likely to opt out of making dividend payouts. With this in mind, we formulate the following hypothesis:

H2: *Firms classified as having received compensation beyond necessary had a higher likelihood of paying dividends than firms receiving less.*

The findings could be useful in evaluating whether there is a possibility that the compensation scheme contributed to firms upholding their dividends by utilizing government support in a way that was not intended during the early stages of the pandemic. Also, it could provide us with a better understanding of how the restrictions implemented in Compensation Scheme four could have changed the financial burden of Covid-19 for the government if we find that these firms were more likely to pay dividends.

5.2 Repayment regulation under compensation scheme four

In order to identify companies that received funds beyond necessary to survive, a clear benchmark of the amount that is defined as beyond necessary is required. The definition is

based on the preparatory works[6] from compensation scheme four, which was effective from November 2021, which we apply to the grant period of the first two compensation schemes for which we have data. In this section we explain the calculations as they were under compensation scheme four. We find that basing our definition on this preparatory work is appropriate considering it is the result of adjustments to the compensation scheme throughout the pandemic, where some of the most publicly criticized aspects have been modified.

Simply put, firms are required to pay back the compensation received if they have a surplus of more than NOK 50 000. The surplus includes operating profit before tax for 2021 and received compensation, minus any negative operating income before tax for fiscal year 2020 (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 3a-2 (2) letter a). This provides the following calculation of the surplus for the financial year ending December 31st, 2021, that must be less than NOK 50 000 if a firm is to keep all received compensation under compensation scheme four during 2021:

Operating profit before tax for the entire fiscal year of 2021
+ Sum of grant for grant period November/December 2021
- Any negative operating income before tax for the entire fiscal year of 2020
= *Surplus*

If the Surplus exceeds NOK 50 000, illustrated in Table 1 column (1), the firm shall repay an amount equal to the surplus minus NOK 50 000. However, if the surplus minus NOK 50 000 is higher than received compensation, illustrated in column (2), the repayment obligation is equal to the amount of compensation received (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 3a-2 (1)). As such, the repayment obligation cannot exceed the compensation received.

[6] Nærings-og fiskeridepartementets vurderinger ved fastsettelse av forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, punkt 8.4

Table 1: Calculation of repayment obligations under compensation scheme four

		(1)	(2)
	Operating profit before tax in fiscal year 2021	130 000	230 000
-	Negative operating income before tax in fiscal year 2020	100 000	100 000
+	Compensation	110 000	110 000
=	Surplus	140 000	240 000
-	50 000	50 000	50 000
=	**Repayment obligation**	**90 000**	**110 000**

Note: calculations based on examples from The Brønnøysund Register Centre (The Brønnøysund Register Centre, n.d.).

The threshold of NOK 50 000 was set to allow for smaller profits without a repayment obligation and was expected to be of minimal importance for larger firms, but could be of larger importance for smaller firms, where profits could be a result of, for instance, the owner's individual effort (Prop. 49 L (2021-2022, p.13).

5.2.1 Classifying companies receiving compensation beyond necessary to survive

Based on the restrictions which would warrant a repayment obligation under compensation scheme four, we apply the same threshold for when a company is to be classified as having received grants beyond necessary to survive for our analysis. This allows us to define which companies received an amount under the first schemes that would have been considered more than necessary to survive under the fourth scheme. Thus, our results may provide insight into whether the scheme for 2020 was too generous when we apply the same limitations that were imposed in the later stages of the pandemic. Considering that our data is only available throughout 2020 we have opted to exclude any 2019 deficit from our calculation, as a deficit in 2019 would not be related to the pandemic. Based on the preparatory works, the calculation of the repayment obligation used to classify companies receiving compensation beyond necessary to survive is thus as follows:

Operating profit before tax 2020
+ Sum of grant for grant period 2020
= Surplus

The classification of firms having received more compensation than necessary to survive is therefore based on the whether the surplus exceeds NOK 50 000 or not. As firms with a surplus of more than NOK 50 000 would be required to make a repayment, we classify these firms as having received compensation beyond necessary to survive. Table 2, column (1) and (2) illustrates two different scenarios that would classify a firm as having received compensation beyond necessary. In column (1), a firm has a surplus of more than NOK 50 000 and shall repay an amount equal to the surplus minus NOK 50 000. In column (2), the firm has a surplus of more than NOK 50 000, however, their surplus minus NOK 50 000 is higher than the received compensation. Therefore, the repayment obligation is equal to the amount of compensation received. If the surplus is below NOK 50 000, no repayment would be required, as illustrated in column (3). The firm would have been allowed to keep the compensation under the restrictions of compensation scheme four. Hence, we classify firms with a surplus of less than NOK 50 000 as not having received compensation beyond necessary, provided the firm has received compensation.

Table 2: Examples of classification based on repayment obligations

		(1)	**(2)**	**(3)**
	Operating profit before tax in fiscal year 2020	30 000	80 000	30 000
+	Compensation	40 000	20 000	15 000
=	Surplus	70 000	100 000	45 000
-	50 000	50 000	50 000	50 000
=		20 000	50 000	-5 000
=	**Repayment obligation**	**20 000**	**20 000**	**0**

For simplicity, we employ the following terminology for the different treated classifications throughout the rest of the thesis; firms that are classified as having received compensation beyond necessary to survive are referred to as “Beyond Necessary” and those that did not are referred to as “Necessary”. Firms that did not receive compensation at all is the control group.

After having classified the firms into these groups we investigated the relationship between classification status and dividend payouts. Furthermore, we aim to determine whether there are differences in the likelihood of dividend based on the classification status.

5.3 Data Management

Preparing the data in a manner that made it suitable for our method of analysis was an important part of the work on our thesis. In our first section we describe where the data originated from. In our next section we describe in more detail the different steps taken in the data management process. Finally, descriptive statistics for the data are presented.

5.3.1 Data collection and data management process

The data which is the basis for our analysis was provided by The Norwegian Tax Administration through the Norwegian Centre of Taxation. For our thesis, we have utilized four of the datasets provided. The datasets contain detailed financial and entity specific information from Income Statement 2, Tax return form for private limited companies, the Norwegian Central Coordinating Register, and separate data on the Compensation Scheme. To ensure the anonymity of the organizations, all organization numbers have been replaced with a fictitious number, and no companies are identified by name. The data from the Norwegian Central Coordinating Register contains, amongst other things, information on date of registry, company form and municipality code, while Income Statement 2 contain detailed financial information from companies' balance sheet and income statement.

The initial sample after merging the datasets consist of 2 000 550 observations and 294 074 unique firms. We prepare the dataset for analysis by first removing companies that are not limited companies (AS) or public limited companies (ASA), as these company forms are often not required to provide accounting figures and therefore contain missing values for several of the figures needed for analysis. This removes 51 189 observations and 11 967 unique firms. Removing these companies, who are primarily Norwegian registered foreign business enterprises (NUF) is also done as it is possible that they differ significantly from the rest of the population. We also remove firms with a negative value or a zero value for received

compensation and companies with negative dividend, as this could possibly be errors values in the data. In total, this removes 1 122 observations and 22 unique firms.

When deciding on the time period to be included in our analysis, we wish to apply a period that is not influenced by abnormalities or otherwise influenced by substantial events in the overall economy. The data in our sample initially covers the period from 2010-2020. We choose to limit our analysis to 2015-2020, where the pre-Covid period 2015-2019 represents conventional years without any significant shocks to the economy. We therefore discard all observations prior to 2015, which removes 760 293 observations and 32 386 unique firms.

Using the Nomenclature of Economic Activities, referred to as NACE-codes from the Norwegian Central Coordinating Register, we remove firms with missing values for NACE-codes. This is done to allow us to later group organizations according to their business activities for analysis. As a result, 5 859 observations and 404 firms are removed.

Further, the calculation of company age is based on the date the firm was registered in the Norwegian Central Coordinating Register. Due to some firms being founded at the end of a year, but not being registered in the Norwegian Central Coordinating Register before the beginning of the following year, we get some firms with an age of negative 1. We remove these observations. As a result, 593 observations and 25 unique firms are removed.

Additionally, we find that some companies have negative values for sales revenue. These observations, 3 618 in total and 76 unique firms are removed as they could potentially be error values. Further, in the dataset of compensation, some firms have been awarded compensation several times during 2020. We aggregate this amount to get the total amount of compensation received in 2020, and then delete duplicate values of compensation for unique firms. This removes 25 621 observations, but no firms.

Due to the requirements of the compensation scheme, companies with no employees in the State Register of Employers and Employees (Aa-register) at the allotment date or no employees between March 2020 and the allotment date were ineligible to receive compensation (Forskrift til utfylling og gjennomføring av lov om midlertidig tilskuddsordning for foretak med stort omsetningsfall etter august 2020 for tilskuddsperioder etter oktober 2021, 2022, § 2-1(1)). As we do not have access to the data from this registry, we account for this requirement to the best of our ability based on the available data and remove companies with

0 registered employees in the Norwegian Central Coordinating Register in 2020, which removes 80 320 observations and 5 206 unique firms.

Further, we remove firms that made no dividend payouts in any of the years from 2015-2020, as these firms will not be informative in the analysis since they do not have any variability in dividend payout. This removes 762 401 observations and 184 545 unique firms.

In order to create the control variables profitability and company size, which is based on total assets and net income, we remove observations with missing values for both. We also remove negative values for total assets, as company size will be calculated using the natural logarithm of total assets, where negative values will not be calculated when applying the natural logarithm. In total, this removes 361 observations and 3 unique firms. Finally, to ensure we have data on all variables of interest, we balance the dataset by removing all firms where data is not available for the entire time period we have chosen to analyze. The balanced dataset consists of 198 912 observations and 33 152 unique firms.

Table 3: An overview of the dataset selection steps

Description	**Number of observations**	**Number of unique firms**
Samle size after merging	(2,000,550)	(294,074)
Keep only AS and ASA	(51,189)	(11,967)
Remove negative values for dividend and compensation & zero values for compensation	(1,122)	(22)
Remove observations prior to 2015	(760,293)	(32,386)
Remove missing values NACE-code	(5,859)	(404)
Remove firms with company age less than 0	(593)	(25)
Remove negative values for sales revenue	(3,618)	(76)
Remove duplicate values compensation	(25,621)	(0)
Remove firms with 0 employees	(80,320)	(5,206)
Remove firms that have never paid dividend	(762,401)	(184,545)

Remove missing values for profitability and negative values total assets	(361)	(3)
Balance to include observations from 2015-2020 for all firms	(110,261)	(26,288)
Total sample for analysis	**198,912**	**33,152**

Note: Table 3 presents the steps taken in the data cleaning process. Figures in parentheses represents removed observations and firms.

In addition to the alterations above, The Ministry of Local Government and Regional development implemented new municipality and county numbers effective from 1st of January 2020 (Government, 2020). This must be addressed in our data in order to investigate how receiving compensation impacted dividend payouts at county level. We find that only the data for the compensation scheme include a county specific variable. For companies not having received compensation, we use the first two digits of their municipality number from the Norwegian Central Coordinating Register to assign them to the correct county. Due to some inconsistencies in the assigned municipality number, where some firms change number from one year to another, we assign each firm to the municipality they belonged to in 2020 for analysis.

For further analysis of compensation by sector affiliation, we use the NACE - codes to group companies by their sector affiliation, as detailed in Appendix A1. We observe that some firms have a change in NACE-code during the years in the panel. To account for this, we assign each firm to the sector of their respective NACE-code in 2020.

5.4 Descriptive statistics

In this section, we present descriptive statistics and graphics of our processed dataset to provide a more in-depth understanding of the underlying data and the variables in our analysis. We also look at how companies receiving compensation are distributed by different sectors and regions. As discussed in the previous section, there are 198 912 observations and 33 152 unique firms in our final sample with data from 2015-2020 on all variables of interest.

Table 4 presents the descriptive statistics of raw data on dividends and control variables of interest in our analysis for the full period of 2015-2020, before winsorization at the top and bottom 1 percent level. We see a minimum value of dividend equal to 0 and a maximum value

of NOK 7 544 930 275. The standard deviation of dividend is high at NOK 44 753 408, which implies that the data is widely spread. We also observe that the mean is much higher than the median, indicating a positive skewness, and that there are outliers present in the data for dividends. As for the control variables, we observe that the mean age in the total sample is 13.8 years, which is close to the median and implies that company age is not very widely spread. The mean of profitability is –0.24, while the median is 0.11, indicating some negative outliers for profitability. Size is the natural logarithm of total assets, which explains the minimum value of 0. Due to the presence of outliers in the data we winsorize dividend, size and profitability at the top and bottom 1 percent level for analysis.

Table 4: Descriptive Statistics of continuous variables from 2015 to 2020

	N	Mean	SD	Min	Pctl (25)	Median	Pctl (75)	Max
Dividend	198,912	2,226,236	44,753,408	0	0	20,000	675,000	7,544,930,275
Age	198,912	13.8	7.36	0	7	14	21	25
Size	198,912	15.6	1.65	0	14.5	15.5	16.5	27.3
Profitability	198,912	-0.24	132.2	-58,096	0.035	0.11	0.22	1,471

Note: Data before winsorization.

In Tables 5 to 8, descriptive statistics of the continuous variables for the full period of 2015-2020 is presented after winsorizing at the top and bottom 1 percent level for dividend, size and profitability. By comparing the treated firms in Table 5 and the control group in Table 8, we observe that the control group on average tend to pay out more dividends than treated firms. We further observe that in terms of age, size and profitability, the firms in the two groups appear to be comparable, with small deviations in the mean of these variables after winsorization.

When treated firms are divided by classification status of Beyond Necessary in Table 6 and Necessary in Table 7, we observe the same, where both treated groups have similar age and size as the control group, while profitability is comparable for Beyond Necessary firms and the control group. For firms classified as Necessary, the profitability is lower than that of the control group. In terms of dividend, we see that the mean dividend of the control group is

higher than both treated groups, and the difference is largest compared to the firms classified as Necessary. Overall, firms in the treated and control group appear to be comparable in terms of age, size and profitability, with an exception for Necessary firms in terms of profitability. We observe that firms in the control group have a higher mean dividend than treated firms, where the difference is highest when compared to firms classified as Necessary.

Table 5: Continuous variables from 2015 to 2020 for all treated firms

	N	Mean	SD	Min	Pctl (25)	Median	Pctl (75)	Max
Dividend	30,234	550,704	1,701,390	0	0	0	452,610	23,000,000
Age	30,234	13.6	7.29	0	7	14	20	25
Size	30,234	15.2	1.26	12	14.4	15.2	16	20.3
Profitability	30,234	0.12	0.16	-0.52	0.034	0.11	0.21	0.65

Note: Data after winsorization.

Table 6: Continuous variables from 2015 to 2020 for firms Beyond Necessary

	N	Mean	SD	Min	Pctl (25)	Median	Pctl (75)	Max
Dividend	24,192	596,964	1,747,206	0	0	0	500,000	23,000,000
Age	24,192	13.7	7.26	0	7	14	20	25
Size	24,192	15.3	1.24	12	14.4	15.2	16	20.3
Profitability	24,192	0.14	0.15	-0.52	0.049	0.12	0.22	0.65

Note: Data after winsorization.

Table 7: Continuous variables from 2015 to 2020 for firms Necessary

	N	Mean	SD	Min	Pctl (25)	Median	Pctl (75)	Max
Dividend	6,042	365,482	1,489,837	0	0	0	180,000	23,000,000
Age	6,042	13.4	7.42	0	7	13	20	25
Size	6,042	15.1	1.34	12	14.1	15	15.9	20.3
Profitability	6,042	0.046	0.18	-0.52	-0.035	0.052	0.15	0.65

Note: Data after winsorization.

