# The Impact of COVID-19 on Public Capital Markets

# - Empirical Evidence from the Nordics

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## Abstract

How did the COVID-19 pandemic affect firms' ability to raise capital? This paper explores how non-financial Nordic firms raised capital from public debt and equity markets during the pandemic. We find that (1) the bond market experiences turbulence during the outbreak period; (2) being a rated bond issuer is only important for access during the outbreak period; (3) factors that determine bond spreads during the normal period do not change fundamentally during the COVID-19 period; (4) the equity market is an important source of capital throughout the COVID-19 period in terms of both IPOs and secondary issues.

**Keywords:** COVID-19; Capital market; Nordics; Bond spread

# 1    Introduction

As an exogenous shock and a globally synchronized crisis, COVID-19 induced unprecedented disruption to financial markets around the globe. From March 2, 2020 to March 18, 2020, the S&P 500 plummeted by 22%, while the OMX Nordic 40 (consisting of the 40 largest and most actively traded stocks on the Nordic exchanges) fell by 21%. During the same period, the fixed-income market experienced turmoil as well, with Euro High Yield Index Option-Adjusted Spread rising from 4.1% to 8.2%. In Sweden, bid-ask spreads for existing bonds widened from a stable 0.1% in February to 0.5% by mid-March as sales pressure culminated, and many bonds had no buyers at all (Becker et al., 2021). From March 16 to March 20, bond risk premiums for Norwegian issuers in the EUR market increased from approximately 50 bps to 150 bps (Norges Bank, 2021). During crisis periods, corporate bond markets are expected to be hit hard, as investors reduce share of credit risk bearing securities in their portfolios, a phenomenon known as "flight to quality" (Bernanke et al., 1996). However, a crisis on the scale of the COVID-19 pandemic was previously unprecedented. When firms across geographies and industries simultaneously face adverse shocks to their profitability and cash flows, it is interesting to investigate whether firms' access to the public capital markets was disrupted during this time. In other words, how did the COVID-19 pandemic affect firms' ability to raise capital through the bond market and the equity market?

To answer this question, we start by looking at the bond market - do we see a significant deviation in number of issues, capital raised, and industry composition in the Nordic bond markets during the COVID-19 period, compared to non-crisis periods? How are these issuers and issues rated? Initially, we compare issues and capital raised by firms in each Nordic country to normal periods, and against a backdrop of key industries. We find that number of bonds issued overall take a hit and remain below normal period average levels till August 2020, and that the bond market rebounds strongly afterwards. We also note that at the onset of the pandemic, from March 16 to April 30, only issuers rated investment-grade access the bond markets, and non-rated firms only issue bonds from June 2020 and onward. Overall, from March 16 to June 30, 68.4% of the issuers are investment-grade, a percentage that is much higher than those of the later COVID-19 periods.

In terms of bond issue ratings, most issues are unrated throughout both the COVID-19 period and the normal period. This is typically the case in the Nordic bond market, as investors often already know the issuers well, and the rating fees and annual maintenance cost charged by the top firms that issue ratings can be hard to justify for many bond issuers (Baghai et al., 2021). Interestingly, we see AA rated bonds issued the most during the outbreak period and then disappear throughout the rest of the COVID-19 period. On the other hand, a steady number of BBB rated bonds are issued throughout, including the outbreak period. We also find experience with previous bond issues have good explanatory power in firms' choice to issue bonds during the COVID-19 period. Overall, with the exception of the outbreak period March 16 to June 30, 2020, bond market access for all issuers, rated or unrated, appears to be unaffected throughout the COVID-19 period.

Decomposing issues per Nordic country, we see issuance activities for Swedish firms pick up again in June 2020 after an initial slump during the outbreak period, in line with the Swedish Central Bank's quantitative easing policy timeline (Riksbank, 2020). Interestingly, 90% of the capital raised in April 2020 and 75% in May 2020 are attributable to Norwegian firms. It comprises a staggering 38% of the total amount raised by all Nordic firms combined during the COVID-19 period in 2020. We find Danish and Finnish markets to be very small, and activities to be mostly insignificant compared to their Nordic peers. In terms of industry composition, issues from real estate and manufacturing firms dominate during the COVID-19 period. 75% of the capital raised, however, is attributable evenly to manufacturing, natural resources and real estate firms. Observing trends during the COVID-19 period in the denomination currency of these issues reveals an interesting finding. Non-rated issues for foreign currency denominated bonds issued by Swedish and Norwegian firms is very low, compared to the significant number of non-rated local currency denominated bonds. A possible explanation is that rating is required for better reaching foreign investors and inclusion into certain European indices (Riksbank, 2020). We also note all Danish firm issues to be foreign currency-denominated, by large firms with annual revenues exceeding DKK 5 billion and surmise that the Danish corporate bond market was only important to a handful of large issuers with ability to reach foreign investors.

We explore further into the bond issue characteristics: do bond issues at higher costs or exhibit preferences for certain maturities? We find that due to the downward shifting of the government bond yields over the last decade, firms issuing bonds during the COVID-19 period can generally do so at coupon rates lower than their historical average coupon rates. Meanwhile, the average coupon rate of bonds issued during March 16 to June 30, 2020, the early stage of the COVID-19 period, is significantly higher than the other periods of the COVID-19 period, showing the impact of COVID-19 on the cost of bonds mostly concentrates in the initial stage of the pandemic. As for maturity, we document that during the COVID-19 period, firms issue bonds with a maturity that is quite comparable to the maturity of bonds issued in the past. Interestingly, during the same period, we see a distinctively longer average maturity than the rest of the COVID-19 period. Both trade-off between long-term uncertainty risk and rollover risk and a mix of relatively higher rated bonds could serve as explanations for the outcome.

Furthermore, do firm characteristics weigh differently on their impact on bond spreads during the COVID-19 period, as opposed to the normal period? We examine firm characteristics that could determine spreads using regression models, and find that even though the COVID-19 crisis has a visible impact on the bond market, it appears to not have fundamentally changed the nature of determinants. Specifically, net book leverage and size have a positive relationship with spreads across normal and COVID-19 periods; profitability and tangibility have a negative relationship with spreads across normal and COVID-19 periods. Moreover, while being profitable plays a more critical role in lowering the spread during the COVID-19 period, having tangible assets plays a less important role. We also investigate the role of past experience by adding historical average spread and number of past issues as explanatory variables, and find that being an experienced bond issuer helps lowering the costs of bonds even more during crisis times. Finally, compared to issuers with lower ratings, issuers with A-and-above ratings can issue bonds with lower spreads during normal times. We do not find this is true during the COVID-19 period, but this is more likely due to our small sample which allows one single issuer to distort the result.

Finally, we ask the same for equities: is there a significant deviation in number of issues, capital

raised, and industry composition in the Nordic equity capital markets during the COVID-19 period, compared to non-crisis periods? We find that in general, number of issues, amount of capital raised and percentage of IPOs during the COVID-19 period are greater compared to the normal period, with the exception of the period from March 16 to June 30, 2020, for which we observe the opposite to be true. The higher percentage of IPOs is likely attributable to the booming startup scene in the Nordics and the Euronext Growth Market in Oslo, accounting for 13.2% of total equity issues (Wass and Ahmad, 2021). We also see a fewer share of withdrawn IPOs during the COVID-19 period compared to normal periods. We conclude that the equity market was very important during the COVID-19 period, particularly for repeat access. Most of the times during the COVID-19 period, Swedish firms dominate in terms of both number of issues and amount raised. A possible explanation for this, aside from Swedish companies accounting for the highest number of listed companies in Europe (Wass and Ahmad, 2021), is that Sweden followed a more relaxed policy approach to COVID-19 restrictions (Riksbank, 2020). Furthermore, studies have shown high trust on a government by citizens and high individual freedom reduce uncertainty avoidance which reduces volatility in equity markets during crisis periods (Erdem, 2020). Sweden's low uncertainty avoidance score (Hofstede, 2022) can account for a possible explanation of the continued equity capital raising activity for Swedish corporations during the COVID-19 period. Interestingly, observing our sample of 117 bond issuers during the COVID-19 period, we find 36% of these issuers also issued equity during the COVID-19 period. Overall, we find equity capital raised during the COVID-19 period make up 51%, and capital raised by bonds 49% of the composition. During normal periods, the composition is 63% bond versus 37% equity. A possible explanation for the increased preference of equity capital raising during the COVID-19 period is the hunt for liquidity, due to small corporate bond markets in the Nordics lacking much-needed transparency and liquidity during crisis periods (Riksbank, 2020).

The rest of the paper is structured as follows. In section 2, we discuss the related literature. In Section 3, we describe our data. In Section 4, we present our empirical findings and analysis. Finally, in Section 5 we present our conclusion.

# 2  Literature Review

This paper is related to studies that examine how firms raise capital from public capital markets in crisis periods. More specifically, we focus on the impact of COVID-19, the global pandemic that has induced heightened economic uncertainty. In March 2020, the capital markets witnessed a sharp selling pressure, with investors rushing to bolster their liquidity positions in a "dash for cash", making corporate financing more difficult and more expensive (Samantha et al., 2021). A strand of literature study this "dash for cash" behavior by corporations during COVID-19. Li et al. (2020) show that at the onset of the crisis in late March 2020, firms in the U.S. instantaneously turned to their banks for liquidity provision, drawing down existing credit lines and loan commitments. Acharya and Steffen (2020) find that there were two distinct phases of the demand for liquidity during the COVID-19 outbreak, marked by the Federal Reserve's announcement on March 23, 2020[1]. Before the announcement, all firms turn to their banks in dash for cash; after the announcement, while high rated firms switched from credit line drawdowns to bonds and equity issues, BBB rated and non-investment-grade firms still mostly turn to banks for cash. Seemingly contradictorily, Becker and Benmelech (2021) find that syndicated loan origination activities between mid-March and June 2020 in the U.S. was low. However, this can be explained by the different nature of credit lines and syndicated loans, as credit lines are generally not used for long-term financing. Similar to Acharya and Steffen (2020), Becker and Benmelech (2021) also find that the Federal Reserve's program supported the corporate bond market, especially in the investment grade sector.

Other studies take a broader view, studying not only the debt market but also the equity market. The dynamic between the corporate bond market and equity market in the Nordics during the COVID-19 crisis is also something this paper is interested in. Comparing to the equity market, the Nordic corporate bond market is relatively illiquid and mainly serves issuers that want to borrow in local currency (Baghai et al., 2021). Defining the COVID-19 crisis period as from March 16 to May 15, 2020, Halling et al. (2020) note that the U.S. equity market provided a capital amount

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[1]Federal Reserve announces its measures to support the economy, including buying corporate bonds using its emergency lending powers.

only 5% of that provided by bond market. Interestingly, Halling et al. (2020) also find that firm characteristics that determine bond spreads differ substantially between the COVID-19 and normal periods. Most notably, tangibility has a negative effect on spreads during normal times but a positive effect during the COVID-19 period, indicating that credit markets associate tangibility with inflexibility during the COVID-19 crisis. Focusing on the first half year of 2020, Hotchkiss et al. (2020) find that while the amount of debt capital raised increased significantly, when it comes to firms that have higher credit risk and are more financially constrained, equity capital plays a more dominant role. Pettenuzzo et al. (2021) explore firms' payout and financing decisions during the COVID-19 and identify which firm and stock characteristics help explain cross-sectional difference. They find that US firms bolstered their liquidity position by issuing more bonds than equity.

The Nordic countries' financial market is well integrated with the global economy. While many of such studies are country-specific and mostly focused on the US, to the best of our knowledge, very little empirical research has been conducted in the Nordic context. Therefore, our main contribution is to shed light on the impact of the COVID-19 on Nordic firms.

# 3  Data

In this section, we introduce our data sources and explain how we collect data for empirical analysis. We begin by determining the two periods for which the data is to be collected. We define the "COVID-19" period as starting from March 16, 2020, to February 28, 2022. We use March 16, 2020, as the starting date based on dates chosen by Finnish, Danish, Norwegian and Swedish governments, on average, to introduce the first lockdowns or major COVID-19 restrictions. To be able to fully capture effects of the pandemic beyond the initial outbreak phase, the COVID-19 period spans until February 28, 2022, the latest date with data available at the time of our data collection. As we write this paper, the World Health Organization is yet to declare the pandemic to be over. The "normal" period, which would make up our control sample, spans from March 16,

2017, to March 15, 2020. We choose this time frame both to control for any year effects and to provide enough observations. Table 1 provides variable definitions.

## 3.1 Data on Bond Issues

We collect data on bond issues in the primary market of publicly listed Nordic firms from the SDC Platinum database. We include only non-financial firms, as financial firms have significantly different capital structure, use of debt, and regulatory policies. We also exclude covered bonds, convertible, asset-backed bonds, and mortgage bonds as their premiums are different from traditional bonds. Finally, we exclude private debt as our paper focuses on the impact in public capital markets. For each bond issue, we collect data on its principal amount ($M), currency, coupon rate, maturity, spread to treasury, rating, type of bond and industry in which the issuer operates.

In total, we collect 324 bond issues for the COVID-19 period and 449 bond issues for the normal period. 41% of the issues in this sample are comprised of floating-rate, zero-coupon, or perpetual issues, and the remaining sample of issues with fixed-rate coupons and defined maturities comprises of 119 issues for the COVID-19 period and 195 for the normal period. Furthermore, because spread information is unavailable for some bond issues, we obtain a smaller sample of issues with known spreads, consisting of 56 issues for the COVID-19 period and 102 for the normal period. We conduct empirical analysis based on these three samples. We obtain historical data on the same variables starting January 1, 2010, till December 31, 2017, for issuers who had issued bonds during the COVID-19 period or the normal period. This sample presents us with 458 issues.

In addition, we supplement Moody's ratings from SDC Platinum with S&P ratings from Capital IQ, and convert all ratings to the S&P rating scale.

## 3.2  Data on Bond Issuer Characteristics

We use the Compustat and Capital IQ databases to obtain data at the issuer level for our sample of firms that issued bonds during the COVID-19 period or the normal period. For these issuers, we obtain data on total assets, net property, plant and equipment, net sales, total debt, current and long-term debt, cash, and earnings before interest and taxes in our defined periods. This gives us firm level data in the presentation currency of the issuer, which can vary for each issuer. We use WRDS, Federal Reserve Bank Reports to obtain foreign exchange rates to the USD at year-end dates for all these presentation currencies. We then convert all figures to the USD.

## 3.3  Data on Equity Issues

We obtain data on new equity issues in the primary market by non-financial Nordic firms from SDC Platinum. For each equity issue, we collect information on capital raised, industry, and whether it is an IPO or a secondary offering. In total we obtain 1955 equity issues, 1100 for the COVID-19 period and 855 for the normal period.

# 4  Empirical Findings

This section is devoted to presenting our empirical findings. First, we focus on evaluating bond issues. Next, we move to a discussion of our regression results where we analyze whether determinants of bond spreads, in terms of firm characteristics, change during our COVID-19 period as opposed to our normal period, and why. Finally, we analyze equity issues for the same period.

## 4.1 Bond

### 4.1.1 Number of Bond Issues and Capital Raised

We begin our analysis by first assessing bond issue count and capital raised during each period of COVID-19 against the normal period. This allows us to identify any interesting deviations that emerge in issuance activity on a high level. Table 2 presents a summary of bond issues during the COVID-19 period against normal periods. We observe Period 1 issue count to be half of that of the same period in 2019, but that the capital raised far exceeds that of 2018 and 2019, reflecting fewer issuers raising more funds during the outbreak period.

Figure 1, which depicts the normal period values against the COVID-19 period values, show that from January 2020 to March 15 2020, number of bonds issued reflect that of comparable periods in 2017, 2018 and 2019. Total capital raised, too, is comparable to 2019 levels. Prior to announcement of restrictions by respective Nordic governments, issuance activity appears to continue unperturbed.

We see bond issues hit a low in the latter part of March 2020, and levels remain below normal period average till August 2020. Significant declines in transaction volume in primary markets for corporate bonds are typically noted during financial crises (Benmelech and Bergman, 2018). However, the market rebounds strongly from August 2020 onward. We observe that number of issues are consistent with normal periods across most months till February 2021, before tapering off to normal period levels for the rest of our COVID-19 period. In contrast to the number of issues, the capital raised during the outbreak period of April and May 2020 appears to be the greatest, far above amounts raised during normal comparable periods. After a hiatus during the months of June, July, and August, this high then continues for the rest of 2020, but 2021 and 2022 once again reflect normal period levels of capital raised. From the above findings alone, we can deduce that the bond market was an important source of funding during the period March 16 to May 30 2020 for a few firms, judging by lower issue count, in raising a significant amount of funds. We can also deduce that capital raised throughout 2021 and the first two months of 2022

mimic more or less that of comparable normal periods, but had a greater number of issues than the normal periods.

### 4.1.2 Issuer and Issue Ratings

To determine the type of firms that chose to issue bonds during each period, next we segment the issues and amounts raised by rating. Decomposing issue count and capital raised by issue and issuer ratings allow us to observe patterns in the grade of investors stepping in to raise capital during each period of COVID-19. Any deviation from the normal period allows us to gauge importance of bond markets for certain grade investors during each period of COVID-19, as well as any deterred access to the market during each of these periods. From figure 2(a), we observe that most issuers appear to be unrated across the entire COVID-19 period. Figure 2(c) presents three-year average issuer ratings across all months for the normal period, and the same observation holds. Because the Nordic corporate bond market is small, fixed income investors are mostly local, especially for bonds denominated in local currency, and know the issuers well (Baghai et al., 2021). Furthermore, Nordic investors are habituated with unrated issues. Spiltan, Sweden's largest fixed income fund, held bond portfolios in which over 40% of the issues were unrated at the end of 2019 (Becker et al., 2021). Previously, underwriting banks had long provided "shadow ratings" free of cost to unrated bonds in the Nordics, which had recently been disallowed by European Securities and Markets Authority, and it remains to be seen whether or not more small issuers were ready to start paying a substantial amount for official ratings in its absence. For local corporations whose issues are relatively small in size or sporadic, the investment in ratings can be expensive and not generate enough liquidity to warrant taking such a step. (Baghai et al., 2021).

While we do see a small share of high-yield issuers – mostly BB rated – issuing bonds in most months during the normal period, it does not appear to be the case during the COVID-19 period. Among rated issuers, We only see investment-grade issuers raise capital in March and April 2020 following the outbreak. March 2020 comprises of issues by 50% A rated and 50% BBB rated issuers. In April 2020, a little over 30% of issuers are AA rated and the remaining issuer BBB

rated. In May, 4 out of the 5 issuers are investment grade and the other rated BB. In June, non-rated issuers start to raise funding once more from the markets, comprising 56% in terms of issuer count, while BBB rated issuers still account for the remaining 44%. Overall, in our defined Period 1, 68.4% of the issuers are investment-grade, and 26.3% are unrated. An interesting finding is that while bond issue ratings closely match that of issuer ratings for April and May 2020, the two bonds issued during COVID-19 period in March 2020 are unrated, and in June 2020, 72% of the bond issues are unrated. When comparing against our normal period, we observe no significant difference in seasonality, and only that most issues throughout both normal and COVID-19 period are unrated – the exception being Period 1 of our COVID-19 period. Comparing principal amounts against issuer ratings, we find AA rated bonds raise the most funding in Period 1 and then become inactive. This is in contrast to the corresponding normal period, where we see no AA rated issues, and insignificant amounts raised sporadically by A rated issues. Acharya and Steffen (2020) find that, for the U.S. market, BBB rated issues grow steadily after initially remaining flat, spurred by Fed interventions. However, throughout the entire COVID-19 period, we note a steady growth in amounts raised from BBB rated issues, even before Nordic central banks like Sweden's Riksbank announce bond purchase programs for investment-grade issues on June 30. Since we observe no significant spike in BBB rated issues during the COVID-19 period following bond purchases announcements, it is unclear how effective such corporate bond purchase programs were in encouraging investment-grade Nordic firms to issue bonds and get them rated. This steady growth in BBB rated issues occurs despite risk of a ratings downgrade, and subsequent possible losses for financial institutions holding these bonds. A likely explanation, put forward by Benmelech et al. (2009) studying previous financial crises, could be the comparatively lower average downgrades for corporate bonds, -1.8 notches during the 2001-2002 crisis, as opposed to structured financial securities that were downgraded 5 to 6 notches, despite the high percentage of bonds being downgraded.

However, the average capital raised by BBB bonds during Period 1 is significantly lesser than that of the corresponding normal period. This contrasts with findings by Halling et al. (2020) for the U.S. market, where average capital raised by BBB bonds during the COVID-19 outbreak period

exceeded that of the normal period. BB bonds comprise 16.9% of total capital from bonds raised throughout the entire COVID-19 period, although they follow no observable patterns in timing of issue. Observing the total funding raised in terms of issue ratings, we see amounts raised by non-rated issues grow fast from Period 2 and onward, contributing to most funds raised till February 2022. With the exception of period 1, bond market access for all issuers, whether rated or unrated, overall seem to be unaffected throughout the COVID-19 period.

Lastly, we look into past issues of issuers that chose to raise capital during the COVID-19 period. During the historical period of 2010 to 2019, we find an average of 5.5 issues per COVID-19 period issuer, with a median of 2 issues. During the COVID-19 period, we find an average of 2 issues per issuer. Regressing the COVID-19 issues against the historical period issues by the same firms, we find past issues have good explanatory power in firms' choice to issue bonds during the COVID-19 period. Therefore, previous experience with fundraising in the Nordic bond market has been important for firms' access, and choice, to raise funds from these markets during the COVID-19 period.

### 4.1.3   Bond Issues and Capital Raised per Country

Our bond sample is comprised of issues by Danish, Finnish, Norwegian and Swedish firms. Our previous analyses have been on the aggregate level. Here, we decompose in terms of issue count and capital raised on a country level. This allows us to observe different patterns of issuance activity during the COVID-19 period by firms of each country in light of its market environment and government action. This cross-sectional picture, depicted by figure 4, provide some relevant insights. In March 2020, issues come to a complete halt – with only Swedish corporations issuing 4 bonds, 2 on March 6, 2020, before the outbreak period begins, and 2 on March 30 and March 31 respectively, while no issues take place in the remaining three markets. Sweden's corporate bond market has been growing the fastest over the previous 5 years in terms of volume. We see the greatest issue count from Swedish companies across most months of our COVID-19 period. Interestingly, the same cannot be said either for the total amount of capital raised or for the issue

count during the outbreak period of April 2020 and May 2020, where in both cases, Norway takes the lead by far. 90% of the capital raised in April 2020 and 75% in May 2020 can be attributed to the Norwegian firms. This figure for Norwegian firms totals USD 26,016 million and comprises a staggering 38% of the total amount raised by all Nordic firms combined during the COVID-19 period in 2020. Norwegian bonds also accounted for 55% and 75% of the issues in April and May 2020 respectively, although the overall issue count for both periods is low.