Table 8: Continuous variables from 2015 to 2020 for control group

	N	Mean	SD	Min	Pctl (25)	Median	Pctl (75)	Max
Dividend	168,678	1,123,641	3,255,862	0	0	50,000	750,000	23,000,000
Age	168,678	13.8	7.37	0	7	14	21	25
Size	168,678	15.6	1.63	12	14.5	15.5	16.6	20.3
Profitability	168,678	0.13	0.18	-0.52	0.035	0.11	0.22	0.65

Note: Data after winsorization.

To get a clearer picture of the binary variables in our dataset, they are presented separately in Table 9. By looking at the mean value of the Treated variable, we observe a mean of 0.15, indicating that 15 percent of the firms have received compensation. The mean of Beyond Necessary tells us that 12 percent would have had a repayment obligation under compensation scheme four, which classifies them as having received compensation beyond necessary, as discussed in Section 5.2.1. The mean of Necessary shows that only 3 percent of firms in our sample are classified as not having received more compensation than necessary. The Y variable indicates whether a firm made a dividend payout or not in all years in the dataset and show that a dividend payout was made in 50 percent of the cases for all firms, regardless of whether they received compensation.

Table 9: Descriptive statistics of binary variables from 2015-2020

Variables	N	Mean	Minimum	Median	Maximum
Covid	198,912	0.17	0	0	1
Treated	198,912	0.15	0	0	1
Beyond Necessary	198,912	0.12	0	0	1
Necessary	198,912	0.03	0	0	1
Y	198,912	0.50	0	1	1

Note: Data before winsorization.

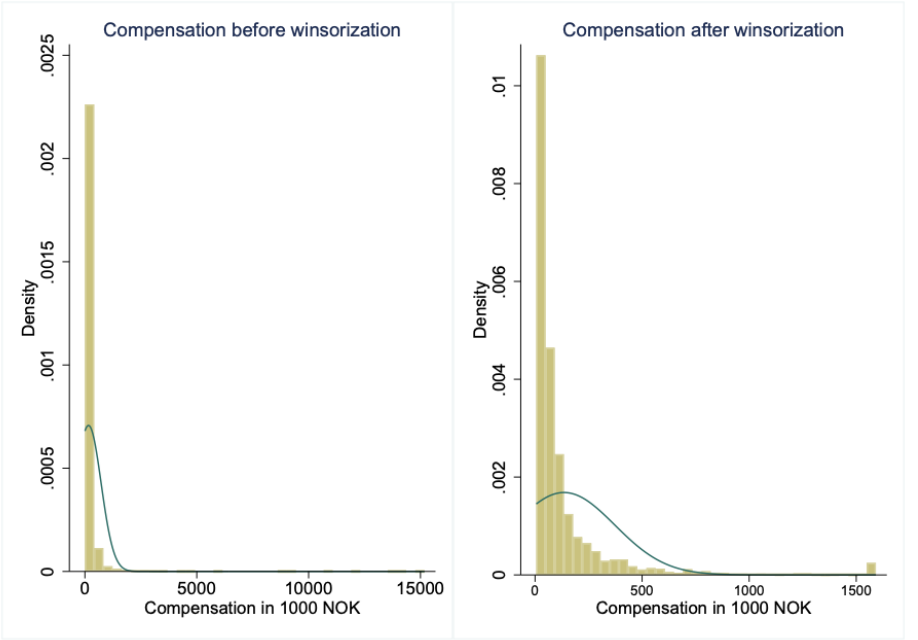
Next, we look at the data before winsorization for companies that received compensation separately. From Table 10 we find that 5 039 firms did, which means these firms are the treated firms in the sample. The average compensation received is NOK 160 122, with a minimum of NOK 2 448 and maximum of NOK 15 180 708. In total, the amount of compensation distributed to the firms in our sample is 806 855 599. As the median is much lower than the mean, this implies that the majority of firms have received a smaller amount of compensation, while a lesser number of firms have received much more, making the data positively skewed. The histogram of compensation for treated firms in Figure 3 confirms this skewness, also when compensation is winsorized at the 1 percent level. For dividends, a total of over NOK 2.5 billion was paid out in 2020, with a maximum value of NOK 130 million for an individual firm. The median of 0 tells us there are more firms that paid no dividend, making the data positively skewed, as illustrated in the histogram in Figure 4. By restricting the dataset to 2020 and only firms that received compensation, we find that the mean of the Y variable is 0,36. This means that 36 percent of firms that received compensation made a dividend payout in 2020.

Table 10: Descriptive statistics for treated firms 2020

Variables	N	Mean	SD	Min	Median	Max	Sum
Compensation	5,039	160,122	563,827	2,448	55,083	15,180,708	806,855,599
Dividend	5,039	525,763	3,042,567	0	0	130,000,000	2,649,322,518
Age	5,039	16.1	7.09	5	16	25	-
Size	5,039	15.3	1.27	10.6	15.2	22.4	-
Profitability	5,039	0.095	0.28	-6.29	0.10	11.6	-
Y	5,039	0.36	0.48	0	0	1	1,834

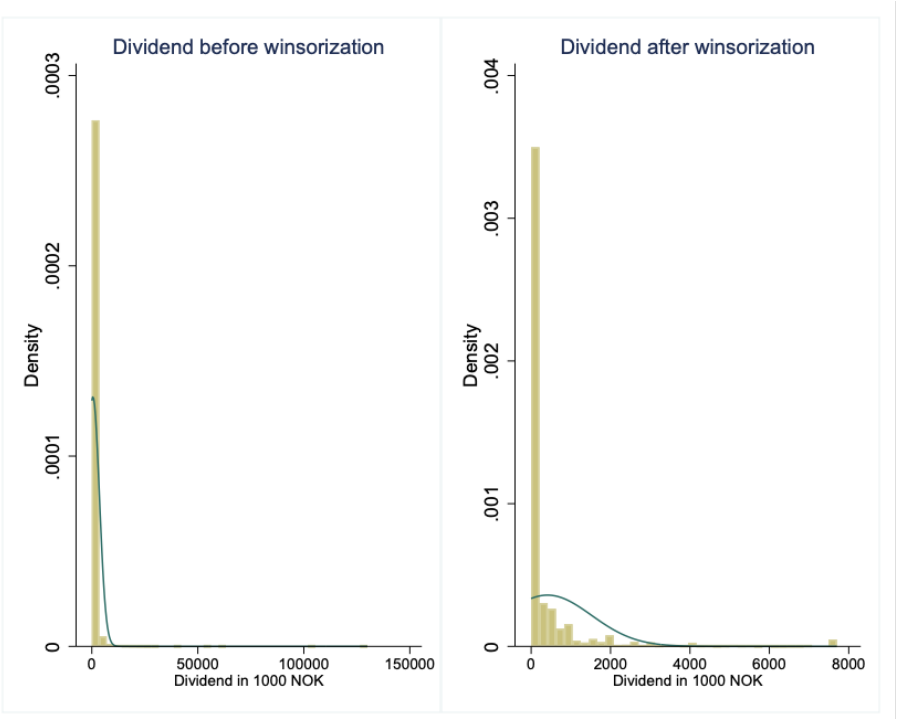
Note: Data before winsorization.

Figure 3: Histogram of compensation for treated firms 2020



Note: Firms that did not receive compensation are excluded from the histogram.

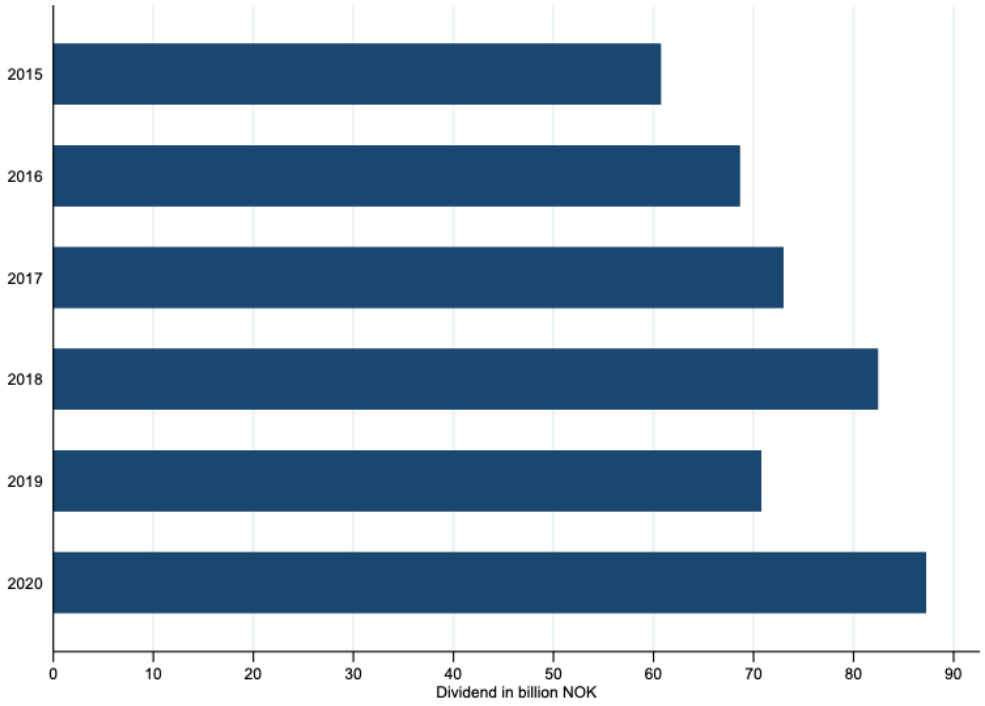
Figure 4: Histogram of dividend for treated firms 2020



Note: Firms that did not receive compensation are excluded from the histogram.

Next, we look at how dividends were distributed in the panel data for all firms in the sample, illustrated in Figure 5, which shows the dividend distribution by year for all firms. We observe a steady incline from 2015 to 2018, with a decline in 2019. Interestingly, 2020 exhibits the largest sum of dividends in all years in the panel data despite the pandemic.

Figure 5: Dividend distribution 2015-2020 all firms



5.4.1 Descriptive statistics of subgroups

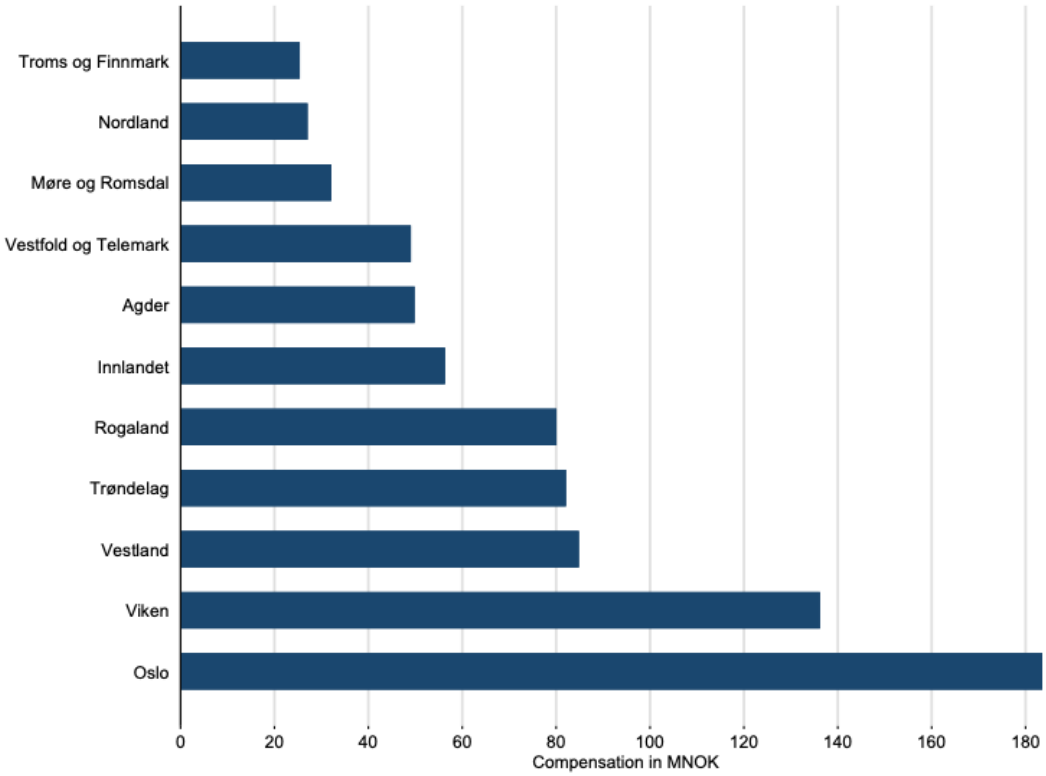
The following section presents graphic statistics on how the compensation for firms was distributed, based on the region and by the sector they belonged to.

Region affiliation

First, we look at how compensation was distributed between different regions. We use the counties described in the data cleaning process to define regions. The bar plot in Figure 6 illustrates the distribution in total amount of Norwegian kroner. We observe that Oslo has the highest sum of compensation with over NOK 180 million, which is equivalent to over 22 percent of the total amount. The percentage distribution for all regions is presented in

Appendix A3. Oslo is followed by Viken with almost NOK 140 million and Vestland with over NOK 80 million. However, we can not yet determine whether this allocation is due to firms in Oslo and Viken receiving more compensation on average or if it is due to there being more treated firms in these regions than the others.

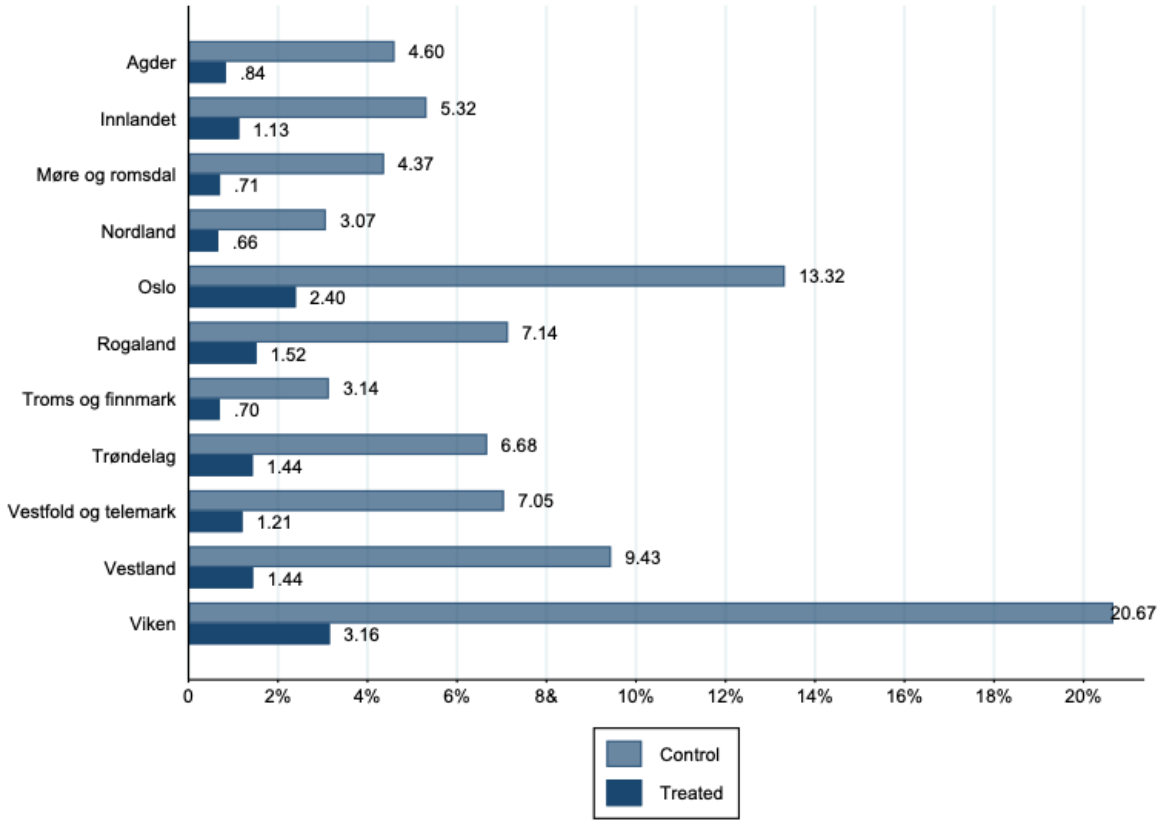
Figure 6: Sum of compensation by region affiliation