Continuing with this two-month period, we see Swedish corporate bond market issuance activity is mostly absent – only one bond was issued in April 2020. A likely explanation relates to the condition of then-existing corporate bonds in the market. The Swedish bond market is relatively illiquid compared to its larger European peers, and the U.S. According to a study conducted by the Swedish Central Bank, it also has an absence of investor categories like ETFs who can contribute to this liquidity. Its investor base is largely investment funds, insurance companies, and pension funds. An absence of speculators in this market meant that a selling pressure due to COVID-19 uncertainty could not be met effectively, raising risk premiums. Furthermore, since these bonds trade so infrequently during their lifetime, reliable prices could not be obtained (Riksbank, 2020). Many investment funds closed down their funds temporarily as accelerated requests for redemptions mounted, in order to avoid selling corporate bonds in an illiquid market and reporting further losses (Becker et al., 2021). This meant that not only was there low liquidity, high uncertainty, and unreliable pricing, but there was also now a shortage of investors to sell bonds issued to. This likely explains the temporary standstill the Swedish bond market came to in April and May, before picking up once again in June.

From June 2020 and onward, we see Swedish corporate bond issues dominate the market till June 2021. This timeline closely follows that of the Riksbank's quantitative easing policies. On June 30, 2020, the Riksbank announced that it would be buying SEK 10 billion worth of investment-grade bonds with remaining maturities of up to 5 years during the periods September 2020 to June 2021. During this 1-year period of July 2020 to June 2021, we see Swedish corporate bonds comprise 49.8% of the total amount of USD 30,167 billion raised, and 70.3% of the total issues.

An obvious next step would be to look into the investment-grade issues in the aftermath and their corresponding maturities, which we do so in later steps.

The Danish corporate bond market, beginning from the outbreak in March 2020 to the end of June 2021, appears to have had the least bond issuance activity with only 4 issues, raising USD 1,842 million – which accounts for only 6.1% of total amount raised by the Nordics during this period. The first bond issue after the COVID-19 outbreak takes place in October 2020. This is hardly surprising, as with the exception of Danish covered bonds being one of the oldest and largest covered bonds market in the world, Denmark's corporate bond sector is extremely small. Its corporate bond sector represents only about 2% of the Nordic corporate bond market at the end of 2021 (Nordic Trustee, 2022).

We see heightened activity again for Norwegian bonds in the third quarter of 2021, accounting for 53% of issues and 48% of total amount raised during this period, although overall issue count and amounts raised remain low. The final three months of our COVID-19 period, however, have very little corporate bond market activity – with only Sweden issuing bonds during this time.

### 4.1.4 Bond Issues per Industry

The effect of COVID-19 was non-uniform across industries. As such, we decompose capital raised on an industry level and compare against the normal period. This allows us to analyze the relative importance on corporate bond markets in raising capital for each major industry during all periods of COVID-19. From Table 3 we observe that for Nordic firms, real estate and manufacturing dominate in number of issues during the COVID-19 period, comprising 47% and 24% of total issues respectively. However, in terms of capital amounts raised, manufacturing firms lead with 27%, followed by natural resources firms (25%) and real estate firms (25%). The normal period depicts similar proportions for number of issues and capital raised. The only notable difference is for the category of natural resources, where capital raised increased in proportion from 14% to 25% during the COVID-19 period.

Next, we decompose four key industries further by country and track their capital raised during the COVID-19 period. They are real estate, natural resources, manufacturing and RRHT (Restaurants, retail, hospitals, and transportation). Real estate, natural resources and manufacturing industries are capital-intensive and therefore expected to be hard-hit during COVID-19. Lockdowns and social distancing measures by governments would likely adversely impact the RRHT industry.

We see very little fundraising activity from these key industries for Swedish firms in period 1, depicted in figure 5. According to the Riksbank, bonds issued by the property sector dominate the Swedish corporate bond market, and any downturn for this category would likely affect other sectors too (Riksbank, 2021). From period 2, however, both the real estate and manufacturing sectors simultaneously appear to recover and raise increasing amounts of capital till the end of our COVID-19 period. While for manufacturing it is a steady increase, for real estate we observe a much steeper increasing trend line. Capital raised during the entire period by RRHT and natural resources firms remain insignificant throughout the COVID-19 period.

For Norway, natural resources are a key industry category and comprise 64% of total capital raised by the four categories during the COVID-19 period. 75% of this capital was raised during period 1, after which we document slightly increases throughout. Both real estate and manufacturing reflect steadily increasing amounts of capital raised throughout the COVID-19 period. Denmark, on the other hand, has the smallest corporate bond market of the four, and we only see a few sporadic issues in the manufacturing and natural resources category. For Finland, manufacturing firms raised 62% of the total capital raised by the four industries during the COVID-19 period by issuing bonds every few months or so. Overall, what remains notable is that while capital raised by RRHT firms remain insignificant during the entire COVID-19 period for all four countries, the earliest bond issue for these firms is in Period 2.

### 4.1.5 Bond Issues and Capital Raised per Currency

We then decompose bond issues and capital raised by currency over the same COVID-19 period. This allows us to observe issuer preferences when turning to local versus foreign investors during each phase of COVID-19. It also allows us to observe whether interrelationships exist between currency of denomination and an issuer's choice to get its bonds rated. The results are presented in figure 6. It is notable that during the initial outbreak period months of April and May, issues denominated in USD made up 38% of total issues, and 62% of funding amounts raised. The rest included 24% bonds issued denominated in Euro and 24% denominated in NOK. Combining this with our previous ratings data, we observe that for the entire COVID-19 period, only 12 out 43 issues denominated in Euro and USD by Norwegian and Swedish firms are unrated, while 221 out of 251 issues in NOK and SEK combined are unrated. A possible explanation is that a rating is required for inclusion into certain indices in the euro market, which is not the case for the NOK and SEK markets (Riksbank, 2020). We also observe that all the USD denominated bonds issued were by Norwegian firms. Meanwhile, all Danish corporate bond issues during the entire COVID-19 period were denominated in euro, and one in GBP. A likely explanation is that given corporate bond markets in Denmark are already negligible compared to its Nordic peers, and hence characterized by even lower activity and liquidity, bonds denominated in Euro provided a good alternative to attract a greater customer base – and via a stronger currency during crisis times. Furthermore, only six Danish firms issued bonds during the COVID-19 period; all of them were large corporations with annual revenues exceeding 5 billion DKK. This also means firms in greater need of foreign capital, likely engaged in international businesses, chose to access the markets during the months following the outbreak. However, smaller, lesser-known firms may find issuing foreign currency denominated bonds, and rated ones at that, to be too expensive. From this, we can deduce that the Danish corporate bond market was not an attractive financing source to medium-size or smaller corporations during COVID-19, and only material to a handful of very large corporations.

### 4.1.6 Coupon Rate and Maturity of Bonds

In Table 4, we further document the coupon and maturity data of the Nordic bonds. The average coupon rate of issues during the COVID-19 period was 1.94%, which is slightly lower than the average coupon rate of issues during the normal period of 1.99%. The difference is statistically insignificant when we run a t-test. With a historical average coupon rate of 2.35%, if we draw the comparison between the average coupon rate during the COVID-19 period and the historical average coupon rate from 2010 to 2019 of the same set of firms, the decrease of coupon rate is even more stark. The difference is statistically significant. This can be explained by the downward shifting of the government bond yields over the last decade, which means the bond market has been offering favorable financing conditions for the firms. Figure 7(a) shows the pattern graphically. We can see that while some firms can raise debt capital at a lower cost than their historical cost, this is not always the case across the whole COVID-19 period. Most noticeably, firms issuing bonds during period 1, which corresponds to the outbreak period of the COVID-19 crisis, faced relatively unfavorable funding rates as high as their historical funding rates. This is expected, as the bond market was negatively affected by the COVID-19 shock and debt capital came at a higher cost. The deterioration of bond funding environment can also be seen by the fact that before the COVID-19 strikes in 2020, firms issued bonds at an average coupon rate of 1.34%, lower than their historical average coupon rate of 1.79%. Interestingly, firms issuing bonds during period 8, which corresponds to the latest stage of the COVID-19 crisis, had to raise debt at rates that were even higher than their historical funding rates. However, this is largely explained by reasons other than the COVID-19 crisis, starting with rising government bond yields during this period due to the rapidly increasing energy prices and inflation. Another reason is that there is one first-time issuer who issued a high yield bond, with coupon rate significantly higher than the others during this period.

When it comes to maturity, the average maturity of issues during the COVID-19 period was 6.72 years, slightly longer than the average maturity of issues during the normal period of 6.12 years. The difference is statistically insignificant. However, the average maturity of issues during the

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COVID-19 period is actually lower than the average maturity of issues by the same set of firms' previous issues since 2010, with the latter being 7.13 years. The difference is also statistically insignificant. Figure 7(b) shows the pattern graphically. We can see that firms generally chose to issue bonds with a maturity somewhat on par with that of their past issues. The most interesting finding is that issues during the first period have a significantly longer maturity than issues during the later periods, even though the average maturity of bonds issued during this period is shorter than the historical average maturity of bonds issued by the same issuers. Based on the U.S. bond market, Halling et al. (2020) find that the average maturity of bonds issued during mid-March to mid-May is consistently longer than the historical average maturity of bonds issued by the same issuers. This is interesting because on the one hand, previous study by Erel et al. (2012) finds that financial conditions and the maturity of bonds are negatively related, indicating that firms would tend to issue bonds with shorter maturity during crisis times, as it is observed in our case. The finding of a negative relationship is logical, since longer maturity entails more risk and one would expect firms to act cautiously during the outbreak of a crisis when uncertainty is at the highest. It is also consistent with the theory of information asymmetry, as shorter maturity securities are less sensitive to information changes (Erel et al., 2012). On the other hand, longer maturity can be explained by the fact that firms want to avoid the debt overhang problem and reduce rollover risk during bad times, as discussed by Kalemli-Ozcan et al. (2020). Both channels could have affected the firms' choice in our context. It is also worth noticing that the bonds issued in period 1 corresponds to a mix of both higher rated issuers and higher rated issues. As discussed before, a larger percentage of investment grade bonds are issued during this period. This is consistent with the theory of bond maturity and issuer rating. Diamond (1991) find that issuers with lower ratings may have no access to long-term debt and are forced to take short-term debt. Guedes et al. (1996) find that firms with investment grade ratings typically occupy the short and long end of the maturity spectrum, while firms with high yield ratings occupy the middle of the spectrum.

Another interesting finding about maturity is that the average maturity of bonds issued during the second half of the COVID-19 period is significantly lower than that of the first half, a drop from 7.52 years to 5.68 years. This is likely linked to the Riksbank's purchase policy for bonds

with a remaining maturity of up to 5 years (Riksbank, 2020).

## 4.2   Spread Analysis

Table 5 presents a summary of the bond issue characteristics, matching the third sample of data that we use for spread analysis. While the relatively small sample size poses challenges in achieving results that are statistically significant, the in-depth analysis of spreads adds value in terms of its economic significance. By comparing the spread of bond issues during COVID-19 and the spread of bond issues during normal times by the same issuers, we can identify some notable impact of the crisis on the Nordic firms' debt financing. The average spread of bonds issued during the COVID-19 period is 175 bps, while the average spread of bonds issued during the normal period is 150 bps. When we run a t-test, we find that the difference is considered statistically insignificant. However, we find that the variance of spread is much higher during the COVID-19 period, which may indicate the mix of bonds is more diverse in regard to risks. The same holds true when we draw the comparison between the average of spread of bonds issued by the same set of firms during COVID-19 and during previous years. The average spread of bonds issued since 2010 by the same issuers is 145 bps, 30 bps lower than the average spread during COVID-19. The decrease is statistically insignificant, and we see the same pattern that the variance of spread during the COVID-19 period is much higher. This could imply a time series difference in bonds issued by the same issuers, with bonds issued during COVID-19 showing greater fluctuation in spreads. However, an important caveat is that we have a small sample to conduct spread analysis, inciting low statistical power and further reducing the likelihood of statistically significant results (Button et al., 2013).

Figure 8 shows the spread comparison graphically. While one would naturally expect the spreads during COVID-19 to be higher than their historical level, we can see that the increase in average of spread attributes to the first two periods of the whole COVID-19 period, as during the rest of the COVID-19 period firms actually issued bonds with spreads lower than those of their previous bonds. In fact, we can see that it is the first half of the COVID-19 period that saw a higher spreads

than the historical level, while the second half saw the spread dropped to a lever that's lower than the corresponding historical level.

More specifically, the average spread of bonds issued in period 1 is 216 bps, a substantial increase from the average of spread of historical of 99 bps. In this sample set, 79% bonds issued are investment grade, and 64% are A and above, which explains the low historical average spread. The spread reflects the increasing risk premium induced by the outbreak of COVID-19, as firms faced uncertain operational situations and stressful financial markets. The corporate bond market saw a strong selling pressure, as there were many sellers but few buyers. Since our sample focus on the issue spread at the primary market, we can infer that even though issuers with high credit ratings can access the bond market and issue bonds with investment grade ratings, the cost of issuance during this period is substantially higher than before. This is a predictable outcome: when the secondary market faced a selling pressure and an increased risk premium, it is only natural for investors to require higher rate of return to buy new bonds on the primary market. However, starting from period three, which corresponds to quarter four of 2020, the average spread fall below the average spread of the historical issues by the same issuers, indicating the risk premium induced by COVID-19 has declined. The lower than historical level spread in our Nordic corporate bond sample is consistent with the reduction of bond spreads for non-financial corporations in Europe since the announcement of the ECB's corporate sector purchase programme (CSPP) in March 2016. The CSPP is part of the ECB's Asset Purchase Programme that aims to support the monetary policy and ensure price stability. According to De Santis et al. (2018), the CSPP not only narrowed the spreads for CSPP-eligible bonds, but also for non-eligible bonds due to spillover effects. As for the mechanism behind the decrease of spread, Cecchetti (2020) find that it is more because of the compressed risk premium than because of reduced expected loss. In particular, the CSPP increased investors' risk appetite, lowering the distress risk premium. Joyce et al. (2014) find that in response to the quantitative easing policy by the Bank of England during the financial crisis, institutional investors turn to corporate bonds to search for yield. Overall, the demand for corporate bonds driven by yield searching would in turn lower the spreads.

### 4.2.1 Determinants of Spreads

Inspired by the work of Halling et al. (2020), which finds a substantial difference in determinants of corporate bond spreads in the U.S. between COVID-19 and normal periods, we use a fixed-effect panel data regression model to dive deeper into the determinants of spreads on the primary market for the Nordic firms. We divide our data into two sets, a COVID-19 sample and a normal sample, and estimate the same three regression models for each sample:

$$Spread_{i,t} = \beta_0 + \beta_1 NetBookLeverage_{i,t} + \beta_2 Size_{i,t} + \beta_3 Profitability_{i,t} + \beta_4 Tangibility_{i,t} \tag{1}$$
$$+ \epsilon_{i,t}$$

$$Spread_{i,t} = \beta_0 + \beta_1 NetBookLeverage_{i,t} + \beta_2 Size_{i,t} + \beta_3 Profitability_{i,t} + \beta_4 Tangibility_{i,t} \tag{2}$$
$$+ \beta_5 HistAvgSpread_{i,t} + \beta_6 No.ofPastIssues_{i,t} + \epsilon_{i,t}$$

$$Spread_{i,t} = \beta_0 + \beta_1 NetBookLeverage_{i,t} + \beta_2 Size_{i,t} + \beta_3 Profitability_{i,t} + \beta_4 Tangibility_{i,t} \tag{3}$$
$$+ \beta_5 HistAvgSpread_{i,t} + \beta_6 No.ofPastIssues_{i,t} + \beta_7 AandAbove_{i,t} + \epsilon_{i,t}$$

where $i$ denotes the issue or issuer, and $t$ denotes the year. The first pair of regressions has four common firm characteristics as independent variables: net book leverage, size, profitability, and tangibility. The second pair of regressions adds number of past issues and historical average spread as variables, providing information about the past experience of the issuers. The third pair of regressions adds an additional dummy variable, distinguishing issuers with A and above credit ratings from issuers with lower ratings or with no ratings. We control for year fixed effects across all sample periods. Table 1 presents the definitions of the variables. Table 6 summarizes pooled descriptive statistics of the variables used in the regression. On average, the spread of all 158 bonds is 159 bps, with the lowest spread being only 33 bps and the highest 554 bps. 15% of the bonds in our sample is rated A and above, and issuers in our sample had on average issued three bonds in the seven years before the current issuance.

We also document the firm characteristics of the issuers during COVID-19 period and compare

them to those of the issuers during the previous year. Figure 9 shows the comparison graphically. We exclude period 8, which is the first two months of 2020, due to lack of required data. In terms of size and profitability, we do not see issuers during the COVID-19 period to be noticeably different from issuers in the year before, nor do we see a large variation among COVID-19 period issuers themselves. On the other hand, we find that issuers during the COVID-19 period appears to have lower net book leverage and less tangible assets than issuers in the year before, and the level of leverage and tangibility differ greatly among COVID-19 period issuers themselves. Apart from the firm characteristic variables we use in the regression analysis, we also document the market-to-book ratios as they could be an important indicator to distinguish between value firms and growth firms. We find that issuers during the first period of COVID-19, which corresponds to the outbreak of the pandemic, have noticeably lower market-to-book ratios. Note that at the second quarter end of 2020, which we use to document the market capitalization of issuers during the first period, OMX Nordic 40 has been in a similar range to the year 2019, so the lower market-to-book ratios cannot be explained by a drop in the stock price. Therefore, it appears to be value firms, as opposed to growth firms, that issued bonds during the onset of the pandemic in the Nordic market. As the pandemic progresses, we find that the market-to-book ratios of issuers in the later stage is generally higher than those of the issuers in the previous year. However, since the OMX Nordic 40 has also had linear growth during the same time period, we cannot safely conclude that the higher market-to-book ratios are driven by more growth firms entering the bond market.

Table 7 presents the result of our regression. When comparing the regression results in COVID-19 period and in normal period, we find that R2 in the normal period is generally higher, which means the explanatory power of variables is higher. However, this is not the case in the first pair of regression, where we have only the core firm characteristics as variables. In fact, we see that R2 increases from 0.061 in normal period to 0.321 in crisis period. This is interesting because having a greater explanatory power means that firm characteristics, in our case net book leverage, size, profitability, and tangibility, explain the spreads better during crisis times than normal times. Even though the result is not significant, the fact that during the COVID-19 period, firm characteristics explains bond spreads at issuance five times as much as during normal period is an interesting

finding. A possible explanation for this is during normal times, spreads are decided relatively more by factors that are not included in our variables, while firm characteristics become more relevant during crisis times. Collin-Dufresne (2001) examine numerous proxies that measure future default probability and recovery rate change, which should in theory determine credit spreads, and find that such proxies have only limited explanatory power. Instead, they conclude that credit spreads changes are mainly driven by local supply and demand shocks, which is independent from firm characteristics.

When we examine each variable closely, we find that net book leverage has a positive sign across samples and time periods, which is consistent with the economic intuitive that higher leverage means higher risk and therefore higher spreads. Interestingly, the same is true for size, having a positive sign albeit the absolute value of coefficient being small and statistically insignificant. This is surprising as one would expect the opposite, since larger firm size is usually associated with lower default risk and should imply lower spread. Acharya et al. (2016) find that the "too big to fail" relationship between firm size and risk sensitivity of bond spreads is missing in the non-financial sector, which possibly explains our result because our sample consists of only non-financial firms. It is also worth noticing that from normal period to COVID-19 period, the absolute values of coefficients of size double in the second and third pair of regressions, indicating that size plays a relatively more important role in COVID-19 period. In terms of coefficient, profitability appears to be the most important explanatory variable in our regression model, with a negative sign across samples and time periods. Notably, we see the absolute value of the coefficients of increase significantly during the COVID-19 period, which means the ability to yield financial gain becomes extremely important for firms to issue bonds during crisis times, as it serves an important role in lowering the spread. The last core firm characteristic we consider is tangibility, which also have a negative sign across samples and time periods. We don't see the change of sign as Halling et al. (2020), whose regression result shows that tangibility has negative signs during normal periods but has positive signs during COVID-19. The change of sign could be because firms with high tangibility are more negatively affected by the economic activity restrictions and therefore the positive effects of having tangible assets during normal times get canceled out during COVID-19.

The fact that tangibility remains a negative relationship with spreads during COVID-19 in our sample suggest that the Nordic firms is affected less adversely by the restrictions to the extent that firms with more tangible assets are stilled deemed favorable. This is a reasonable result, as respectively 41% and 51% of bonds are issued by Swedish firms in our COVID-19 and normal sample, and the Swedish government has posed relatively lenient restrictions during the pandemic.

Next we look at the variables measuring past issuance activities, which can serve as a proxy for experience in raising capital from the bond market. In theory, the determinants of risk premium, hence credit spread, should be forward-looking and historical data should be considered irrelevant. However, Dougal et al. (2015) find that historical data do matter and that current borrowing costs is affected by prior borrowings. This is likely due to behavioral biases that are difficult to eliminate, namely anchoring. Anchoring leads past terms to influence current deals and allows stale information to enter present negotiations. In our sample, we see the R2 increases in both regressions after adding the past issuance dependent variables, especially for normal periods which see a significant increase from 0.061 to 0.559, indicating a higher explanatory power of the model. The first proxy for experience, historical average spread, has a small and positive coefficient across sample and periods. The variable is statistically significant during normal times but lose significance during the COVID-19 period. The second proxy, number of past issuance in the last seven years, has a small and negative coefficient across sample and periods. Interestingly, in terms of absolute value of the coefficient, which symbolize the magnitude of importance of the variable, number of past issuance see a multiplied increase from normal periods to COVID-19 periods. This could mean that being an experienced issuer helps firm raise debt capital in crisis times, either by established reputation or by existing network. This is consistent with the finding of Halling et al. (2020).

Finally, we consider the issuer rating variable, a dummy variable taking the value of 1 if the issuer is rated A or above and otherwise taking the value of 0. Figure 10 shows the mix of issuer rating and issue rating graphically. We see that in our regression sample , the composition of issuer ratings during COVID-19 period and normal period are quite similar overall, whereas the

percentage of AA rated bonds is considerably higher during the COVID-19 period than during the normal period, driven by the AA rated bonds in the first period of the whole COVID-19 period. We see that during normal period the variable has a coefficient with negative of -7.068, which means being rated with A or above on average lowers the spread by 7 bps during normal times. However, we see that the sign switches to positive during COVID-19 period, which is rather surprising because it would suggest that higher rated bonds have to pay extra during COVID-19 period. We investigate the reason and find that it is driven by one issuer, Equinor ASA, that has an issuer rating of AA- and issued 9 bonds with AA ratings during the COVID-19 period. The average spread of bonds issued by Equinor ASA is 203 bps, while the average spread of the rest of the bonds issued by issuers with A and above ratings during COVID-19 period is only 43 bps. This drives up the spread of bonds issued by issuers with A and above ratings and therefore distorts the regression result, which reflects the limit of our sample, as we have few observations that makes the result easily tilted.