From Table 9 we know that approximately 15 percent of the firms in our sample are firms that received compensation, and thus referred to as treated firms. The percentage distribution of treated and non-treated firms in each region is presented in Figure 7. Viken has the highest percentage of treated firms at 3,16 percent, followed by Oslo at 2.40 percent. The distribution of treated firms by region aligns well with the discussion in Chapter 2, where local restrictions were most severe for regions with high infection rates, with Oslo and Viken having the highest numbers of infected through the pandemic. Comparing these percentages to the amount of compensation by region affiliation in Figure 6 show that even though Viken has the highest percentage of treated firms in the population, these firms received less than those in Oslo. This

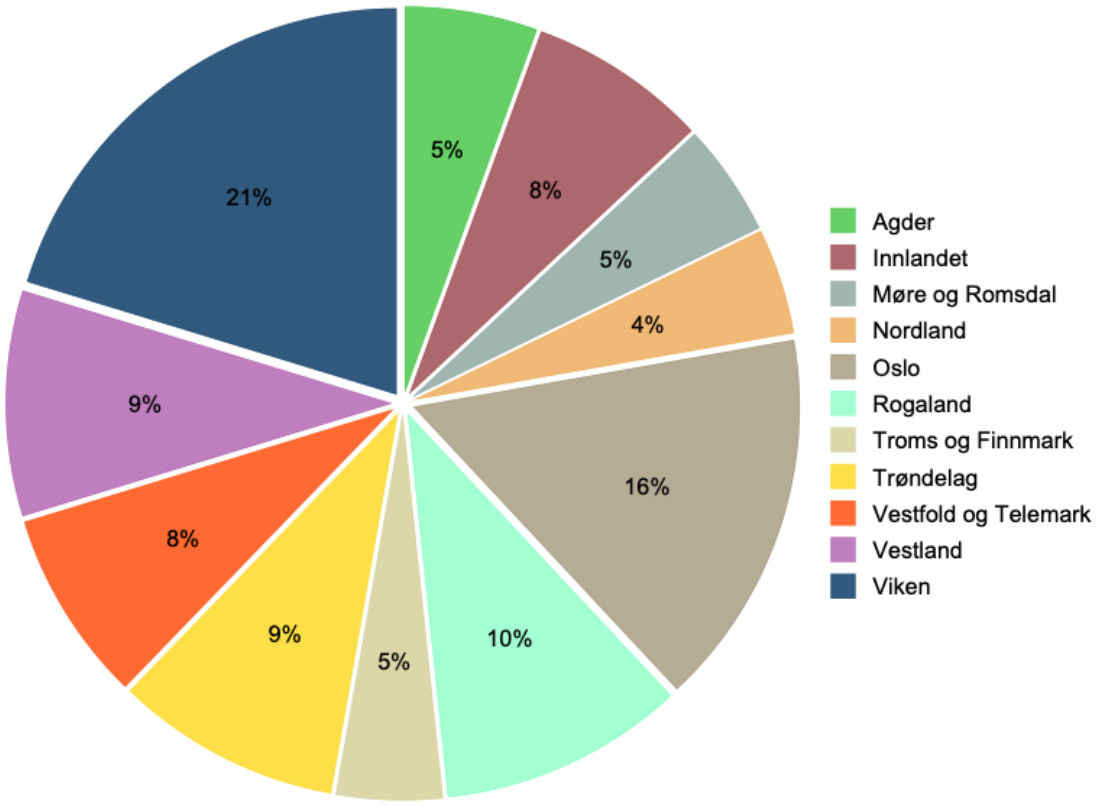
would mean that firms in Viken on average received less compensation than firms in Oslo.

Figure 7: Treated firms in percent for each region



Next, the pie chart in Figure 8 shows the calculation of treated firms by region in percentage of the total number of treated. Again, we observe that Viken has the highest percentage at 21 percent, followed by Oslo at 16 percent and Rogaland at 10 percent. We also observe that Nordland has the lowest percentage of treated firms amongst the treated. Comparing these findings to the sum of compensation distributed to each region from Figure 6, we can derive that while the percentage of firms and sum of compensation appear to be closely related, there has been a somewhat uneven distribution in the sum that has been awarded through the scheme.

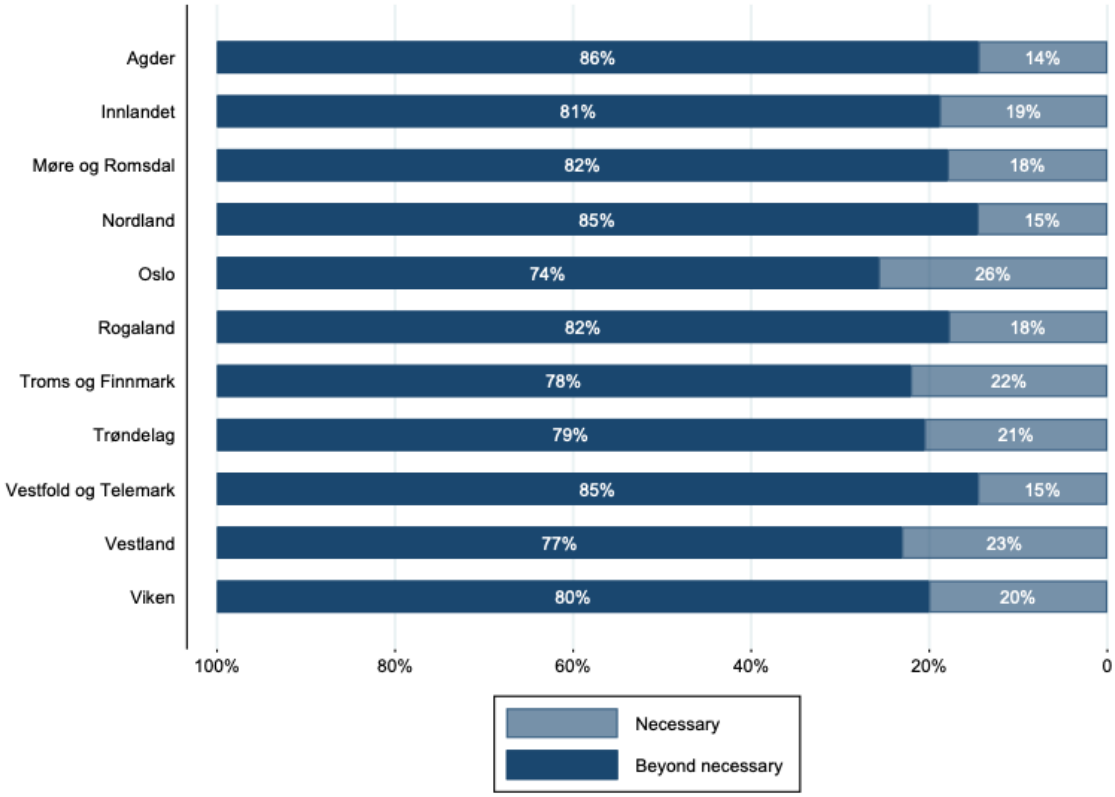
Figure 8: Percentage of treated firms by region affiliation



Note: Numbers rounded to closest percentage.

From Table 9, we know that 12 percent of the firms in our dataset are classified as Beyond Necessary. Based on the discussion of compensation scheme four, this would have resulted in a repayment obligation if the same restrictions had been implemented in 2020. As the total percentage of treated firms in the sample is 15 percent, this means that 80 percent of treated firms are classified as Beyond Necessary. Figure 9 shows this distribution for the treated population by regional affiliation and classification status, and illustrated that for all regions, the vast majority of firms would have been obliged to make a repayment under compensation scheme four.

Figure 9: Percentage of firms receiving Beyond Necessary and Necessary amounts of compensation

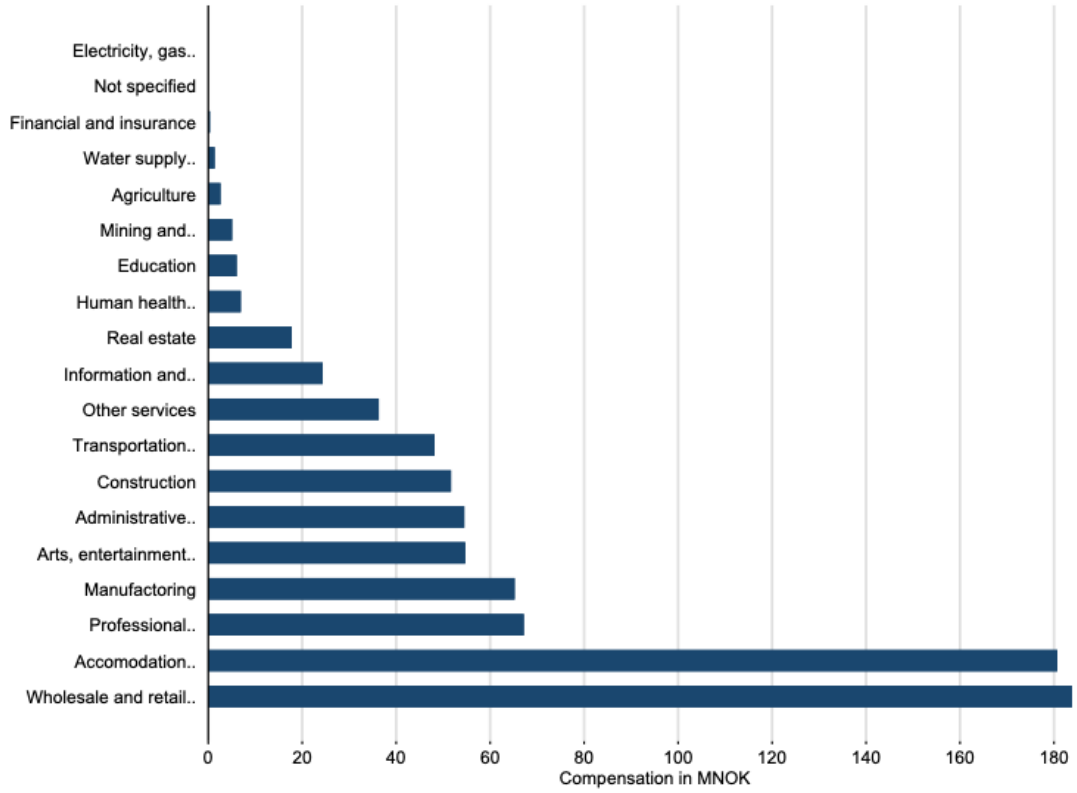


Note: Numbers rounded to closest percentage.

Sector affiliation

From Figure 10 it appears that within our sample, the amount of compensation divided by sector affiliation is somewhat more unequally distributed as compared to region affiliation. Wholesale and retail trade has the highest distributed amount at over NOK 180 million, closely followed by Accommodation and food service activities. From Table A2 in Appendix it is evident that these two sectors combined received approximately 45 percent of all compensation. In total, the nine sectors that received the highest amount of compensation received over 90 percent of all compensation. To determine whether this is due to these sectors having more treated firms than other sectors, or if they received more on average, the percentage distribution of treated firms by sector affiliation is presented in Figure 11.

Figure 10: Sum of compensation by sector affiliation



From the bar plot in Figure 11 we can observe the percentage of treated firms within each sector, allowing us to assess which sectors had the most treated firms. Wholesale and retail trade and Accommodation and food services have the highest percentage of treated firms with 4.79 and 2.27 percent respectively. Based on the discussion of lockdown-restrictions in Chapter 2, this is not surprising considering these sectors typically rely heavily on in-person customer service, and as a result was heavily impacted by the lockdown measures. Arts, entertainment, and recreation has the smallest percentage of firms in the population, where treated firms in this sector accounts for only 0.33 percent of the whole population. Seeing how this sector could apply for another scheme directly targeting this sector, this is not surprising. Finally, based on the percentage of compensation received by each sector calculated in Table A2, sectors that received in aggregate less than 10 percent of the total amount of compensation in our sample are grouped together in "Other Industries". These firms account for 1.13 percentage of the entire population and are thus excluded from our sector-specific analysis in Chapter 7.

Figure 11: Treated firms in percent for each sector

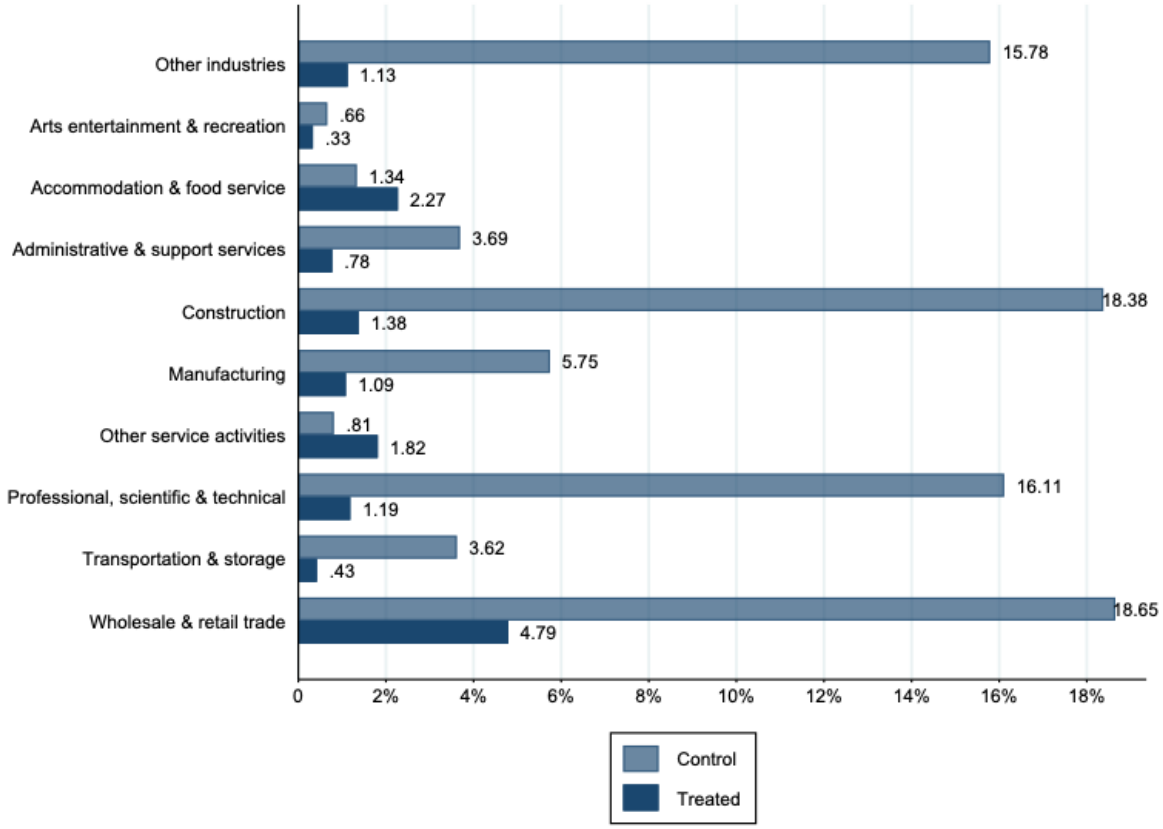
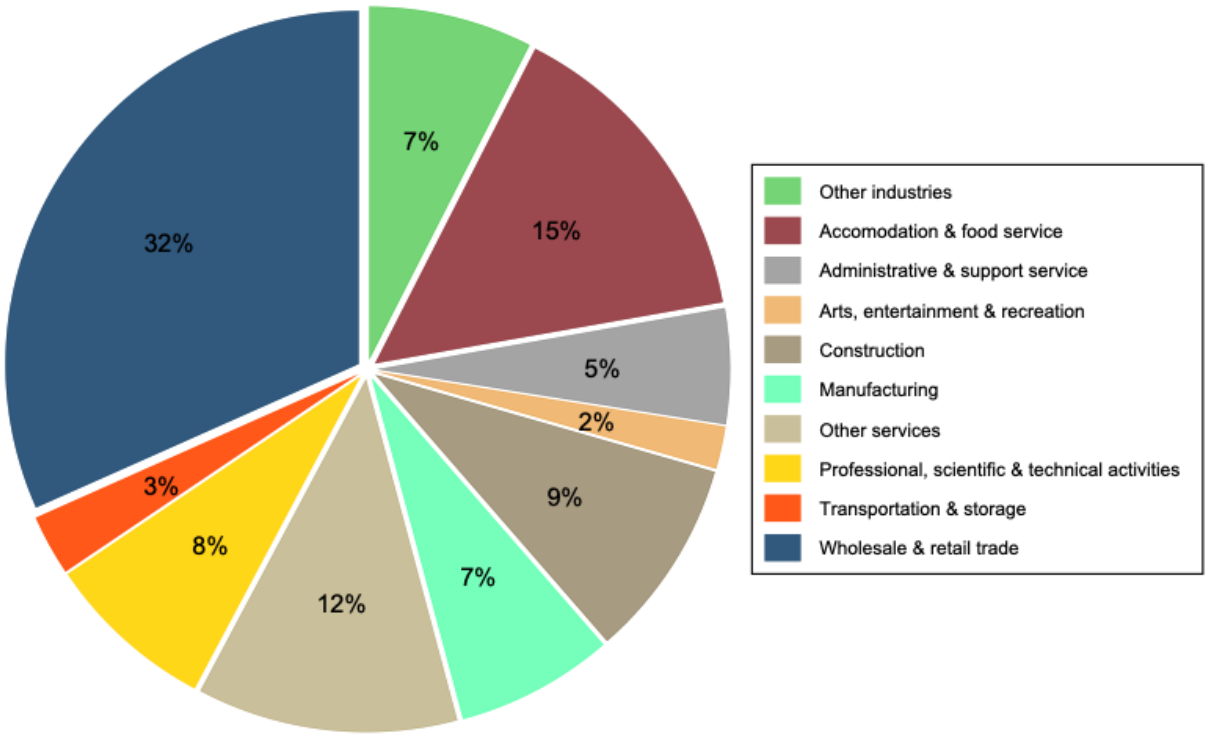


Figure 12 illustrates the percentage calculation of treated firms among the treated by sector affiliation. The pie chart show that approximately 47 percent of treated firms in the population belong to Wholesale and retail trade and Accommodation and food services, which is consistent with Table A2 where these sectors received approximately 45 percent of compensation. Further, treated firms in industries grouped together in "Other Industries" account for 7 percent of all treated firms. We also observe that Arts, entertainment, and recreation has the lowest percentage of treated firms amongst the treated at 2 percent, followed by Transportation and storage with 3 percent.

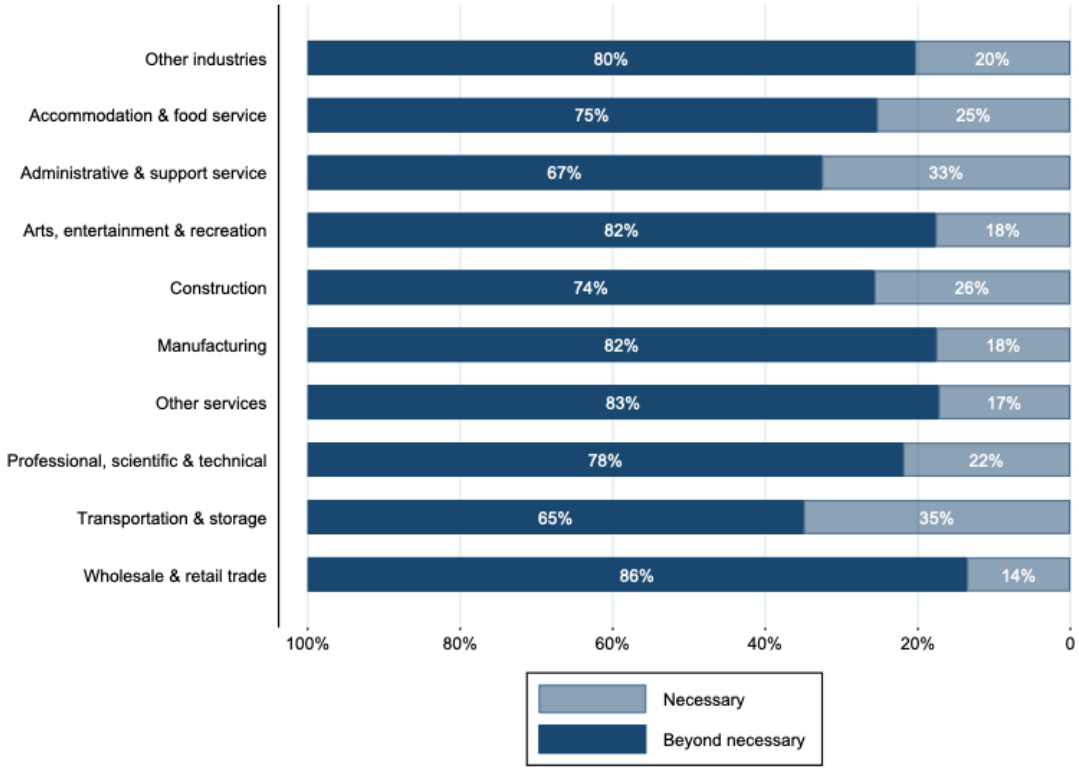
Figure 12: Percentage of treated firms by sector affiliation



Note: Numbers rounded to closest percentage.

Finally, Figure 13 show how the treated firms are distributed by classification status. As for region affiliation, we remark that most firms within each sector would have been obligated to make a repayment of received compensation if the restrictions from compensation scheme four had been imposed in 2020. Interestingly, we observe that Wholesale and retail trade have the highest percentage of firms classified as Beyond Necessary, which could indicate that firms in this industry were able to recover from the initial shock of the lockdown measures in the first part of 2020.

Figure 13: Percentage of firms receiving Beyond Necessary and Necessary amounts of compensation



Note: Numbers rounded to closest percentage.

6. Empirical Models

To investigate our research hypotheses, we apply logit regression models using the Difference-in-Differences method. The theoretical background for using logit regression and Difference-in-Differences is discussed in Section 6.1 along with assumptions for Difference in Difference. Following that, we present the model specifications applied to answer our hypotheses in more detail before a discussion of additional control variables and potentially data concerns.

6.1 Logistic Difference in Difference models

The objective of our research is to investigate if receiving funds from the compensation scheme impacted the likelihood of a dividend payout during Covid-19. When investigating probabilities, a binary dependent variable must be applied, and can be analyzed using an OLS regression model referred to as the linear probability model (Wooldridge, 2016, p.224). The linear probability model, however, has some disadvantages, particularly that it can predict probabilities that are less than zero or greater than one (Wooldridge, 2016, p. 525). In addition, there is also the issue of heteroskedasticity to consider. To overcome the limitations of the linear probability model, one can instead use binary response models, particularly the logit model to produce comparable results. Generally, response probabilities are calculated as follows:

Equation 4:

$$P(y = 1|x) = P(y = 1|x_1, x_{2,\dots,} x_k)$$

Where x represents the full set of explanatory variables (Wooldridge, 2016, p.525). A general binary response model can be expressed as follows:

Equation 5:

$$P(y = 1|x) = G(\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k)$$

In this equation, G is a function that takes on values strictly between zero and one: $0 < G(z) < 1$, for all real numbers z (Wooldridge, 2016, p.525). As a result, the estimated response probabilities will fall strictly within the range of zero to one. Another advantage of the logit model is that the functional form allows for the possibility that the effect of x-variables could vary across values of x-variables, rather than being a constant value (Ringdal, 2018, p.467).

When interpreting the results in a logistic regression, the results can be presented in odds ratios that measure how large the likelihood of an event occurring, illustrated as an outcome of Y = 1 is, compared to the likelihood of an outcome of Y= 0. In our model, the odds ratio represents the relationship between a variable and the likelihood of dividends being paid out in 2020. If the odds ratio is greater than 1, this indicates that the event is more likely to occur, whereas an odds ratio of less than 1 would indicate that the event is less likely to occur. In the case of an odds ratio equal to 1 the odds of the event occurring is equal (Ringdal, 2018, p.458).

While the nature of dependent variable investigated prefers the use of a logistic model, the research topic also encourage us to use the Difference-in-Difference methodology. In empirical research, Difference-in-Differences is often used to estimate the causal impact of a treatment or an intervention (Fredriksson & Oliveira, 2019). Due to the objective of our research, which is to investigate the causal effect of compensation on dividend likelihood, this provides a context suitable for contrasting the two sets of firms that can be classified as treated and non-treated, as well as a pre and post period, thus motivating the use of Difference-in-Difference approach.

Difference-in-Differences (hereafter referred to as DiD) is an approach widely used in economics, public policy, and other research fields (Fredriksson & Oliveira, 2019). The method estimates the causal effects of programs by exploiting time and cross-sectional variation to mimic an experimental design in cases where randomization on the individual level is not achievable, as in the case of the compensation scheme (Columbia, n.d.). By using the DiD methodology, biases that could be a result of permanent differences between the treated and control group is removed, allowing for post-intervention comparison between the two (Columbia, n.d.). If permanent differences in characteristics that are determinants of outcomes are constant over time, their influence is eliminated by studying changes over time (Fredriksson & Oliveria, 2019). This also applies to differences in time-invariant observable

characteristics, which are netted out, as well as biases from changes that occur over time when these changes are present in both groups (Fredriksson & Oliveria, 2019).

The DiD estimator δ in a regression is defined as the difference in average outcome in a treatment group before and after treatment, when the difference in average outcome in the control group before and after treatment is subtracted (Albouy, n.d.). This is equivalent to subtracting the average treatment effect on the control group from the average treatment effect on the treated group, and can be illustrated as in equation 6 (W. Somville, lecture note, March 30th, 2023):

Equation 6:

$$\delta = (E[\bar{Y}_T^1|Post] - E[\bar{Y}_T^0|Pre]) - (E[\bar{Y}_C^0|Post] - E[\bar{Y}_C^0|Pre])$$

When we apply the DiD methodology, the average treatment effect on our control group can be calculated as:

Equation 7:

$$E[\bar{Y}_{i2020}|Compensation_i = 0] - E\left[\bar{Y}_{i2015,2016,2017,2018,2019}\middle|Compensation_i = 0\right]$$

While the average treatment effect on our treated group is calculated as:

Equation 8:

$$E[\bar{Y}_{i2020}|Compensation_i = 1] - E\left[\bar{Y}_{i2015,2016,2017,2018,2019}\middle|Compensation_i = 1\right]$$

We apply a Fixed effect estimator to account for the possibility of differences between firms and to account for variations within the sample. As a result of including fixed effects in the model, we account for any time-invariant unobserved heterogeneity among the units in the sample. This approach helps to control for potential omitted variable bias and identify the causal effect of the treatment (Wing et al., 2018). We define the model's unit-specific

unobserved confounders at firm level, using the fictious firm number in the dataset. The time-specific unobserved confounders are set by year by including a year dummy hereafter referred to as "Post" equal to 1 in the post period and 0 for the years 2016-2019[7]. By setting the time-specific unobserved confounders by year, we cancel out year specific differences that are common for all firms and adjust for other factors such as inflation. Through this approach, we have a model equivalent to a two-way fixed effects model, illustrated in equation 9:

Equation 9:

$$Y_{it} = u_i + v_t + \delta I_{it} + \varepsilon_{it}$$

u_i represents the individual firm fixed effects, and v_t represents the time fixed effects. *I* is a binary variable equaling 1 for treatment observations in the post period, and 0 otherwise, and is the variable of interest as it provides the DiD estimate δ (Fredriksson & Oliveria, 2019). The error term ε_{it} denotes effects outside our model that affect the outcome variable (Wing et al., 2018).

In the modelling of the dependent variable, we use the sum allocated to dividend from Income Statement 2, where the variable takes the value 1 if there is an allocation of dividend, and 0 otherwise, for all years in our panel data, as such:

$$Y = \begin{cases} 0, & \text{No dividend payout was made} \\ 1, & \text{Dividend payout was made} \end{cases}$$

In order to differentiate between our hypotheses, we use two DiD regression models to account for the differences in treatment status needed to investigate the hypotheses separately.

[7] Using a year variable with a prefix i. in Stata would have been the traditional approach. However, this was not achievable due to xtlogit not being able to converge. This approach simplifies the model, allowing for convergence.

6.1.1 Assumptions for DiD models

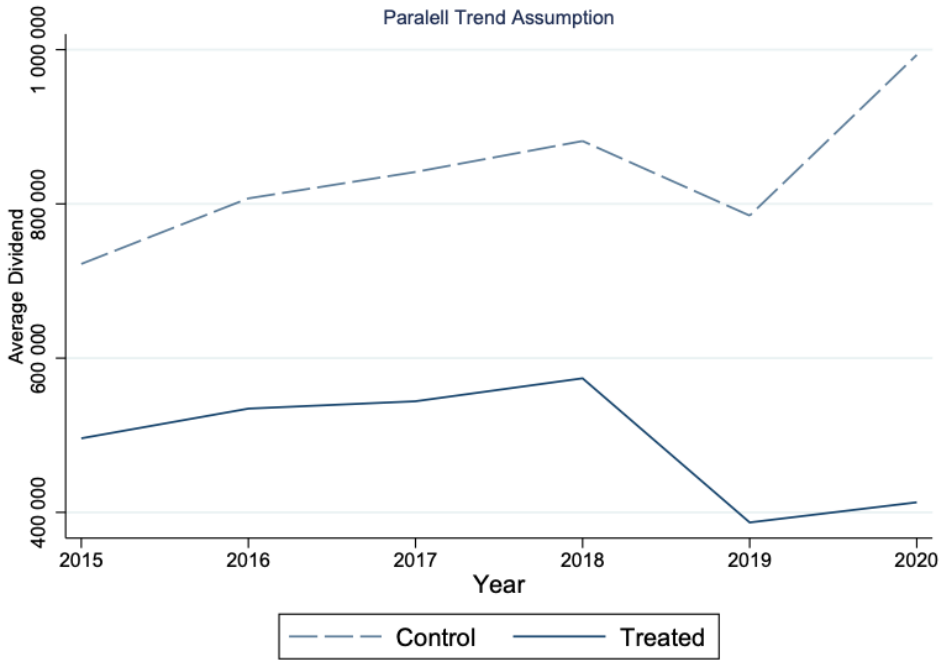
When using the difference in difference methodology, the key assumption is that confounders that vary across groups are time invariant, and that time-varying confounders are group invariant (Wing et al., 2018). This is referred to as the parallel trend assumption, or the common trends assumption. Specifically, in the absence of treatment, the trend in the control group approximates the potential outcome in the treatment group. If the treatment group and the control group are changing in the same way over time, meaning they have the same time trend, then we will be able to identify an unbiased coefficient on the intervention (Fredriksson & Oliveria, 2019).