To better analyze the degree of effect of the COVID-19 crisis, we run a second set of regression models by pooling the data from the COVID-19 period and normal period. We introduce a COVID-19 dummy taking a value of one for the COVID-19 period and zero for normal period, and make the explanatory variables interact with the COVID-19 dummy (CD):

$$
\begin{aligned}
Spread_{i,t} = {} & \beta_0 + \beta_1 NetBookLeverage_{i,t} + \beta_2 NetBookLeverage_{i,t} * CD_{i,t} + \beta_3 Size_{i,t} \\
& + \beta_4 Size_{i,t} * CD_{i,t} + \beta_5 Profitability_{i,t} + \beta_6 Profitability_{i,t} * CD_{i,t} + \beta_7 Tangibility_{i,t} \\
& + \beta_8 Tangibility_{i,t} * CD_{i,t} + \epsilon_{i,t}
\end{aligned}
$$

$$(4)$$

$$
\begin{aligned}
Spread_{i,t} = {} & \beta_0 + \beta_1 NetBookLeverage_{i,t} + \beta_2 NetBookLeverage_{i,t} * CD_{i,t} + \beta_3 Size_{i,t} \\
& + \beta_4 Size_{i,t} * CD_{i,t} + \beta_5 Profitability_{i,t} + \beta_6 Profitability_{i,t} * CD_{i,t} + \beta_7 Tangibility_{i,t} \\
& + \beta_8 Tangibility_{i,t} * CD_{i,t} + \beta_9 HistAvgSpread_{i,t} + \beta_{10} HistAvgSpread_{i,t} * CD_{i,t} \\
& + \beta_{11} No.of PastIssues_{i,t} + \beta_{12} No.of PastIssues_{i,t} * CD_{i,t} + \epsilon_{i,t}
\end{aligned}
$$

$$(5)$$

$$Spread_{i,t} = \beta_0 + \beta_1 NetBookLeverage_{i,t} + \beta_2 NetBookLeverage_{i,t} * CD_{i,t} + \beta_3 Size_{i,t}$$

$$+ \beta_4 Size_{i,t} * CD_{i,t} + \beta_5 Profitability_{i,t} + \beta_6 Profitability_{i,t} * CD_{i,t} + \beta_7 Tangibility_{i,t}$$

$$+ \beta_8 Tangibility_{i,t} * CD_{i,t} + \beta_9 HistAvgSpread_{i,t} + \beta_{10} HistAvgSpread_{i,t} * CD_{i,t}$$

$$+ \beta_{11} No.of PastIssues_{i,t} + \beta_{12} No.of PastIssues_{i,t} * CD_{i,t}$$

$$+ \beta_{13} AandAbove_{i,t} + \beta_{14} AandAbove_{i,t} * CD_{i,t} + \epsilon_{i,t}$$

$$(6)$$

where $i$ denotes the issue or issuer, and $t$ denotes the year. Table 8 represents the regression results for the pooled data.

To start with, the variable of interest COVID-19 dummy (CD) has a positive coefficient across all three regression models, albeit statistically insignificant. The coefficient for CD in the first regression is as high as 189.328, implying that in the COVID-19 period the spreads are on average 189 bps higher than the spreads in the normal period. As we add the past experience variables and rating variable, the importance of CD reduced significantly, with the coefficient being only 4.583 in the third regression.

We then turn to the firm characteristics variables, which give more or less the same result as the first set of regressions. Net book leverage plays an important role, the coefficients are positive and statistically significant across all three models. Interestingly, we see that the interaction term between net book leverage and CD consistently have negative coefficients, implying that the importance of leverage as a determinant of spreads actually decreased during the COVID-19. Size plays a less important role than net book leverage, with small and positive coefficients across models. However, a positive coefficient for the interaction term between size and CD indicates that the importance of size increases during COVID-19 period, which is consistent with the results shown in the previous regression, where the coefficients of size themselves increased. Profitability remains the variable with the highest explanatory power in terms of the magnitude of coefficients. Remarkably, the interaction term between profitability and CD consistently has a negative coefficient with an even larger absolute value, indicating that profitability becomes

even more vital for firms to lower their costs of debt during the COVID-19 period. The role of tangibility shows a rather interesting picture. Consistent with the previous set of regressions, tangibility constantly has negative coefficients, meaning that having tangible assets lowers the spread overall. However, we see that the interaction terms between tangibility and CD in the second and third regression have positive coefficients, implying that the degree to which tangible assets can lower the spread has diminished during the COVID-19 period. This resonates with the reasoning of Halling et al. (2020) that firms with tangible assets are less resilient to the COVID-19 restrictions and therefore the positive effects of tangibility decreased during the COVID-19 period.

The variables measuring past experience tell the same story as the previous set of regressions. Explicitly, historical average spread has a small, positive, and statistically significant coefficient across regression models, with the importance decreasing during the COVID-19 period indicated by the negative coefficient of the interaction term. On the other hand, number of past issuance has a small, negative, and statistically insignificant coefficient across regression models, but the importance of number of past issuance increased considerably, indicated by the magnitude of the negative coefficient of the interaction term. Being an experienced bond issuers helps in lowering the costs of bonds even more during crisis times. Lastly, being a high rated issuer is expected to lower the spread in normal times, but we cannot say the same for the COVID-19 period due to the limit of our data sample.

## 4.3 Equity Issuance

### 4.3.1 Number of Equity Issues and Capital Raised

In Table 9 we document number of equity issues for each of our defined COVID-19 period and normal periods. We note that number of issues is significantly higher in all periods of COVID-19 compared to the same normal period. This, surprisingly, also holds true for the period 1, and the pre-outbreak period starting January 1 to March 15, 2020. Surveying the table, we find number of equity issues increase consistently from July 2019 and onward. We also observe that with the

exception of the outbreak period 1, and period 6, equity capital raised was higher for all COVID-19 periods against their comparable normal periods. A study by Yun Ke (2021) on cost of equity capital changes for U.S. firms from September 2019 to August 2020 show increase in the cost of equity capital by 172 bps after controlling for other firm characteristics. Substantial increases in the cost of equity capital discourage raising equity capital during these turbulent times, which likely explains the slowdown in amount of capital raised by Nordic firms during Period 1. Furthermore, with the exception of period 1, percentage of IPOs was higher for all COVID-19 periods against their comparable normal periods. Approximately 40% of IPOs in Europe during 2020 and 2021 occurred in the Nordics. This was partly attributable to the booming startup scene in the Nordics, and partly fueled by listings in the Euronext Growth market in Oslo, an unregulated market for listings of early-stage companies (Wass and Ahmad, 2021). Period 1, however, had only 5% of its issues as IPOs, primarily due to the then-sluggish Swedish market, against comparable levels of 13%, 15% and 5% for 2017, 2018 and 2019 respectively. We also see only 8.2% withdrawn IPOs as a percentage of successful IPOs during the COVID-19 period, compared to 20% withdrawn IPOs as a percentage of successful IPOs during the normal period. Of USD 58.9 billion equity capital raised during the COVID-19 period, USD 14.8 billion was attributable to IPOs, and 13.2% of COVID-19 issue volume. Secondary issues far surpass IPOs in terms of both issue volume and capital raised. From this, we can surmise that the equity market was very important for repeat access during COVID-19 for listed firms. A study by Dissanaike et al. (2014) on U.K. firms during the financial crisis of 2007-2008 finds strong positive returns for many firms immediately following secondary equity issue announcements during crisis periods. While usually perceived as a negative signal to issue equity, secondary equity issuance can be a positive signal for many firms due to public perception that such an equity offering could prevent a firm from entering bankruptcy. It is also likely that the low interest rate environment set by all four Nordic central banks created a favorable environment to issue stocks by encouraging higher capital market flows (Tarek et al., 2020).

Figure 11 lends some further insights into the month-by-month issuance activity. With the exception of March 2020, average number of equity issues for the normal period is always lower than

that of all COVID-19 periods. The same holds true for capital amounts raised, which peaks in October 2021. When pitting months of COVID-19 against each other, we also observe more equity issues from July 2020 to February 2021 compared to issues from July 2021 to February 2022.

### 4.3.2 Equity Issues and Capital Raised per Country

Next, we decompose equity issues and capital amounts raised further on the basis of nation. The results are depicted in figure 12. From March 16, 2020, till the end of the month, we find 67% of issues to be made by Swedish firms, 22% by Danish firms, and the remainder by Norwegian firms. When it comes to capital raised, however, it is two Danish secondary issues that dominate in this period. They raise 70% of the total equity capital during this period, while Swedish firms follow with approximately 28%, and all being secondary issues. We observe no such spikes in capital raising for Danish firms for the rest of the COVID-19 period. In April, the composition shifts. 90% of the capital is raised then by Swedish firms. Swedish firms, afterwards, dominate in terms of both issues and capital raised across most periods. This is hardly surprising, as Sweden has the highest number of listed companies in the EU (Daly, 2021). Furthermore, studies have shown high trust on a government by citizens and high individual freedom reduce uncertainty avoidance which reduces volatility in equity markets during crisis periods (Erdem, 2020). Sweden's low uncertainty avoidance score (Hofstede, 2022) can account for a possible explanation of the continued equity capital raising activity for Swedish corporations during the COVID-19 period, along with lesser restrictions imposed by the government compared to its Nordic peers. At the end of our COVID-19 period, in February 2022, we see Norwegian firms dominate by raising 65% of the total capital and issuing 55% of the equity during the month. Throughout the COVID-19 period, we also observe a low but steady number of issues by Danish and Finnish firms. When compared to its Nordic peers, Finnish firms raise the most percentage of capital during the third quarter of 2020, and then slump back to its consistently low proportions.

### 4.3.3 Equity Issues per Industry

As with our analysis on bond issuance activity, we decompose equity issuance and capital raised initially by industry depicted in Table 10, and then take a deeper dive into four key industries across each of our defined COVID-19 periods. It is well worth noting that agricultural issues increase by 17.5 times, and capital raised by 22 times over the COVID-19 period compared to normal period. During COVID-19 period, it accounts for 3% of all capital raised, compared to negligible levels during the normal period. Capital raised by firms in the personal, business, and repair service category increase from 16% to 40% in COVID-19 period compared to the normal period, although percentage of total issues remain in similar levels. On the contrary, for firms in the natural resource category, capital raised as a percentage of total capital is only 5% during the COVID-19 period compared to 21% during normal periods.

Tracking the firms' capital raised across time on the basis of four key industries, as previously identified, unveils some interesting findings which we present in figure 13. Manufacturing firms raise the most capital across the COVID-19 period for all firms with the exception of Finnish firms – where the most capital is raised, with steep increases across the period, by firms in the RRHT category. Scrutinizing Finnish firms across all four categories, we see almost no capital raising activity till period 2. Capital raising for manufacturing firms initialize from 2021, with slight increases over time. We conclude that for Finnish firms, equity markets have been the most important for capital raising by firms in the RRHT category, followed by real estate and then manufacturing.

For Denmark, it is manufacturing firms that raised 93.8% of the total capital raised by the four industries during the COVID-19 period. We observe no inactivity in capital raising for manufacturing firms during the outbreak period (period 1) as we did for Finnish manufacturing firms. Instead, we observe steep increases in capital raised for these firms till January 2021. Firms in the RRHT category make up approximately 6% of remaining capital raised, while the other categories remain insignificant throughout the entire period. For Norway, capital raising activity begins to pick up from May 2020. Manufacturing firms raise the most capital over time, followed by natural

resources, and then RRHT, while real estate is insignificant throughout time. 69.6% of total capital raised during COVID-19 by the four industries by Swedish firms is attributable to manufacturing firms. For these firms, we observe issuance activity in every single month of the COVID-19 period. Real estate firms, an important category for the Swedish market, follow with steady increases, and comprise 18.7% of total capital raised by the four categories during the COVID-19 period. Sporadic issuance by RRHT firms are also noticeable during the period.

### 4.3.4   Comparison of Bond and Equity Issues

Lastly, we compare equity issues and bond issues made during the COVID-19 period on an industry basis against the normal period in Table 11 and explore some interesting findings. For companies in the electric service category, in the normal period, percentage of capital raised via bond issues is 94%, and only 6% by equity issues. However, we see a stark difference during the COVID-19 period – capital raised by bond issues plummets to 8% and equity rises to 92%. For firms in the personal, business, repairs, and service category, we also see a strong preference for equity capital (81%) over capital raised via bonds during the COVID-19 period compared to the normal period (45%).

For two particular industries, we see more capital during the COVID-19 period raised through bond issues instead. During normal periods, 83% of the capital raised by firms in the wholesale category are from equity issues. But during the COVID-19 period, the proportion evens out with 51% capital raised via bond issues, and 49% via equity. Firms in the natural resources category also raised 83% of their public capital from bond issues, as opposed to only 52% via corporate bonds during the normal period. These capital-intensive corporations in this category, for different projects, have traditionally raised most of their capital using bank debt. However, during crisis periods, when banks strive to decrease loan portfolios, greater capital diversification is required, causing these corporations to access more public funding. Next, we assess their preference for bond versus equity capital. Going back to our bond ratings data, we find 15 out of 18 bond issues during the COVID-19 period are rated, and all 18 issues denominated in euro, USD, or the British

pound. Given that 17 of these issues were made by Norway, Sweden, and Denmark, this indicates a preference for capital raising from a wider, possibly foreign, investor base and raise capital in foreign currency – which likely explains the preference for debt capital over equity during the COVID-19 period.

It is also interesting to note that from our sample of 117 bond issuers during the COVID-19 period, 36% of issuers also issued equity during the COVID-19 period. Overall, we find equity capital raised during the COVID-19 period make up 51%, and capital raised by bonds 49% of the composition. During normal periods, the capital raised by corporate bonds outstrips that raised by equity – 63% versus 37% respectively. This shift during COVID-19 appears to be in contrast with the pecking order theory, as equity issues generally have the highest transaction costs and a negative information cost (Barclay et al., 2020). During turbulent times, median illiquidity for all bonds increases sharply, as observed during the financial crisis of 2008 (Bao et al., 2011). According to Swedish Central Bank reports, during the pandemic, existing vulnerabilities like insufficient liquidity and lack of transparency in the corporate bond market came to a head. As we discussed earlier, there is a lack of market-makers in these relatively small Nordic markets (Riksbank, 2020). A possible explanation, therefore, for the increased preference of equity capital raising during the COVID-19 period despite likely increases in the cost of equity capital is the hunt for liquidity.

# 5  Conclusion

This paper explores how non-financial Nordic firms raised capital from public debt and equity markets during the COVID-19 period. We have four key findings. First, we find that the bond market experiences turbulence during the outbreak period. Number of bonds issued overall take a hit and remain below normal period average levels till August 2020, but the bond market rebounds strongly afterwards. Furthermore, we find that being a rated bond issuer is only important for access during the outbreak period. Excluding the outbreak period, most issues and issuers across the COVID-19 period are non-rated.

We also find that factors that determine bond spreads during the normal period do not change fundamentally during the COVID-19 period. Specifically, across both COVID-19 and normal periods, net book leverage and size have a positive relationship with spreads while profitability and tangibility have a negative one. Moreover, having tangible assets plays a less important role during the COVID-19 period. We also find that being an experienced bond issuer helps lowering the costs of bonds even more during crisis times.

Finally, we find that the equity market is an important source of capital throughout the COVID-19 period, as capital raised by IPOs and secondary issues are greater than the normal period in general. The higher percentage of IPOs is likely attributable to the booming startup scene in the Nordics. We also see an increased preference to raise more equity capital than bond during the COVID-19 period, likely explained by a hunt for liquidity as the Nordic corporate bond markets lack much-needed transparency and liquidity during crisis periods.

While a limitation is the small number of observations used in the spread analysis, this paper nevertheless sheds light on the impact of COVID-19 on the Nordic capital markets, beyond the outbreak period to 28 February 2022. We believe this paper contributes to future research on the Nordic capital markets.

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Tables

Table 1: **Variable Definitions**

This table presents definitions of variables used in our empirical analysis.

| Variables | Definition |
| --- | --- |
| Bond issue variables | |
| Principal | Principal amount ($M) |
| Spread | Offering spread over benchmark (bp) |
| Maturity | Maturity (year) |
| Coupon | Coupon rate (percent) |
| A and above | A dummy variable equals one if the issue is rated A- or above; and zero otherwise |
| COVID dummy | A dummy variable equals one if the bond is issued during the COVID-19 period; and zero otherwise |
| Equity issue variables | |
| Proceeds | Issuance proceeds ($M) |
| IPO | Initial public offering |
| Issuer characteristics | |
| Total no. of past issues | Total number of past bond issues in the last 7 years |
| Hist. avg. spread | Average offering spread of past bond issues in the last 7 years |
| Hist. avg. coupon | Average coupon of past bond issues in the last 7 years |
| Hist. avg. maturity | Average maturity of past bond issues in the last 7 years |
| Size | The natural logarithm of net sales |
| Market to book ratio | Market capitalization to book value of equity |
| Profitability | The operating income before depreciation to total assets (book value) ratio |
| Tangibility | The net PPE to total assets (book value) ratio |
| Net book leverage | The total debt less cash and cash equivalent to total assets (book value) ratio |
| Sample Periods | |
| COVID-19 Period | 2020 Mar 16 - 2022 Feb |
| Period 1 | 2020 Mar 16 - 2020 Jun |
| Period 2 | 2020 Jul - 2020 Sep |
| Period 3 | 2020 Oct - 2020 Dec |
| Period 4 | 2021 Jan - 2021 Mar |
| Period 5 | 2021 Apr - 2021 Jun |
| Period 6 | 2021 Jul - 2021 Sep |
| Period 7 | 2021 Oct - 2021 Dec |
| Period 8 | 2022 Jan - 2022 Feb |
| Normal Period | 2017 Mar 16 - 2020 Mar 16 |

Table 2: **Bond Issuance: All**

This table reports summary characteristics of all bonds issued by Nordic firms during our defined COVID-19 period and normal period in terms of number of issues and principal amount ($M) raised in each period. Panel A shows COVID-19 period issues were in total 324 for four markets combined, raising USD 54,218 million. Panel B reports issue statistics right before our defined outbreak date, from March 1st to 15th, recording 34 issues and USD 7,161 million funding raised. Panel C reports the necessary comparison period where we take full calendar years of 2017, 2018 and 2019 into account. Variable definitions are in Table 1.

| Panel A: COVID-19 Period | | | | | |
|---|---|---|---|---|---|
| Period | No. of Issues | Sum of Principal ($M) | Inv. Grade | A and Above | NR |
| 1 | 34 | 12654 | 62% | 26% | 32% |
| 2 | 42 | 6154 | 24% | 0% | 60% |
| 3 | 33 | 7208 | 15% | 0% | 76% |
| 4 | 52 | 8785 | 17% | 0% | 81% |
| 5 | 65 | 8020 | 8% | 0% | 89% |
| 6 | 49 | 5671 | 2% | 0% | 92% |
| 7 | 30 | 3928 | 13% | 3% | 87% |
| 8 | 19 | 1798 | 11% | 11% | 84% |
| COVID period | 324 | 54218 | 18% | 4% | 77% |
| 2020 Mar 16 - 2021 Mar 15 | 146 | 32583 | 30% | 6% | 61% |
| 2021 Mar 16 - 2022 Feb | 178 | 21635 | 7% | 2% | 89% |
| Panel B: Before COVID-19 in 2020 | | | | | |
| 2020 Jan - Mar 15 | 34 | 7161 | 26% | 3% | 62% |
| Panel C: Normal Period | | | | | |
| 2017 Jan - Mar 16 | 25 | 4526 | 16% | 0% | 76% |
| 2017 Mar 16 - Jun | 45 | 11013 | 11% | 0% | 71% |
| 2017 Jul - Sep | 18 | 3326 | 17% | 0% | 72% |
| 2017 Oct - Dec | 40 | 5547 | 20% | 0% | 78% |
| 2018 Jan - Mar 16 | 35 | 4592 | 6% | 0% | 86% |
| 2018 Mar 16 - Jun | 57 | 5893 | 5% | 0% | 82% |
| 2018 Jul - Sep | 37 | 4041 | 14% | 3% | 84% |
| 2018 Oct - Dec | 21 | 3727 | 24% | 0% | 71% |
| 2019 Jan - Mar 16 | 32 | 7819 | 28% | 0% | 63% |
| 2019 Mar 16 - Jun | 66 | 9366 | 18% | 3% | 70% |
| 2019 Jul - Sep | 24 | 4467 | 25% | 0% | 63% |
| 2019 Oct - Dec | 40 | 5459 | 20% | 8% | 78% |
| 2017 Mar 16 - 2018 Mar 15 | 138 | 24479 | 13% | 0% | 77% |
| 2018 Mar 16 - 2019 Mar 15 | 147 | 21479 | 15% | 1% | 77% |
| 2019 Mar 16 - 2020 Mar 16 | 164 | 26453 | 21% | 4% | 69% |

Table 3: **Bonds Issuance: Industry**

This table reports the number of bond issues and principal amount ($M) issued during the COVID-19 period and during normal period by each industry. Variable definitions are in Table 1.

| Industry | No. of Issues | | | | Principal Amount ($M) | | | |
|---|---|---|---|---|---|---|---|---|
| | COVID-19 | | Normal | | COVID-19 | | Normal | |
| Agriculture | 2 | 1% | 1 | 0% | 161 | 0% | 20 | 0% |
| Construction | 6 | 2% | 9 | 2% | 548 | 1% | 745 | 1% |
| Electric Service | 1 | 0% | 4 | 1% | 59 | 0% | 2914 | 4% |
| Manufacturing | 77 | 24% | 104 | 23% | 14808 | 27% | 17990 | 25% |
| Natural Resource | 18 | 6% | 21 | 5% | 13352 | 25% | 10084 | 14% |
| Pers/Bus/Rep Svc | 26 | 8% | 45 | 10% | 5349 | 10% | 8655 | 12% |
| Radio/TV/Telecom | 14 | 4% | 16 | 4% | 2680 | 5% | 6825 | 9% |
| Real Estate | 152 | 47% | 216 | 48% | 13536 | 25% | 20663 | 29% |
| Wholesale | 9 | 3% | 6 | 1% | 1138 | 2% | 407 | 1% |
| RRHT | 19 | 6% | 26 | 6% | 2587 | 5% | 4051 | 6% |
| Other | 0 | 0% | 1 | 0% | 0 | 0% | 58 | 0% |
| Total | 324 | 100% | 449 | 100% | 54218 | 100% | 72411 | 100% |