If the treatment group and the control group are not randomly assigned, there is a possibility that the treatment group would have had different trends, which could be a result of individual firm traits which make them more susceptible to treatment (Fredriksson & Oliveria, 2019). This means that causal inference under the DiD methodology is only valid when firms can not influence whether they receive treatment or not (Caniglia & Murray, 2020). While firms could choose whether to apply for compensation or not, it is reasonable to assume that only very few entities that qualified would opt out of applying. This can be argued based on the widespread communication of the support scheme and the fact that it is in the company's interest to apply for compensation regardless, as there are no negative consequences associated with applying. Also, we argue that the design of the compensation scheme supports this assumption. Qualifying was determined by firms experiencing a loss of income, hence we argue that firms could not influence whether they would experience such a loss of income, as it was a consequence of the lockdown measures, and thereby imposed on them by an outside force. In theory, all firms could by subject to the negative drawbacks of the lockdown-measures, and we therefore assume that all firms had a non-zero probability of receiving the treatment, and that they were not able to impact whether or not they would receive treatment.

As described in Section 5.3.1, our data is a balanced dataset consisting of entries from 2015-2020 where the treatment was introduced in 2020, making the period 2015-2019 the pre-intervention periods. When working with multiple pre-treatment periods, we can use graphical evidence to partially validate the parallel trends assumption by plotting the mean

outcome by group and time-period to look for deviations from the parallel trend assumption (Wing et al., 2018). To deal with the issue of outliers discussed in descriptive statistics, the dividend variable has been winsorized at the top and bottom 1 percent before plotting the means. Assessing the trend plot in Figure 14 we observe a moderate increase in dividends for both the treated and the control group which moves in parallel from 2015 to 2018. From 2018 to 2019 we see that the trend shifts to a decline in average dividend for both groups. When assessing how the groups differ in the post-intervention period of 2020, we observe an increase for both groups, where the increase is steeper for the control group.

Figure 14: Trend in mean dividend from 2015 to 2020



While visual inspection of the parallel trend assumption provides a partial validation, visual evidence can be less reliable when dealing with noisy data or a short time series (Wing et al., 2018). To support the visual inspection of the parallel trend assumption, we use a more formal approach to provide support for the parallel trend assumption by conducting a placebo regression (Fredriksson & Oliveria, 2019). There are several ways one can use placebo regression to test the parallel trend assumption. We choose one of the most common, which is to introduce a fake treatment period. Thus, we perform an additional DiD estimation excluding all post-treatment observations and applying 2017 as the placebo treatment period. If the parallel trend assumption holds, there should be no significant

treatment effect (Fredriksson & Oliveria, 2019). The results are presented in Appendix A6 and show no significance for the DiD estimate, supporting the visual inspection of the parallel trends assumption.

Another important assumption when using the DiD method is that there is no anticipation (Angrist & Pischke, 2009). This can happen, for instance, in cases where firms change their behavior in anticipation of a new regulation before it is implemented (Wing et al., 2018). When this is the case, it could invalidate the DiD estimates. We argue that the circumstances under which the compensation scheme was implemented make the issue of anticipation unlikely in this case. As discussed in Chapter 2, the first case of Covid-19 in Norway occurred in early 2020, and the implementation of the compensation scheme happened swiftly as a response to a surge in infection rates. Hence, we argue that the possibility of the compensation scheme being put into legislation was not known prior to 2020, making anticipation issues highly unlikely.

6.1.2 DiD model for hypothesis one

As the objective of our first hypothesis is to investigate whether companies receiving compensation are more likely to pay dividends, the treated variable is a binary variable taking the value of 1 in all years pre and post intervention for companies that received compensation in 2020, while the control group take the value of 0. The time variable Covid is a binary variable specifying the pre and post period, taking the value of 1 for the post-intervention period 2020 and 0 in the pre-intervention period of 2015-2019. Since our model includes group and year fixed effects, the Treated and Covid variables are omitted from the model because of collinearity, so the equation is shown without them to better reflect the variables in our regression table.

The interaction term consisting of Treated*Covid is our variable of interest, where the estimator δ shows the effect of receiving compensation on the likelihood of making a dividend payout. This provides the following model for the first hypothesis:

Equation 10: Regression equation for hypothesis one:

$$P(Dividend\ payout\ is\ made = 1|x) = u_i + v_t + \delta(Treated * Covid)_{it} + \varepsilon_{it}$$

6.1.3 DiD model for hypothesis two

When investigating the second hypothesis of whether firms classified as having received compensation beyond necessary had a higher likelihood of paying dividends than firms receiving less, we apply the same binary dependent variable as in model 1. As the groups are classified in a manner that makes them mutually exclusive, we can compare how received compensation impacted their likelihood of a dividend separately.

To be able to differentiate between the treated firms that would have been classified as having received compensation beyond necessary, and those that did not, we include two separate interactions terms of treated variables and the time variable.

The first treatment variable "Treatment 1" is a binary variable taking the value of 1 in all years pre and post intervention for companies that are classified as having received compensation beyond necessary. The calculation is based on whether firms would have had a surplus of more than NOK 50 000 under compensation scheme four, as discussed in Section 5.2.1. The time variable Covid is the same as in model 1, with the value of 1 for 2020 and 0 for 2015-2019.

The second treatment variable "Treated 2" is a binary variable taking the value of 1 in all years pre and post intervention for companies that received compensation but had a surplus of less than NOK 50 000. The time variable Covid is also the same as for the first interaction term.

Equation 11: Regression equation for hypothesis two:

$$P(Dividend\ payout\ is\ made = 1|x) = u_i + v_t + \delta(Treated1 * Covid)_{it} + \delta(Treated2 * Covid)_{it} + \varepsilon_{it}$$

6.1.4 Additional control variables and concerns in data

To increase the precision of the estimates of the causal effect in our model, we include individual level controls in both models (Angrist & Pischke, 2009). These variables must vary over time, as time invariant observables are already controlled for trough the time fixed effects in the model.

Based on the discussion of prior research in our literature review in Chapter 4, several characteristics have been found to be significant determinants of whether a company makes dividend payouts or not. Our selection of control variables is based on these prior findings, and include company age, company size and profitability, which were highlighted in most studies as significant determinants of firm dividends.

When calculating the age of a company, we subtract the year the company was registered in the Norwegian Central Coordinating Register for Legal Entities. Because the effect of a one-year increase in age cannot be differentiated from the aggregate time effects, we include this control variable as a fixed effect (Wooldridge, 2016, p.437). Company size is a continuous variable measured by calculating the natural logarithm of total assets. We consider it appropriate to control for the company size since it has been found to be a significant determinant in other studies and is also likely to be correlated with the companies' fixed, unavoidable costs, thereby affecting the compensation received by the companies. We control for profitability by calculating the ratio of net income/total assets.

When adding additional control variables, there should also be no multicollinearity between the independent variables. This occurs when independent variables are correlated and could result in less reliable statistical inference. We check for multicollinearity through correlation matrixes and using the variance inflation factor (VIF) for both models (Wooldridge, 2016, p.86). The mean VIF is 1.12 and 1.11 for model 1 and model 2, respectively. The result of the correlation matrixes can be found in Appendix A7 and A8.

In addition to the concern of multicollinearity, we check the data for heteroskedasticity before analysis is performed. Through the hettest command in Stata, we perform the Breausch-Pagan/Cook-Weisberg test and find that the nature of the data is heteroskedastic, which is often the case when dealing with log-linear models. We account for this by running our regressions with bootstrap[8] to obtain heteroskedasticity-robust standard errors. This had only a miniscule impact on the statistical significance of our results.

[8] Ideally, we would use robust standard errors, however estimating a xtlogit with fixed effects is not compatible with robust standard errors in Stata.

7. Results

In the following section, we present the results of the two regression models used to investigate our two hypotheses. First, we present the analysis of how receiving compensation impacted the likelihood of making a dividend payout under hypothesis one. Second, the analysis of the second hypothesis is presented, where we analyze how being classified as having received compensation beyond necessary or not impacts the likelihood of a dividend payout. For both analyses, we separately investigate whether result differ across regions and sectors by running the regressions on each subsample. Finally, tests for robustness conducted for both models are presented.

7.1 Hypothesis 1

Table 11 presents the results of the DiD model for hypothesis one, analyzing how receiving compensation impacts the likelihood of making a dividend payout. Based on prior research presented in the literature review, we expect the likelihood of a dividend payout to decrease when compensation is received. In the table, outputs of regression model 1 are shown with three model variations defined by columns (1) to (3), where our controls variables and fixed effects for company age have been included or excluded from the regression models. We find that most results are significant at the 1 percent level. As discussed in Section 6.1, the results are presented in odds ratio, where an odds ratio of less than 1 indicates that dividends is less likely to occur. An odds ratio greater than 1 would indicate that dividends are more likely to occur.

The results presented in column (1) indicate that excluding all control variables and the Post variable, the likelihood of a dividend payout is negatively affected by receiving compensation and significant at the 1 percent level. We observe that for firms that received compensation, the odds ratio of 0.555 is less than 1, suggesting the odds of paying out dividends have decreased and showing a negative impact of compensation on dividend likelihood.

In column (2) we present the regression model with control variables, including the Post variable for year fixed effects and age of the company as fixed effects, and see that the odds ratio changes to factor of 0.626. As an odds ratio of less than 1 indicates that the event is less

likely to occur, we observe that including the control variables still indicates a decrease in the odds of dividends, however the decrease is not as severe as without controls. This indicates that including company size and profitability as control variables, as well as company age as a fixed effect and a Post variable explain some of the effect on the outcome variable. We observe from the Post variable that all else equal, a dividend payout was generally more likely in 2020 as compared to 2016-2019. Also, an increase in company size and profitability positively impacts the likelihood of a dividend payout.

The full output of the model with fixed effects for company age can be found in Table A5 in Appendix. It shows that within the age-range of one to twenty-five, there is a positive trend valid only for the first five years compared to the benchmark year of one year of age. From six to twenty-five years of age, there seems to be a decrease in the likelihood as compared to the benchmark. As such, it appears that companies that are younger than six years old have a higher likelihood of paying dividends than older firms. However, these coefficients are not significant, except for the third and fourth year.

For column (3), we wish to include the squared term of company age as a control variable to capture the possibility of a non-linear relationship between company age and dividend payout. When we include the age squared term of company age as a control variable, we observe that the coefficient of the squared term is negative. Based on this, it appears that we have a positive non-linear relationship up to the sixth year. This non-linear relationship is captured by the quadratic term, which allows the relationship between company age and our dependent variable to change direction after five years.

The goodness of fit of the models is assessed through the McFadden Pseudo R^2 and by performing a Chi-square test. A higher McFadden Pseudo R^2 is usually associated with better model fit (Tufte, 2000, p.50). We observe that the model in column (2) has a much larger Pseudo R^2 than the unfitted model in column (1), and higher than for column (3). The p- value indicated that the models are statistically significant for all columns. Therefore, for the remainder of the thesis, column (2) will be referred to as our main model for hypothesis one.

Table 11: Logit Regression Analysis for model 1

Variables	(1)	(2)	(3)
DiD	0.555***	0.626***	0.579***
	(0.024)	(0.029)	(0.023)
Post		1.449***	1.471***
		(0.038)	(0.031)
Company Age			1.030**
			(0.012)
Age^2			0.995***
			(0.000)
Company Size		3.003***	
		(0.072)	
Profitability		101.03***	142.43***
		(8.60)	(12.97)
Observations	169,266	124,430	124,430
Age fixed effect	No	Yes	No
Log likelihood	-64805.5	-41177.7	-42426.7
Pseudo R^2	0.002	0.133	0.106
Wald Chi^2	179.8	15213.4	4356.1
Prob>Chi^2	0.0000	0.0000	0.0000
AIC	129613	82411.5	84863.3

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** p<0.01, ** p<0.05, * <0.1*

Table 12 presents the results of the region-specific regression analysis which is used to investigate heterogeneity in the likelihood of a dividend payout across region affiliation by restricting our sample to each region. The region is determined by the county in which the company is located. As illustrated by infection rates scaled by population in Table A4, the severity of the pandemic in terms of infection rates were unequal in different counties in Norway, which, as discussed in Chapter 2 resulted in stricter lockdown measures in these counties. According to the table, Oslo, Viken and Vestland, were the three counties with the highest number of reported cases of Covid-19.

From the regression results, the odds ratios indicate that there is a decrease in the likelihood of paying dividends for most regions, with the exceptions being regions where the results are not statistically significant. For firms in Vestland, the odds of dividends are reduced by a factor of 0.461, marking the highest decrease amongst the regions, followed closely by Trøndelag and Rogaland. Meanwhile, the other significant regions also exhibit a decrease in the likelihood of dividends, however, compared to Vestland the decrease is not as severe. Interestingly, after Agder, Viken and Oslo exhibits the lowest decrease with a factor of 0.653 for Viken and 0.623 for Oslo, even though Oslo and Viken received the highest amounts of compensation. Overall, the results indicate that receiving compensation results in a decrease in the odds of paying dividends across region affiliation for all significant results, with some variation in the magnitude of the decrease.

Table 12: Region-Specific Logit Regression Analysis for model 1

Variables	Agder	Innlandet	Møre & Romsdal	Nordland	Oslo
	(1)	(2)	(3)	(4)	(5)
DiD	0.701**	1.033	0.829	0.862	0.623***
	(0.125)	(0.167)	(0.141)	(0.163)	(0.067)
Post	1.367***	1.493***	1.340**	1.721***	1.331***
	(0.135)	(0.164)	(0.163)	(0.217)	(0.084)
Company Size	2.598***	3.419***	3.163***	2.622***	2.958***
	(0.341)	(0.443)	(0.499)	(0.471)	(0.214)
Profitability	176.11***	198.76***	414.43***	107.10***	53.86***
	(71.60)	(97.29)	(151.30)	(45.02)	(6.95)
Observations	6,870	8,030	6,410	4,770	19,285
Age fixed effect	Yes	Yes	Yes	Yes	Yes
Log likelihood	-2233.4	-2650.2	-2083.1	-1624.0	-6284.6
Pseudo R^2	0.138	0.137	0.146	0.109	0.148
Wald Chi^2	968.1	535.9	1091.6	463.13	3883.5
Prob Chi^2	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	4522.8	5356.5	4222.1	3304.0	12625.1

Rogaland	Trøndelag	Troms/ Finnmark	Vestfold/ Telemark	Vestland	Viken
(6)	(7)	(8)	(9)	(10)	(11)
0.485***	0.468***	0.554***	0.611***	0.461***	0.653***
(0.063)	(0.072)	(0.125)	(0.094)	(0.064)	(0.066)
1.520***	1.429***	1.406**	1.676***	1.502***	1.409***
(0.142)	(0.121)	(0.195)	(0.141)	(0.119)	(0.077)
2.714***	3.841***	2.998***	3.765***	2.888***	2.908***
(0.293)	(0.513)	(0.541)	(0.474)	(0.353)	(0.192)
110.90***	100.66***	131.90***	139.00***	251.79***	63.23***
(30.95)	(34.83)	(58.70)	(43.99)	(66.04)	(11.14)
10,710	10,260	4,825	10,485	13,530	29,240
Yes	Yes	Yes	Yes	Yes	Yes
-3538.4	-3334.8	-1618.5	-3443.5	-4404.1	-9740.9
0.137	0.142	0.119	0.144	0.146	0.127
1199.7	1119.1	1060.2	983.8	2353.8	1602.4
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7132.8	6725.6	3292.9	6942.9	8864.3	19537.8

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

As shown in Figure 10, there is heterogeneity for compensation companies received across sectors. Therefore, we find it appropriate to examine whether receiving compensation affects a firm's likelihood of dividends differently based on sector affiliation. We choose to investigate the nine sectors that received the highest sums of compensation, accounting for approximately 90 percent of the total funds, as displayed in Table A2. The regressions are run by restricting the sample to each sector.