Table 4: **Bond Issuance: Coupon and Maturity**

This table reports summary characteristics of bonds with fixed-coupon rates and definite maturities issued during the COVID-19 period and normal period by Nordic firms : number of issues, principal amount ($M) raised, coupon rate (%), historical average coupon rate (%) of bonds issued by the same issuers, maturity (year), and historical average maturity (year) of bonds issued by the same issuers. Variable definitions are in Table 1.

| Panel A: COVID-19 Period | | | | | | |
|---|---|---|---|---|---|---|
| Period | No. of Issues | Sum of Principal ($M) | Coupon (%) | Hist. Avg. Coupon (%) | Maturity (year) | Hist. Avg. Maturity (Year) |
| 1 | 22 | 11413 | 2.61 | 2.61 | 9.45 | 9.97 |
| 2 | 20 | 4450 | 1.75 | 1.92 | 5.52 | 5.42 |
| 3 | 14 | 5408 | 1.65 | 2.64 | 7.42 | 6.41 |
| 4 | 19 | 4488 | 1.29 | 2.02 | 6.72 | 5.28 |
| 5 | 17 | 3000 | 1.77 | 1.64 | 5.69 | 4.96 |
| 6 | 14 | 1938 | 2.42 | 1.89 | 5.89 | 4.88 |
| 7 | 7 | 2132 | 1.31 | 2.82 | 6.02 | 8.23 |
| 8 | 6 | 600 | 2.88 | 2.14 | 4.69 | 7.32 |
| COVID period | 119 | 33428 | 1.94 | 2.35 | 6.72 | 7.13 |
| 2020 Mar 16 - 2021 Mar 15 | 67 | 23999 | 1.88 | 2.23 | 7.52 | 7.07 |
| 2021 Mar 16 - 2022 Mar 28 | 52 | 9429 | 2.00 | 2.24 | 5.68 | 6.12 |
| Panel B: Before COVID-19 in 2020 | | | | | | |
| 2020 Jan - Mar 15 | 13 | 4009 | 1.34 | 1.79 | 6.97 | 5.39 |
| Panel C: Normal Period | | | | | | |
| 2017 Jan - Mar 15 | 12 | 3352 | 1.43 | | 5.56 | |
| 2017 Mar 16 - Jun | 21 | 7493 | 2.03 | | 5.56 | |
| 2017 Jul - Sep | 11 | 2405 | 1.96 | | 6.49 | |
| 2017 Oct - Dec | 20 | 3490 | 1.34 | | 5.24 | |
| 2018 Jan - Mar 15 | 15 | 2875 | 2.18 | | 5.11 | |
| 2018 Mar 16 - Jun | 27 | 3260 | 2.10 | | 4.39 | |
| 2018 Jul - Sep | 15 | 2618 | 1.51 | | 5.00 | |
| 2018 Oct - Dec | 10 | 2653 | 3.82 | | 8.02 | |
| 2019 Jan - Mar 15 | 12 | 5977 | 1.90 | | 7.11 | |
| 2019 Mar 16 - Jun | 24 | 5927 | 2.48 | | 7.63 | |
| 2019 Jul - Sep | 7 | 3538 | 1.84 | | 6.57 | |
| 2019 Oct - Dec | 20 | 3071 | 1.74 | | 7.25 | |
| 2017 Mar 16 - 2018 Mar 15 | 67 | 16263 | 1.85 | | 5.52 | |
| 2018 Mar 16 - 2019 Mar 15 | 64 | 14508 | 2.19 | | 5.61 | |
| 2019 Mar 16 - 2020 Mar 16 | 64 | 16546 | 1.95 | | 7.26 | |
| All | 195 | 47317 | 1.99 | | 6.12 | |

Table 5: **Bond Issuance: Spread**

This table reports summary characteristics of bonds that have available offering spread data, corresponding to the data used in our regression analysis. Variable definitions are in Table 1.

| Period | No. of Issues | No. of Issuers | Sum of Principal ($M) | Spread (bp) | Hist. Avg. Spread (bp) | Coupon (%) | Hist. Avg. Coupon (%) | Maturity (year) | Hist. Avg. Maturity (year) | Inv. Grade | A and Above | NR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Panel A: COVID-19 Period | | | | | | | | | | | | |
| 1 | 14 | 5 | 10839 | 216 | 99 | 2.46 | 2.70 | 10.06 | 12.30 | 79% | 64% | 7% |
| 2 | 9 | 6 | 3947 | 264 | 158 | 2.47 | 2.36 | 6.56 | 6.53 | 44% | 0% | 0% |
| 3 | 8 | 7 | 4328 | 159 | 178 | 1.17 | 2.53 | 7.72 | 6.43 | 63% | 0% | 13% |
| 4 | 11 | 11 | 3851 | 103 | 140 | 0.81 | 2.17 | 6.87 | 6.29 | 55% | 0% | 45% |
| 5 | 4 | 4 | 1872 | 221 | 330 | 1.94 | 4.71 | 6.52 | 5.35 | 50% | 0% | 50% |
| 6 | 1 | 1 | 351 | 214 | 329 | 2.00 | 3.00 | 7.02 | 7.03 | 0% | 0% | 0% |
| 7 | 5 | 5 | 1900 | 92 | 144 | 1.09 | 2.75 | 6.42 | 7.45 | 40% | 20% | 60% |
| 8 | 4 | 4 | 220 | 108 | 133 | 2.08 | 1.80 | 4.52 | 8.18 | 0% | 0% | 0% |
| COVID period | 56 | 36 | 27308 | 175 | 145 | 1.76 | 2.62 | 7.51 | 8.68 | 54% | 18% | 29% |
| 2020 Mar 16 - 2021 Mar 15 | 37 | 22 | 21597 | 192 | 132 | 1.86 | 2.56 | 8.25 | 9.36 | 68% | 24% | 8% |
| 2021 Mar 16 - 2022 Feb | 19 | 18 | 5711 | 142 | 170 | 1.56 | 2.65 | 6.06 | 6.69 | 26% | 5% | 68% |
| Panel B: Before COVID-19 in 2020 | | | | | | | | | | | | |
| 2020 Jan - Mar 15 | 8 | 7 | 3880 | 110.13 | 188.2 | 1.43 | 2.93 | 7.08 | 6.83 | 63% | 13% | 13% |
| Panel C: Normal Period | | | | | | | | | | | | |
| 2017 Jan - Mar 15 | 7 | 5 | 3123 | 107 | | 1.28 | | 5.88 | | 57% | 0% | 14% |
| 2018 Jan - Mar 15 | 7 | 7 | 2330 | 115 | | 1.97 | | 5.88 | | 29% | 0% | 43% |
| 2019 Jan - Mar 15 | 8 | 6 | 5118 | 139 | | 1.75 | | 7.65 | | 88% | 0% | 0% |
| 3M | 22 | 14 | 10571 | 121 | | 1.67 | | 6.52 | | 59% | 0% | 18% |
| 2017 Mar 16 - 2018 Mar 15 | 39 | 27 | 13906 | 148 | | 1.98 | | 6.27 | | 31% | 0% | 46% |
| 2018 Mar 16 - 2019 Mar 15 | 29 | 22 | 11567 | 153 | | 2.11 | | 6.27 | | 52% | 3% | 31% |
| 2019 Mar 16 - 2020 Mar 15 | 34 | 22 | 13466 | 150 | | 1.86 | | 8.01 | | 62% | 6% | 21% |
| All | 102 | 50 | 38939 | 150 | | 1.98 | | 6.85 | | 47% | 3% | 33% |

Table 6: **Variables: Summary Statistics**

This table reports the summary statistics of the variables used in the regression analysis. Variable definitions are in Table 1.

| VARIABLES | Observations | Mean | Std. dev | Min | Max |
|---|---|---|---|---|---|
| Spread | 158 | 158.962 | 99.724 | 33.000 | 554.000 |
| Net book leverage | 158 | 0.265 | 0.161 | -0.088 | 0.587 |
| Size | 158 | 7.986 | 1.760 | 3.966 | 11.272 |
| Profitability | 158 | 0.092 | 0.056 | 0.003 | 0.278 |
| Tangibility | 158 | 0.490 | 0.326 | 0.004 | 0.983 |
| No. of past issues | 158 | 3.171 | 5.344 | 0.000 | 24.000 |
| A and above (dummy) | 158 | 0.146 | 0.354 | 0.000 | 1.000 |

Table 7: **Determinants of Spreads**

This table presents regression results. P-values are placed in the parentheses underneath the estimated coefficients. * denotes results that are statistically significant. Variable definitions are in Table 1.

| VARIABLES | (1) COVID-19 Spread | (2) COVID-19 Spread | (3) COVID-19 Spread | (4) Normal Period Spread | (5) Normal Period Spread | (6) Normal Period Spread |
|---|---|---|---|---|---|---|
| Net book leverage | 204.483 | 152.747 | 160.722 | 185.710 | 214.210* | 208.460* |
| | (0.090) | (0.432) | (0.478) | (0.082) | (0.007) | (0.011) |
| Size | 5.404 | 24.829 | 25.848 | 6.810 | 11.616 | 11.211 |
| | (0.500) | (0.342) | (0.372) | (0.436) | (0.220) | (0.242) |
| Profitability | -794.833 | -757.274* | -770.875 | -143.237 | -319.715* | -318.606* |
| | (0.058) | (0.040) | (0.069) | (0.734) | (0.018) | (0.021) |
| Tangibility | -148.886* | -49.699 | -45.544 | -90.001 | -59.659 | -62.502 |
| | (0.023) | (0.621) | (0.663) | (0.060) | (0.096) | (0.111) |
| Hist. avg. spread | | 0.474 | 0.478 | | 0.507* | 0.501* |
| | | (0.086) | (0.094) | | (0.000) | (0.000) |
| No. of past issues | | -1.333 | -2.025 | | -0.563 | -0.309 |
| | | (0.804) | (0.792) | | (0.763) | (0.875) |
| A and above | | | 9.701 | | | -7.068 |
| | | | (0.866) | | | (0.699) |
| Year dummies | Y | Y | Y | Y | Y | Y |
| Observations | 56 | 44 | 44 | 102 | 68 | 68 |
| Adj R-squared | 0.321 | 0.352 | 0.334 | 0.061 | 0.559 | 0.552 |

## Table 8: **Determinants of Spreads: with COVID-19 Dummy**

This table presents results of the regression with COVID-19 Dummy. P-values are placed in the parentheses underneath the estimated coefficients. * denotes results that are statistically significant. Variable definitions are in Table 1.

| VARIABLES | (1) Spread | (2) Spread | (3) Spread |
|---|---|---|---|
| Net book leverage | 218.765* | 205.986* | 201.736* |
|  | (0.040) | (0.021) | (0.032) |
| Net book leverage*CD | -44.116 | -52.027 | -27.746 |
|  | (0.641) | (0.769) | (0.895) |
| Size | 5.165 | 6.018 | 5.294 |
|  | (0.661) | (0.653) | (0.692) |
| Size*CD | -5.474 | 17.453 | 20.557 |
|  | (0.586) | (0.515) | (0.505) |
| Profitability | -368.484 | -383.968* | -387.969* |
|  | (0.267) | (0.008) | (0.013) |
| Profitability*CD | -500.608 | -457.957 | -490.577 |
|  | (0.088) | (0.145) | (0.196) |
| Tangibility | -116.912* | -79.195 | -82.426 |
|  | (0.004) | (0.065) | (0.066) |
| Tangibility*CD | -53.098 | 15.894 | 28.802 |
|  | (0.281) | (0.871) | (0.790) |
| Hist. avg. spread |  | 0.497* | 0.490* |
|  |  | (0.000) | (0.000) |
| Hist. avg. spread*CD |  | -0.064 | -0.052 |
|  |  | (0.810) | (0.851) |
| No. of past issues |  | -0.434 | -0.170 |
|  |  | (0.843) | (0.940) |
| No. of past issues*CD |  | -2.076 | -3.992 |
|  |  | (0.704) | (0.649) |
| A and above |  |  | -5.838 |
|  |  |  | (0.761) |
| A and above*CD |  |  | 28.681 |
|  |  |  | (0.676) |
| COVID-19 dummy (CD) | 189.328 | 37.230 | 4.583 |
|  | (0.112) | (0.891) | (0.988) |
| Year dummies | Y | Y | Y |
| Observations | 158 | 112 | 112 |
| Adj R-squared | 0.251 | 0.436 | 0.424 |