From Table 13 we observe that receiving compensation while also belonging to one of the separate sectors appear to negatively affect the likelihood of a dividend payout across all sectors. Arts, entertainment, and recreation stand out with the largest decrease likelihood with an odds ratio of 0.413, followed by Transportation and storage and Administrative and support services. Hence, belonging to one of these three sectors and being treated makes the likelihood of a dividend payout generally less likely, and also less likely compared to other

sectors. This aligns well with how hard-hit different sectors were by the pandemic, as discussed in Chapter 2. Interestingly, Wholesale and retail trade has amongst the lowest decreases in likelihood, despite this sector receiving the highest amount of compensation. The same applies for Accommodation and food service, but this result are not significant.

Table 13: Sector-Specific Logit Regression Analysis for model 1

Variables	Accommodation & food service (1)	Administrative /support service (2)	Arts, entertainment/ recreation (3)	Wholesale /retail trade (4)
DiD	0.940	0.533**	0.413*	0.612***
	(0.185)	(0.146)	(0.217)	(0.052)
Post	1.028	1.098	1.151	1.664***
	(0.167)	(0.112)	(0.390)	(0.102)
Company Size	3.665***	3.183***	2.880***	3.092***
	(0.599)	(0.501)	(0.749)	(0.215)
Profitability	149.69***	82.09***	43.01***	416.46***
	(54.57)	(31.13)	(24.24)	(66.56)
Observations	5,005	5,850	1,315	28,930
Age fixed effect	Yes	Yes	Yes	Yes
Log likelihood	-1486.4	-1859.9	-400.6	-9545.5
Pseudo R^2	0.225	0.169	0.199	0.135
Wald Chi^2	134.4	524.2	224.4	4972.9
Prob Chi^2	0.0000	0.0000	0.0000	0.0000
AIC	3028.8	3775.7	857.2	19147.1

Manufacturing	Transport/ storage	Professional, scientific/ technical activities	Construction	Other service activities
(5)	(6)	(7)	(8)	(9)
0.547***	0.518***	0.618***	0.665***	0.995
(0.088)	(0.133)	(0.091)	(0.104)	(0.219)
1.727***	1.281**	1.408***	1.380***	1.576**
(0.169)	(0.141)	(0.077)	(0.095)	(0.309)
3.408***	2.919***	3.002***	3.948***	6.826***
(0.557)	(0.474)	(0.214)	(0.307)	(2.252)
520.69***	199.48***	46.142***	183.50***	78.83***
(236.94)	(74.88)	(8.096)	(43.78)	(36.74)
8,560	4,935	20,705	24,960	3,310
Yes	Yes	Yes	Yes	Yes
-2780.2	-1628.5	-6727.6	-8116.5	-1056.5
0.146	0.125	0.149	0.148	0.163
845.7	536.4	1482.1	1750.4	625.1
0.0000	0.0000	0.0000	0.0000	0.0000
5616.4	3313.1	13511.3	16289.1	2169.1

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

7.2 Hypothesis 2

As previously discussed, the second model include two interaction terms to differentiate between different classifications of treated firms. In Table 14, Beyond Necessary is the DiD estimate for treated firms that have been classified in Section 5.2.1 as having received compensation beyond necessary. Necessary refers to the DiD estimate for treated firms that received compensation but were not classified as having received more than necessary.

In the absence of age fixed effects, the post variable, and without controlling for company size and profitability, the results in column (1) indicate that the likelihood of paying dividends is negatively affected by receiving compensation, for both classifications. We observe that firms classified as Beyond Necessary are 0.739 times less likely to pay dividends, while firms classified as Necessary 0.089 times less likely. Hence, firms that are classified as Necessary are far less likely to pay dividends in 2020 than their counterparties that are classified as Beyond Necessary. We find that all results are significant at the 1

percent level.

When control variables are included in column (2), along with company age as a fixed effect and the Post variable, we find that for firms classified as Beyond Necessary, the likelihood of dividends decrease compared to the unfitted model, while for firms classified as Necessary, the likelihood increases compared to the unfitted model. However, the effect is negative overall for both groups, though firms that are classified as Beyond Necessary did not have their likelihood decreased as much as firms classified as Necessary.

Table 14: Logit Regression Analysis for model 2

Variables	(1)	(2)
Beyond Necessary	0.739***	0.671***
	(0.032)	(0.032)
Necessary	0.089***	0.319***
	(0.012)	(0.049)
Post		1.455***
		(0.039)
Company Size		2.991***
		(0.087)
Profitability		97.99***
		(8.26)
Observations	169,266	124,430
Age fixed effect	No	Yes
Log likelihood	-64643.8	-41163.7
Pseudo R2	0.004	0.133
Wald Chi2	448.1	18380.3
Prob Chi2	0.0000	0.0000
AIC	129291.6	83385.4

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

The results of the region-specific regression analysis is presented in Table 15, where heterogeneity between municipalities is investigated for hypothesis two. The same model as

for column (2) in Table 14 is applied. From the table, we find that all regions that are statistically significant have a decrease in the likelihood of paying dividends. The results are similar to the results of the region-specific analysis for hypothesis one, which indicates that the findings for heterogeneity across regions are robust across models. For treated firms classified as Beyond Necessary, firms in Vestland have the largest decrease, being 0.498 times less likely to pay dividends, with Rogaland following closely behind. We again find that firms in Agder, Viken and Oslo has the lowest reduction in likelihood of dividends when insignificant regions are excluded, despite Oslo and Viken receiving the most compensation.

For treated firms classified as Necessary, we recognize that these results should be interpreted with caution, as is appears we do not have enough observations for each interaction to give significant results. We find that only four regions produce results that are statistically significant. These are Oslo, Viken Rogaland and Vestland. The reduction in odds is highest for firms in Vestland, which are 0.252 times less likely to pay dividends, followed by Viken. Meanwhile, Oslo and Rogaland have similar results, where firms in Oslo have the smallest decrease in likelihood. Overall, we observe that firms classified as Necessary has the largest decrease in likelihood of dividends compared to firms classified as Beyond Necessary.

Table 15: Region-Specific Logit Regression Analysis for model 2

Variables	Agder	Innlandet	Møre & Romsdal	Nordland	Oslo
	(1)	(2)	(3)	(4)	(5)
Beyond Necessary	0.713**	1.108	0.924	0.956	0.666***
	(0.111)	(0.236)	(0.204)	(0.204)	(0.083)
Necessary	0.632	0.604	0.248	0.305	0.371**
	(0.415)	(0.307)	(1.380)	(1.149)	(0.166)
Post	1.368***	1.493***	1.342**	1.728***	1.332***
	(0.147)	(0.161)	(0.145)	(0209)	(0.089)
Company Size	2.596***	3.398***	3.137***	2.593***	2.948***
	(0.366)	(0.398)	(0.591)	(0.486)	(0.156)

Profitability	175.39***	191.34***	388.98***	100.17***	52.61***
	(50.67)	(87.84)	(170.33)	(44.23)	(11.35)
Observations	6,870	8,030	6,410	4,770	19,285
Age fixed effect	Yes	Yes	Yes	Yes	Yes
Log likelihood	-2233.4	-2649.3	-2081.3	-1622.5	-6283.1
Pseudo R^2	0.138	0.138	0.146	0.110	0.148
Wald Chi^2	1103.9	559.2	815.7	821.4	2512.6
Prob Chi^2	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	4524.8	5356.6	4220.7	3302.9	12624.1

Rogaland	Trøndelag	Troms/ Finnmark	Vestfold/ Telemark	Vestland	Viken
(6)	(7)	(8)	(9)	(10)	(11)
0.499***	0.501***	0.611**	0.644***	0.498***	0.711***
(0.069)	(0.876)	(0.127)	(0.102)	(0.066)	(0.072)
0.344**	0.196	0.185	0.237	0.252**	0.305***
(0.170)	(0.669)	(0.689)	(0.898)	(0.136)	(0.113)
1.519***	1.432***	1.401***	1.678***	1.500***	1.410***
(0.135)	(0.119)	(0.172)	(0.174)	(0.111)	(0.059)
2.709***	3.824***	2.984***	3.748***	2.884***	2.894***
(0.303)	(0.446)	(0.504)	(0.407)	(0.323)	(0.155)
109.22***	97.182***	124.79***	135.69***	243.036***	61.48***
(24.17)	(24.906)	(54.45)	(48.11)	(65.472)	(10.01)
10,710	10,260	4,825	10,485	13,530	29,240
Yes	Yes	Yes	Yes	Yes	Yes
-3538.1	-3333.4	-1617.1	-3442.3	-4402.9	-9736.9
0.138	0.143	0.120	0.145	0.146	0.127
1626.6	1118.9	407.9	1484.9	1887.1	3345.1
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7134.3	6724.7	3292.2	6942.7	8863.8	19531.9

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

To conclude our analysis of hypothesis two, we look at the results of the sector-specific regression analysis in Table 16. We apply the same model specifications from column (2) in Table 14 as we did for the region-specific analysis above and investigate the same nine sectors as in the analysis under hypothesis one.

For firms classified as Beyond Necessary, we first observe that only three sectors produce significant results. These sectors provide similar results, and overall show a reduction in likelihood of dividends. The results for Wholesale and retail trade are similar to those obtained under hypothesis one, with firms classified as Beyond Necessary and belonging to this sector being 0.654 times less likely to pay dividends. Overall, we find firms classified as Beyond Necessary in all sectors are less likely to pay dividends. The results are similar to those obtained for hypothesis one, however less sectors provide significant results.

For firms classified as Necessary, we again find that there is a decrease in the likelihood of dividends in most sectors. For significant results we find that firms are less likely to pay dividends, except for firms in Accommodation and food service, which are more likely to pay dividends. Consistent with the findings from hypothesis one, we find that Arts, entertainment, and recreation had the largest decrease in likelihood of dividends. Overall, the findings indicate that firms that did not receive compensation beyond necessary, had a much larger decrease in the likelihood of dividend compared to those classified as having received beyond necessary, however few sectors provide significant results for firms classified as Necessary.

Table 16: Sector-Specific Logit Regression Analysis for model 2

Variables	Accommodation /food service (1)	Administrative /support service (2)	Arts, entertainment/ recreation (3)	Wholesale /retail trade (4)
Beyond Necessary	0.851 (0.172)	0.618 (0.172)	0.473 (0.185)	0.654*** (0.178)
Necessary	2.081* (0.873)	0.188 (0.881)	0.000*** (0.000)	0.178*** (0.086)
Post	1.027 (0.172)	1.099 (0.125)	1.094 (0.341)	1.668*** (1.668)

Company Size	3.796***	3.169***	2.971***	3.068***
	(0.637)	(0.488)	(0.728)	(0.234)
Profitability	180.453***	78.11***	40.10***	391.69***
	(67.35)	(28.46)	(23.93)	(100.38)
Observations	5,005	5,850	1,315	28,930
Age fixed effect	Yes	Yes	Yes	Yes
Log likelihood	-1482.9	-1858.3	-398.4	-9538.1
Pseudo R^2	0.227	0.169	0.206	0.136
Wald Chi^2	694.2	1006.6	790.9	3232.4
Prob Chi^2	0.0000	0.0000	0.0000	0.0000
AIC	3023.9	3774.6	854.8	19374.1

Manufacturing	Transport/ storage	Professional, scientific/ technical activities	Construction	Other service activities
(5)	(6)	(7)	(8)	(9)
0.604***	0.647	0.625***	0.778	0.998
(0.108)	(0.211)	(0.104)	(0.124)	(0.210)
0.191	0.207	0.573	0.186	0.978
(0.785)	(0.689)	(0.242)	(0.419)	(0.429)
1.729***	1.273	1.408***	1.379***	1.577***
(0.177)	(0.166)	(0.086)	(0.090)	(0.336)
3.382***	2.893***	3.002***	3.935***	6.819***
(0.381)	(0.479)	(0.204)	(0.274)	(2.001)
496.34***	188.73***	46.07***	178.40***	78.48***
(187.91)	(82.97)	(7.45)	(30.52)	(33.64)
8,560	4,935	20,705	24,960	3,310
Yes	Yes	Yes	Yes	Yes
-2778.1	-1626.9	-6727.6	-8111.9	-1056.5
0.147	0.126	0.149	0.149	0.163

1270.7	788.9	1997.9	2708.3	386.1
0.0000	0.0000	0.0000	0.0000	0.0000
5614.3	3311.9	13513.3	16517.4	2171.1

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
Significance level: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

7.3 Robustness of Results

In this section we perform a selection of robustness tests to see whether our baseline model estimates are robust to changes in our model specification. The presence of plausible and robust coefficients is commonly interpreted as evidence of structural validity (Lu & White, 2014). If the odds ratio estimates remain largely unchanged after dropping or adding covariates, it is likely that the estimated odds ratio are of interest. Moreover, we exclude observations from the region Oslo and sector Wholesale and retail trade, as they have received the highest amounts of compensation.

7.3.1 Hypothesis 1

To assess the robustness of the analysis of the first hypothesis, four robustness tests are performed, each with a modification to the model or the data set. The results are presented in Table 17. Across all four model specifications, company age is a fixed effect. Our robustness tests, which are significant at the 1 percent level are compared to the results from column (2) in Table 11.

Initially, we want to determine if we obtain different results by excluding company size. Column (1) shows that removing company size as a control variable obtains a slightly larger decrease in the likelihood of dividend payout. When profitability is removed, but other controls are included in column (2) we find that removing profitability has only a small impact on the findings from our main model.

Further, in column (3) we remove all observations for Oslo to examine if the heterogeneity observed in the main regression results for our first hypothesis in Table 11 impacts those results. We find that removing observations from Oslo changes the odds ratio by a miniscule amount compared to the baseline model.

Lastly, we removed the observations from Wholesale and retail trade in column (4), as our sector-specific analyses revealed that being in different sectors gave different results regarding the likelihood of dividends in 2020 for treated firms. We remove Wholesale and retail trade sector as this sector received the highest amount of compensation, while also having the largest number of observations. The results of the main regression are not significantly affected by removing these observations. Overall, the results are similar to those obtained from the main regression analysis in Table 11, column (2), and the difference for all alterations is less than 0.05 compared to our main results.

Table 17: Robustness Logit Regression Analysis for model 1

Variables	Remove Company Size	Remove Profitability	Remove Oslo	Remove Wholesale & retail trade
	(1)	(2)	(3)	(4)
DiD	0.580***	0.586***	0.624***	0.613***
	(0.028)	(0.022)	(0.032)	(0.028)
Post	1.487***	1.507***	1.469***	1.378***
	(0.036)	(0.037)	(0.039)	(0.036)
Company Size		4.365***	3.026***	2.998***
		(0.139)	(0.098)	(0.113)
Profitability	147.57***		116.78***	74.98***
	(10.39)		(10.02)	(8.95)
Observations	124,430	124,430	105,145	95,500
Age Fixed effect	Yes	Yes	Yes	Yes
Log likelihood	-42280.7	-44476.7	-34853.8	-31545.9
Pseudo R^2	0.109	0.063	0.131	0.134
Wald Chi^2	11127.4	7610.8	12309.5	7563.9
Prob Chi^2	0.0000	0.0000	0.0000	0.0000
AIC	84615.5	89007.3	69763.5	63147.9

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

7.3.2 Hypothesis 2

Due to the similarity between model one and model two, we ran the same four robustness tests for hypothesis two as for hypothesis one. The robustness tests show statistical significance at the 1 percent level for all four specifications. We compare the results in Table 18 to those obtained in the main regression for hypothesis two in column (2), in Table 14.

First, we look at how the results differ from those obtained in the main model for firms classified as having received compensation beyond necessary. From column (1) we observe that removing company size as a control variable produces a slightly larger decrease in likelihood of dividends compared to our main regression. When profitability is removed as a control in column (2), the decrease in likelihood compared to the main regression is slightly lower.

Removing all observations for Oslo in column (3) produce almost identical results to those obtained in the main regression, and the same applies when Wholesale and retail trade is removed. Overall, we find that the results for firms classified as having received compensation beyond necessary are similar to those of the main regression when alterations are made to the model and data set, with a difference in odds ratio of 0.044 at most.

Next, we look at how the results differ for firms that are classified as Necessary. By removing company size in column (1), the negative effect of receiving compensation changes slightly by a factor of 0.065. The change in likelihood is larger when profitability is removed, decreasing the odds ratio of dividends by a factor of 0.181. Overall, the results of separately removing these variables are similar to those obtained in the main regression. When observations for Oslo is removed in column (3), the results remain similar to the results from the main regression, and the decrease in the likelihood of dividend is almost unchanged. Finally, in column (4) the results are also vastly similar to the results obtained from the main regression.

Table 18: Robustness Logit Regression Analysis for model 2

Variables	Remove Company Size	Remove Profitability	Remove Oslo	Remove Wholesale & retail trade
	(1)	(2)	(3)	(4)
Beyond Necessary	0.636***	0.715***	0.669***	0.655***
	(0.030)	(0.035)	(0.031)	(0.028)
Necessary	0.254***	0.138***	0.309***	0.367***
	(0.037)	(0.024)	(0.051)	(0.067)
Post	1.487***	1.509***	1.469***	1.377***
	(0.043)	(0.038)	(0.041)	(0.040)
Company Size		4.296***	3.013***	2.989***
		(0.126)	(0.079)	(0.114)
Profitability	141.81***		113.16***	73.35***
	(11.07)		(10.92)	(6.81)
Observations	124,430	124,430	105,145	95,500
Age Fixed effect	Yes	Yes	Yes	Yes
Log likelihood	-42258.2	-44392.4	-34841.4	-31539.1
Pseudo R^2	0.109	0.065	0.131	0.134
Wald Chi^2	12549.1	6206.1	11054.7	10068.7
Prob Chi^2	0.0000	0.0000	0.0000	0.0000
AIC	84844.9	88840.9	69740.9	63136.2

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Based on the findings from the robustness tests, the results are overall similar to those obtained from the main regression analysis of the first hypothesis, where we find that receiving compensation appears to have a negative impact on the likelihood of a dividend payout in 2020 for treated firms. The results of the robustness test for the Beyond Necessary and Necessary groups under hypothesis two are also similar, with the negative impact being most severe for firms classified as Necessary.

8. Findings

In this section, the results of our study are discussed along with potential explanations and implications, as well as comparison with similar studies on dividends and government support for companies during Covid-19 discussed in our literature review. Also included in our discussion are some limitations to our study. We conclude with suggestions for future research.

8.1 Discussion of results

For our discussion, we start by assessing the results in regard to our first hypothesis. The purpose of our first hypothesis was to investigate whether *"receiving compensation impacts a firm's likelihood of making a dividend payout"*. Through our analysis, we find that receiving compensation appears to have a negative effect, where firms receiving compensation have a decreased likelihood of dividends in 2020. For significant results, this seems to be the case regardless of region and sector affiliation, although we do observe some heterogeneity in the magnitude of the impact. Overall, we find support for our hypothesis that receiving compensation impacts the likelihood of dividends, which indicates that these firms generally suffered financial hardship due to the repercussions of Covid-19, making dividend payments more difficult to execute.

In our analysis of regions and sectors there are some interesting findings that deviate from what we might expect based on the amount of compensation distributed. Although one might expect that the regions and sectors that received the highest amount of compensation would exhibit the greatest decrease in dividend likelihood, we are unable to conclude that there is such a direct association. First, we find that Viken has the smallest decrease in likelihood of dividends after Agder, despite this region receiving the second highest amount of compensation and the highest percentage of treated firms in our population. Thus, although Viken had long periods of lockdown restrictions, Figure 6 and 7 from descriptive statistics show that on average, firms in Viken received less compensation compared to others. This could indicate that the firms in Viken may not have experienced a loss of income as severe as one might expect based on the lockdown restrictions in this region. Another possible explanation could be related to the composition of firms within this region. When investigating the data further we find that approximately 34 percent of firms that received

compensation from Viken belong to the Wholesale and retail trade sector. From our analysis, we find that this sector, although being the sector that received the highest amount of compensation still had amongst the smallest decreases in likelihood of dividends despite many entities within this region being closed for a long period of time. For instance, many of the city center stores in Oslo and Viken were closed for months and were also adversely affected by the reduction in travel and the use of home offices (Meld. St. 2 (2020-2021), p. 98). Hence, while our findings may seem surprising, figures from Statistics Norway show that there was an increase in online shopping of 37.8 percent compared to 2019. The shift from physical to digital sales indicates that this sector was able to adapt efficiently to lockdown measures. The same figures also show that overall, the retail trade increased by 11 percent (Statistics Norway, 2021b). Thus, despite being the sector with the largest amount of compensation, it is evident that they managed through the pandemic quite well after all.

Another interesting finding is that Arts, entertainment, and recreation had the largest decrease in likelihood of dividends. The 330 firms in this sector account for only 2 percent of treated firms in the sample, however they have received over NOK 53 million. Hence, the firms in our sample from this sector seem to have been severely impacted by the lockdown restrictions and received on average a large amount of compensation. Additionally, this sector had a separate support scheme for business and culture, specifically targeted towards it. Hence, we may not be able to conclude that the large decrease can be attributed to the compensation scheme alone, as data from other schemes is not available in our sample.

For our second hypothesis, the purpose was to investigate whether *"firms classified as having received compensation beyond necessary had a higher likelihood of paying dividends than firms receiving less"*. When assessing the results, we find a negative effect for both groups with an interesting exception for Accommodation and food services, where we observe that firms classified as Necessary actually had an increased likelihood of dividends. When investigating this further, we find that there are only 16 firms classified as Necessary in this industry that made a dividend payout in 2020. We therefore recommend caution when interpreting this result. With this exception, when comparing the results of the two treated groups, we do however find that the effect is much more severe for firms that did not receive compensation beyond necessary. For all significant results, there seems to be a high degree of consistency with our findings under hypothesis one for both region and sector affiliation,

specifically for firms classified as Beyond Necessary. For firms classified as Necessary, we find that only three sectors provide significant results which is likely a power issue due to few observations of Necessary firms, and even fewer within each sector. Of significant results, Arts, entertainment, and recreation has the highest decrease in likelihood. When investigating the data further, we find that none of the firms in Arts, entertainment and recreation classified as Necessary made a dividend payout in 2020, which explains the extreme value presented in Table 16. Based on the discussion of the strictness of measures for this sector in particular, we argue the findings are reasonable as these firms were most likely shut down for a majority of 2020. Further, for Wholesale and retail trade, firms classified as Necessary has a larger decrease in the likelihood of dividends than firms classified as Beyond Necessary. Possible explanations include firms in this group having difficulty converting their sales to online-shopping, or having to shut down for longer periods, resulting in a more severe decline in turnover. For regions we find that the results overall align well with those under hypothesis one, showing a negative impact of compensation on dividend likelihood for both treated classifications.

Overall, the results of our investigation imply that the criticism and findings of compensation and dividends presented in the media and discussed in Section 3.1.5 may provide a unnuanced perspective of the reality of the implications of the compensation scheme. While findings in the media have shown that firms receiving compensation paid out more dividends in total amounts than the previous year, we argue that our findings contradict this position. On the contrary, our findings may suggest that this could be the result of relatively few major companies increasing their dividends by a large amount. We would also argue that even if firms that received compensation paid out more dividends than in 2019, this provides little insight without also considering the amount of compensation received compared to the size of the dividend. Hence, it could be argued that these firms would have increased their dividends regardless of compensation. According to Table 10 of descriptive statistics for treated firms in 2020, 36 percent of firms receiving compensation in 2020 paid out dividends. Based on the calculations in Table A5 in Appendix, these firms received approximately 20 percent of the total amount of compensation. Furthermore, it shows a decrease in dividends of NOK 520 million compared to 2019, a decrease of 16.4 percent. Also, the 10 firms that received the highest amount of compensation omitted dividends in 2020 despite half of them having made payments in 2019. Thus, we argue that our findings offer a more nuanced picture of compensation and dividends than what has been presented in the media.

Although we consistently find that receiving compensation decreases dividend likelihood, we should consider the possibility of companies delaying dividend payments before drawing such a conclusion. The possibility of postponement of dividend payments for companies that received compensation has been mentioned as a potential weakness of a prohibition on dividend payments (Fraser et al., 2021a). As the recipients of compensation and the respective amounts awarded is publicly available information, firms could choose to delay dividends strategically to avoid the risk of negative media coverage. If so, the negative impact of compensation on dividends indicated by our results could in part be a result of dividend postponements. Still, we do not find any indication that companies have exploited the scheme to finance larger dividends or to make payouts they otherwise would not have made in the absence of the compensation scheme.

Another perspective worth considering is that there could be several reasons why a firm may choose not to pay dividends. First, it could be due to financial difficulties where a firm may choose to retain their earnings, for instance, to ensure that certain financial requirements such as financial covenants are met. A firm may also choose to retain earnings for other reasons, such as for reinvestment purposes or to strategically position themselves for future investment opportunities. Finally, a company may choose to prioritize debt obligations rather than dividends, which could be the case for firms during the pandemic considering the uncertainty of the situation (Baker et al., 2012).

Another important discussion is whether the negative effect associated with receiving compensation is a result of compensation, or rather the effect of these firms genuinely performing worse overall during the pandemic, at least compared to firms that did not receive compensation. This possibility must be addressed, specifically because compensation received is directly related to a drop in turnover. Hence, we can not with certainty say that it is in fact the receival of compensation that is the driving force behind the decreased likelihood of dividends. Additionally, since the effect overall is less negative for companies classified as Beyond Necessary than for Necessary, this could indicate that the first compensation schemes favored companies that could operate without financial support and could constitute unproductive spending by the government in the first phase of the pandemic. Also, we can not rule out the possibility that the presence of other government schemes may influence our

estimates. As a result, the presence and magnitude of a causal effect of receiving compensation on dividend payouts should be interpreted with a certain degree of caution.

8.2 Comparison with prior research

The results of our analysis are further evaluated by comparing them with existing research articles that discuss dividends and support policies during the Covid-19 pandemic. We found the body of research on this field in Norway to be very limited, except for a master thesis by Juskaite & Yasemin Balci (2022). Their results indicate that firms that received more compensation had a lower probability of dividends in 2020, and also paid less. These results are consistent with ours. There is however more research on this subject in other countries, and we will mainly be drawing comparisons from those studies.

We find that in comparison with prior research, the study by Kluzek & Schmidt-Jessa's (2022) is most comparable with ours, as they investigate the effects of government support on companies' dividend payments in Poland. They find that receiving government aid negatively impacted the probability of dividends during Covid-19, and thus support our findings that receiving government support negatively affects a company's likelihood of paying dividends in 2020. However, some differences makes the results not directly comparable, as our research includes both listed and unlisted companies in Norway, whereas their analysis involves only a limited sample of Polish listed companies.

Further, we compare our findings with studies that look at whether dividends were more or less likely during Covid-19. We note, however, that these studies can not be compared in terms of the results of our DiD variables, as they do not investigate government support. From our analysis, we find that the Post variable indicated that dividends were generally more likely during 2020 than in 2015-2019. This finding contradict that of Krieger et al. (2021) in their study of United States publicly listed companies, whose findings suggested that that proportion of dividend omissions and cuts were three to five times higher than in any quarter since 2015. While this might seem surprising, the United States and Norwegian economy differ greatly. Our findings also contradict those of Ali (2022) in their study of G-12 countries during the pandemic, where the proportion of dividend omissions were much higher during Covid-19 than prior years. They did however find that a majority of firms still maintained or increased their dividends. We also find that our findings contradict with Ali et

al. (2022), in their study of publicly listed companies in Pakistan during the pandemic. Their findings suggest that omissions were the preferred policy during Covid-19, while our finding for the Post variable show the opposite. We do note, however, that the objective of the research and methods applied makes a direct comparison difficult. While we use a binary dependent variable for whether a dividend payout was made or not, they use a dependent variable for dividend change rate to calculate the percentage difference between a firm's dividend in the fiscal year and the previous fiscal year.

In terms of determinants of dividends and our control variables, our results aligns well with prior literature. Ali et al. (2022), Brawn & Šević (2018), Fama & French (2001) and Brav et al. (2005) all found that firm-level characteristics impact dividend policy. Companies with higher profitability and size were more likely to continue paying dividends. This is in line with our results for profitability and size, where the results for these variables indicate that an increase in size and profitability is associated with an increase in the likelihood of dividends and is well aligned with the expected relationship.

8.3 Limitations

The results of the analyses may have been impacted by several limitations of our study, and we therefore find it appropriate to emphasize them.

While our definition of firms receiving compensation beyond necessary is based on the repayment obligation introduced in compensation scheme four, we do acknowledge the possibility that another specification of which firms receiving compensation beyond necessary could have produced different results. The changes to the compensation scheme have been both criticized and supported. For larger enterprises, where NOK 50 000 is assumed to be of marginal importance, the threshold has been criticized as having limited importance. According to the ministry's assessment, the amount could be more significant for small businesses, where, for instance, the owner's efforts during the period have made a significant difference to the business' survival. Several consultation bodies point out that the surplus may be the result of good restructuring, hard work, or that the owners have taken little or no salary. The situation may be more challenging for small and medium-sized

businesses, and when a request for repayment of grants arises, it should consider the business' liquidity situation (Prop. 49 L (2021-2022), p. 11).

Another potential limitation is that we only had access to data through 2020, which allowed us to examine the impact of the first and part of the second compensation schemes. The results may have been different if we had included more years of the compensation scheme in our analysis. Therefore, when more data becomes available, it will be possible to generate more robust and accurate results. Another limitation is that, due to the scope of the study and access to data, the study looks at the compensation scheme separately from other schemes. Consequently, it is difficult to rule out the possibility of other government support schemes having an effect on dividends.

Moreover, our analysis of the hypotheses using annual dividend payments may lead to potentially unreliable results. The reason for this is that we were unable to access monthly dividend payments for companies in 2020 due to data availability restrictions. Since the compensation scheme began in March 2020, companies may have paid dividends in the first months of the year before the scheme took effect. Therefore, compensation cannot be attributed to the effect on dividends paid during those months. However, due to data restrictions, we had to include these months in our analyses. Consequently, dividends paid in early 2020 may distort the results and provide an inaccurate picture of how compensation may impact dividend payouts in 2020. However, we consider this limitation to be less consequential since we have access to six-years of panel data. Moreover, through the data cleaning process described in Section 5.3.1, we removed a large number of observations. We can not determine whether these observations could have impacted the results if included.

Further, a limitation of this study might be that the groups compared may not be similar enough prior to treatment. From descriptive statistics after winsorization we found the firms are similar and comparable in terms of age, size and profitability, with an exception for profitability for firms classified as Necessary. We also found that there was a difference in the average amount of dividends paid between the groups, and there is a possibility that the firms differ in terms of some unobserved characteristics not accounted for by our models. Hence, while we found the treatment and control firms to be similar and comparable in terms of most of the variables in our models, there exist some differences that could potentially make a comparison challenging.

Additionally, it is possible that some important factors may have been omitted from our models that could have influenced the dependent variable. For example, it might have been appropriate to include control variables for company growth, leverage, and liquidity, which could have affected dividend payments. On the contrary, these control variables could potentially have been "bad controls", meaning they could in principle be affected by receiving compensation, thus absorbing some of the compensation effect we are trying to measure (Cinelli et al., 2022). As a result, our decision to exclude these variables may also be considered a limitation since they may influence dividends. Finally, there is a possibility that the larger sample of firms that did not receive compensation may have overestimated the effects in our analysis.

8.4 Future research

The Covid-19 pandemic has been an ongoing event for the past few years. However, as of May 5th, the World Health Organization announced that Covid-19 is no longer a global threat (World Health Organization, 2023). The conclusion of the pandemic thus provide important possibilities for future research in the years to come. Despite the insights gained regarding the compensation scheme in Norway, we find that several areas remain uninformed. This section provides suggestions for future research on the topic of government support during Covid-19 in Norway and possible extensions to our research.

As part of this study, we focused on compensation schemes for companies in the first and part of the second arrangements. This prevents us from conducting a comprehensive assessment of the overall scheme. A natural extension to our research and the general topic of dividends during Covid-19 is to examine all arrangement periods in which the compensation scheme was applicable. This would provide more datapoints for the post period in a DiD analysis, which could improve the reliability of the estimates. Furthermore, an investigation into the effectiveness of the restrictions introduced under compensation scheme four should be conducted. This could provide relevant insight into whether firms that received compensation under this scheme adjusted to the dividend restrictions by strategically postponing dividends, or if they made other strategic measures to circumvent the dividend restrictions. In this context, it could also be of relevance to investigate whether companies that voluntarily repaid the compensation did so in order to pay out dividends.

Another interesting topic could be whether firms that received compensation during the first schemes had an increase in bonus payments. We find this to be relevant considering the restrictions implemented in compensation scheme four, where bonuses could be considered an attempt to bypass the dividend restriction.

Additionally, as the purpose of the scheme was in part to prevent otherwise viable firms from going bankrupt, we suggest comparing the bankruptcy probability in 2019 for firms that received compensation with actual bankruptcy figures in the years following Covid-19. The performance of companies that received more than was necessary to survive over the next few years could be interesting to compare relative to those that received only what was necessary to survive.

Finally, a comparison of the compensation scheme with other government support measures could be interesting, for instance, the deferral of tax payments, fees reductions, guarantee and the loan schemes to assess the effectiveness of the compensation scheme, as well as the overall effect of these schemes combined.

9. Conclusion

This thesis was conducted with the aim of assessing what effect the compensation scheme had on dividend payouts. A two-fold analysis of receiving compensation is performed to first determine whether dividends are more or less likely to be paid in 2020 by firms receiving compensation. In addition, we analyze how a company's likelihood of making a dividend payout was affected by receiving compensation beyond what was necessary. We also investigate the presence of heterogeneity in both analyses to determine whether outcomes vary across regions and sectors.

According to our analysis of compensation data and financial figures from The Norwegian Tax Administration, companies receiving compensation are less likely to pay a dividend in 2020 when all firms that received compensation is investigated. Despite the large differences in compensation received by specific regions and sectors, the results of all the significant findings show a consistently negative effect of compensation when this heterogeneity is investigated. Moreover, we find that the reduction in dividend likelihood does not seem to correspond directly with how hard-hit different regions and sectors were by the pandemic, or with the amount of compensation received by each region or sector.

Further, when investigating whether the findings differ for firms that we classify as having received compensation beyond necessary, we do not find evidence supporting that receiving compensation beyond necessary positively impacts the likelihood of dividends. This finding is particularly interesting given the introduction of dividend restrictions in the final revision of the compensation scheme.

In conclusion, the results of our thesis suggest that, although the 2020 compensation scheme has been criticized, it does not appear that firms have taken advantage of the scheme to finance dividends during the first part of Covid-19. However, we do acknowledge the limitations of our thesis, and that the results should be assessed with caution due to the unknown effects of other schemes. Hence, we recommend further research on this topic once financial data on all support schemes for the entire period is available.

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Appendix

Table A1: Standard Industrial Classification 2007

Section	Section Name	Division	Division Name
A	Agriculture, forestry, and fishing	1	Crop and animal production, hunting and related service activities
		2	Forestry and logging
		3	Fishing and aquaculture
B	Mining and quarrying	5	Mining of coal and lignite
		6	Extraction of crude petroleum and natural gas
		7	Mining of metal ores
		8	Other mining and quarrying
		9	Mining support service activities
C	Manufacturing	10	Manufacture of food products
		11	Manufacture of beverages
		12	Manufacture of tobacco products
		13	Manufacture of textiles
		14	Manufacture of wearing apparel
		15	Manufacture of leather and related products
		16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials.
		17	Manufacture of appear and paper products
		18	Printing and reproduction of recorded media
		19	Manufacture of coke and refined petroleum products
		20	Manufacture of chemicals and chemical products
		21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
		22	Manufacture of rubber and plastic products
		23	Manufacture of non-metallic mineral products

		24	Manufacture of basic metals
		25	Manufacture of fabricated metal products, except machinery and equipment
		26	Manufacture of computer, electronic and optical products
		27	Manufacture of electrical equipment
		28	Manufacture of machinery and equipment N.E.C.
		29	Manufacture of motor vehicles, trailers and semi-trailers
		30	Manufacture of other transport equipment
		31	Manufacture of furniture
		32	Other manufacturing
		33	Repair and installation of machinery and equipment
D	Electricity, gas, steam, and air conditioning supply	35	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage, waste management and remediation activities	36	Water collection, treatment and supply
		37	Sewerage
		38	Waste collection, treatment and disposal activities, materials recovery
		39	Remediation activities and other waste management services
F	Construction	41	Construction of buildings
		42	Civil engineering
		43	Specialized construction activities
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	45	Wholesale and retail trade repair of motor vehicles and motorcycles
		46	Wholesale trade, except of motor vehicles and motorcycles
		47	Retail trade, except of motor vehicles and motorcycles
H	Transportation and storage	49	Land transport and transport via pipelines
		50	Water transport

		51	Air transport
		52	Warehousing and support activities for transportation
		53	Postal and courier activities
I	Accommodation and food service activities	55	Accommodation
		56	Food and beverage service activities
J	Information and communication	58	Publishing activities
		59	Motion picture, video and television program production, sound recording and music publishing activities
		60	Programming and broadcasting activities
		61	Telecommunications
		62	Computer programming; consultancy and related activities
		63	Information service activities
K	Financial and insurance activities	64	Financial service activities, except insurance and pension funding
		65	Insurance, reinsurance and pension funding, except compulsory social security
		66	Activities auxiliary to financial services and insurance activities
L	Real estate activities	68	Real estate activities
M	Professional, scientific, and technical activities	69	Legal and accounting activities
		70	Activities of head offices; management consultancy activities
		71	Architectural and engineering activities; technical testing and analysis
		72	Scientific research and development
		73	Advertising and market research
		74	Other professional, scientific and technical activities
		75	Veterinary activities
N	Administrative and support service activities	77	Rental and leasing activities
		78	Employment activities

		79	Travel agency, tour operator and other reservation service and related activities
		80	Security and investigation activities
		81	Services to budlings and landscape activities
		82	Office administrative, office support and other business support activities
O	Public administration and defense; compulsory social security	84	Public administration and defense; compulsory social security
P	Education	85	Education
Q	Human health and social work activities	86	Human health activities
		87	Residential care activities
		88	Social work activities without accommodation
R	Arts, entertainment, and recreation	90	Creative, arts and entertainment activities
		91	Libraries, archives, museums and other cultural activities
		92	Gambling and betting activities
		93	Sports activities and amusement and recreation activities
S	Other service activities	94	Activities of membership organizations
		95	Repair of computers and personal and household goods
		96	Other personal service activities
T	Activities of household as employers; undifferentiated goods-and services-producing activities of households for own account	97	Activities of households as employers of domestic personnel
U	Activities of extraterritorial organizations and bodies	99	Activities of extraterritorial organisation and bodies
X	Not specified	0	Not specified

Source: (Statistics Norway, 2022c).

Table A2: Distribution of Compensation by Sector Affiliation

Section	Section Name	Mean	Unique firms	Compensation amount	Compensation %
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	3 942	7 772	183 838 516	22,78 %
I	Accommodation and food service activities	25 159	1 197	180 695 419	22,40 %
M	Professional, scientific, and technical activities	1 951	5 736	67 169 956	8,32 %
C	Manufacturing	4 799	2 265	65 225 462	8,08 %
R	Arts, entertainment, and recreation	27 624	330	54 696 834	6,78 %
N	Administrative and support service activities	6 132	1 481	54 497 814	6,75 %
F	Construction	1 315	6 549	51 675 702	6,40 %
H	Transportation and storage	5 988	1 341	48 181 557	5,97 %
S	Other service activities	6 945	871	36 296 691	4,50 %
J	Information and communication	2 348	1 730	24 374 038	3,02 %
L	Real estate activities	1 278	2 319	17 791 066	2,20 %
Q	Human health and social work activities	4 483	258	6 939 978	0,86 %
P	Education	5 709	177	6 063 768	0,75 %
B	Mining and quarrying	6 669	127	5 081 852	0,63 %
A	Agriculture, forestry, and fishing	964	452	2 614 662	0,32 %

E	Water supply; sewerage, waste management and remediation activities	1 934	118	1 369 382	0,17 %
K	Financial and insurance activities	273	209	342 902	0,04 %
D	Electricity, gas, steam, and air conditioning supply	0	172	0	0,00 %
X	Not specified	0	48	0	0,00 %
O	Public administration and defense; compulsory social security	0	0	0	0,00 %
T	Activities of household as employers; undifferentiated goods-and services-producing activities of households for own account	0	0	0	0,00 %
	Total	**4 056**	**33 152**	**806 855 599**	**100,00 %**

Note: Mean calculated based on frequency.

Table A3: Distribution of Compensation by Region Affiliation

Region	Mean	Unique firms	Compensation amount	Compensation %
Oslo	5 869	5 212	183 551 914	22,75 %
Viken	2 874	7 898	136 200 870	16,88 %
Vestland	3 919	3 608	84 852 232	10,52 %
Trøndelag	5 088	2 689	82 104 796	10,18 %
Rogaland	4 648	2 871	80 074 726	9,92 %
Innlandet	4 391	2 138	56 333 550	6,98 %
Agder	4 609	1 803	49 866 065	6,18 %
Vestfold og Telemark	2 987	2 737	49 061 726	6,08 %
Møre og Romsdal	3 178	1 683	32 100 075	3,98 %
Nordland	3 643	1 238	27 065 620	3,35 %
Troms og Finnmark	3 327	1 272	25 397 980	3,15 %
Not specified	13 669	3	246045	0,03 %
Total		**33 152**	**806 855 599**	**100,00 %**

Note: Mean calculated based on frequency. Not specified firms could not be allocated due to wrong municipality numbers.

Table A4: Reported Covid-19 cases scaled by 100 000 inhabitants in 2020

Region	**Reported Covid-19 cases**	**Number of citizens**	**Reported Covid-19 cases per 100 000 inhabitants**
Agder	3 198	307 231	1 041
Innlandet	5 155	371 385	1 388
Møre og Romsdal	2 356	265 238	888
Nordland	2 169	241 235	899
Oslo	22 006	693 494	3 173
Rogaland	6 112	479 892	1 274
Troms og Finnmark	3 169	243 311	1 302
Trøndelag	6 185	468 702	1 320
Vestfold og Telemark	5 059	419 396	1 206
Vestland	10 421	636 531	1 637
Viken	23 933	1 241 165	1 928

Source: (Folkehelseinstituttet, 2023), (Statistics Norway, 2022d).

Table A5: Overview of firms that received highest amount of compensation

	Region	Sector	Compensation	Dividend 2019	Dividend 2020
1	Oslo	Transportation & storage	15 180 708	1 997 310 000	0
2	Oslo	Wholesale & retail trade	14 010 374	0	0
3	Agder	Professional, scientific, & technical	13 928 890	0	0
4	Innlandet	Arts, entertainment, & recreation	12 241 455	75 000 000	0
5	Oslo	Real estate activities	10 840 026	500 000 000	0
6	Oslo	Professional, scientific, & technical	10 697 099	33 300 000	0
7	Viken	Wholesale & retail trade	9 190 321	0	0
8	Viken	Accommodation & food service	8 882 720	0	0
9	Vestland	Accommodation & food service	6 131 431	0	0
10	Møre & Romsdal	Administrative & support service	4 830 464	3 200 000	0
Sum			**105 933 488**	**2 608 810 000**	**0**
Total compensation paid out in 2020				806 855 599	
Compensation to dividend paying firms				167 000 000	
Share of compensation to dividend paying firms				20,70 %	
Total dividend in 2019				3 170 000 000	
Total dividend in 2020				2 650 000 000	
Change in dividend				520 000 000	

Table A6: Whole specification of Logit regression Analysis for model 1

Variables	(1)	(2)	(3)
DiD	0.555***	0.626***	0.579***
	(0.024)	(0.029)	(0.023)
Post		1.448***	1.471***
		(0.038)	(0.031)
Company Age			1.030**
			(0.012)
Company Age			
Age 2		1.136	
		(0.093)	
Age 3		1.308***	
		(0.110)	
Age 4		1.178**	
		(0.095)	
Age 5		1.041	
		(0.085)	
Age 6		0.854*	
		(0.075)	
Age 7		0.689***	
		(0.064)	
Age 8		0.564***	
		(0.058)	
Age 9		0.498***	
		(0.052)	
Age 10		0.396***	
		(0.041)	
Age 11		0.351***	
		(0.041)	
Age 12		0.288***	
		(0.034)	

Age 13	0.234*** (0.028)	
Age 14	0.183*** (0.023)	
Age 15	0.151*** (0.019)	
Age 16	0.119*** (0.016)	
Age 17	0.087*** (0.013)	
Age 18	0.068*** (0.010)	
Age 19	0.057*** (0.009)	
Age 20	0.045*** (0.007)	
Age 21	0.034*** (0.006)	
Age 22	0.030*** (0.005)	
Age 23	0.027*** (0.005)	
Age 24	0.015*** (0.003)	
Age 25	0.015*** (0.003)	
Age^2		0.995*** (0.000)
Company Size	3.003*** (0.072)	
Profitability	101.03***	142.43***

		(8.60)	(12.97)
Observations	169,266	124,430	124,430
Age fixed effect	No	No	No
Log likelihood	-64805.5	-41177.7	-42426.7
Pseudo R^2	0.002	0.133	0.106
Wald Chi^2	179.8	15213.4	4356.1
Prob>Chi^2	0.0000	0.0000	0.0000
AIC	129613	82411.5	84863.3

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
Significance level: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table A7: Placebo Analysis

Variables	(1)
2017- Placebo year	-
Treated	-
Placebo DID	0.933
	(0.043)
Year 2017	1.034*
	(0.019)
Company Size	3.225***
	(0.137)
Profitability	91.67***
	(9.94)
Observations	83,652
Age Fixed effect	Yes
Log likelihood	-27145.3
Pseudo R^2	0.134
Wald Chi^2	7818.2
Prob Chi^2	0.0000
AIC	54344.5

Notes: Bootstrap standard errors in parenthesis are clustered at firm level.
*Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table A8: Correlation Matrix model 1

Variables	Y	DiD	Year	Company Age	Company Size	Profitability
Y	1					
DiD	-0.045***	1				
Post	-0.003	0.354***	1			
Company Age	0.087***	0.052***	0.137***	1		
Company Size	0.142***	-0.024***	0.037***	0.353***	1	
Profitability	0.323***	-0.027***	0.007***	-0.089***	-0.022***	1

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A9: Correlation Matrix model 2

Variables	Y	DiD	DiD	Year	Company Age	Company Size	Profitability
Y	1						
Beyond Necessary	-0.020***	1					
Necessary	-0.061***	-0.010***	1				
Post	-0.003	0.316***	0.156***	1			
Company Age	0.087***	0.048***	0.021***	0.137***	1		
Company Size	0.142***	-0.013***	-0.027***	0.037***	0.353***	1	
Profitability	0.323***	-0.026***	0.110***	0.007***	-0.089***	-0.022***	1

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$