## Table 9: **Equity Issuance**

This table reports summary characteristics of all equity issues by Nordic firms during the COVID-19 period and normal period in terms of number of issues, equity capital ($M) raised, number of IPOs, and number of withdrawn IPOs in each period. Variable definitions are in Table 1.

| Period | No. of Issues | Sum of Proceeds ($M) | IPO | IPO (%) | No. of Withdrawn IPOs |
|---|---|---|---|---|---|
| Panel A: COVID-19 Period | | | | | |
| 1 | 163 | 5713 | 3 | 2% | 2 |
| 2 | 111 | 4760 | 6 | 5% | 0 |
| 3 | 199 | 9211 | 28 | 14% | 2 |
| 4 | 171 | 8673 | 38 | 22% | 3 |
| 5 | 166 | 11163 | 30 | 18% | 1 |
| 6 | 92 | 4936 | 11 | 12% | 2 |
| 7 | 152 | 11803 | 26 | 17% | 1 |
| 8 | 46 | 2653 | 3 | 7% | 1 |
| COVID period | 1100 | 58913 | 145 | 13% | 12 |
| 2020 Mar 16 - 2021 Mar 15 | 610 | 26225 | 61 | 10% | 5 |
| 2021 Mar 16 - 2022 Mar 28 | 490 | 32688 | 84 | 17% | 7 |
| Panel B: Before COVID-19 in 2020 | | | | | |
| 2020 Jan - Mar 15 | 65 | 2717 | 2 | 3% | 0 |
| Panel C: Normal Period | | | | | |
| 2017 Jan - Mar 15 | 30 | 2635 | 2 | 7% | 0 |
| 2017 Mar 16 - Jun | 88 | 6291 | 11 | 13% | 1 |
| 2017 Jul - Sep | 32 | 2140 | 1 | 3% | 0 |
| 2017 Oct - Dec | 90 | 4949 | 7 | 8% | 0 |
| 2018 Jan - Mar 15 | 48 | 1840 | 2 | 4% | 2 |
| 2018 Mar 16 - Jun | 112 | 7894 | 17 | 15% | 1 |
| 2018 Jul - Sep | 28 | 775 | 0 | 0% | 1 |
| 2018 Oct - Dec | 67 | 4101 | 5 | 7% | 2 |
| 2019 Jan - Mar 15 | 38 | 1556 | 0 | 0% | 0 |
| 2019 Mar 16 - Jun | 104 | 4261 | 5 | 5% | 3 |
| 2019 Jul - Sep | 56 | 1775 | 3 | 5% | 1 |
| 2019 Oct - Dec | 127 | 4678 | 7 | 6% | 1 |
| 2017 Mar 16 - 2018 Mar 15 | 258 | 15219 | 21 | 8% | 3 |
| 2018 Mar 16 - 2019 Mar 15 | 245 | 14326 | 22 | 9% | 4 |
| 2019 Mar 16 - 2020 Mar 15 | 352 | 13430 | 17 | 5% | 5 |
| All | 855 | 42976 | 60 | 7% | 12 |

Table 10: **Equity issuance: Industry**

TThis table reports the number of equity issues and equity capital ($M) raised during the COVID-19 period and during normal period by each industry. Variable definitions are in Table 1.

| Industry | No. of Issues | | | | Capital raised | | | |
| | COVID-19 | | Normal | | COVID-19 | | Normal | |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 35 | 3% | 2 | 0% | 1103 | 2% | 50 | 0% |
| Construction | 30 | 3% | 19 | 2% | 1947 | 3% | 833 | 2% |
| Electric Service | 13 | 1% | 9 | 1% | 646 | 1% | 200 | 0% |
| Manufacturing | 463 | 42% | 369 | 43% | 17311 | 31% | 13014 | 30% |
| Natural Resource | 70 | 6% | 73 | 9% | 2832 | 5% | 9228 | 21% |
| Pers/Bus/Rep Svc | 310 | 28% | 220 | 26% | 22428 | 40% | 6955 | 16% |
| Radio/TV/Telecom | 10 | 1% | 14 | 2% | 623 | 1% | 983 | 2% |
| Real Estate | 73 | 7% | 57 | 7% | 3599 | 6% | 4340 | 10% |
| Wholesale | 18 | 2% | 11 | 1% | 1101 | 2% | 1952 | 5% |
| RRHT | 59 | 5% | 60 | 7% | 4514 | 8% | 3891 | 9% |
| Other | 19 | 2% | 21 | 2% | 566 | 1% | 1531 | 4% |
| Total | 1100 | | 855 | | 56669 | | 42976 | |

Table 11: **Industry: Capital Raised through Bond and Equity**

This table reports the percentage of capital raised by bond and equity issues by each industry during the COVID-19 period and the normal period. Variable definitions are in Table 1.

| Industry | COVID | | Normal | |
| | Bond | Equity | Bond | Equity |
|---|---|---|---|---|
| Agriculture | 13% | 87% | 29% | 71% |
| Construction | 22% | 78% | 47% | 53% |
| Electric Service | 8% | 92% | 94% | 6% |
| Manufacturing | 46% | 54% | 58% | 42% |
| Natural Resource | 83% | 17% | 52% | 48% |
| Pers/Bus/Rep Svc | 19% | 81% | 55% | 45% |
| Radio/TV/Telecom | 81% | 19% | 87% | 13% |
| Real Estate | 79% | 21% | 83% | 17% |
| Wholesale | 51% | 49% | 17% | 83% |
| RRHT | 36% | 64% | 51% | 49% |
| Other | 0% | 100% | 4% | 96% |
| Total | 49% | 51% | 63% | 37% |

Figures

## Figure 1: **Bond Issuance**

The left graph shows the number of bond issues by Nordic non-financial firms. The right graph shows the principal amount ($M) issued by Nordic non-financial firms. Variable definitions are in Table 1.



(a) Number of bond issues



(b) Principal amount ($M)
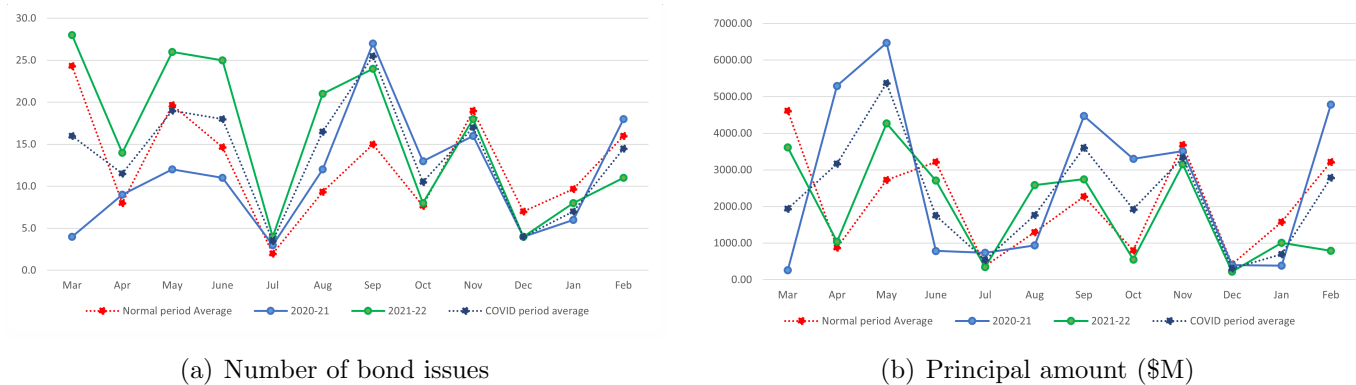
Figure 2: **Bond Issuance: Rating composition**

The top left graph shows the issuer rating composition during the COVID-19 period. The top right graph shows the issue rating composition during the COVID-19 period. The bottom left graph shows the issuer rating composition during the normal period. The bottom right graph shows the issue rating composition during the normal period. Variable definitions are in Table 1.
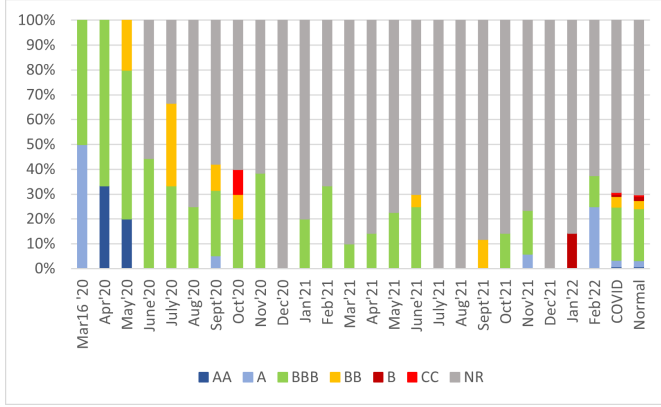


(a) COVID-19: Issuer rating
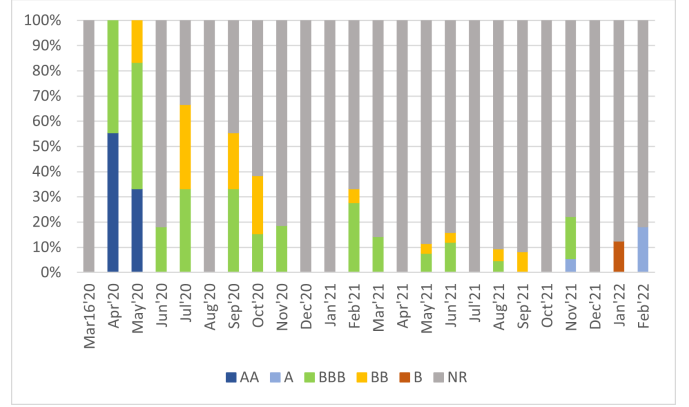


(b) COVID-19: Issue rating
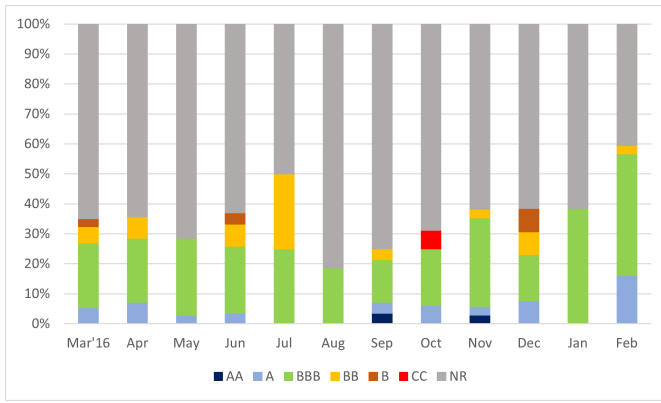


(c) Normal: Issuer rating
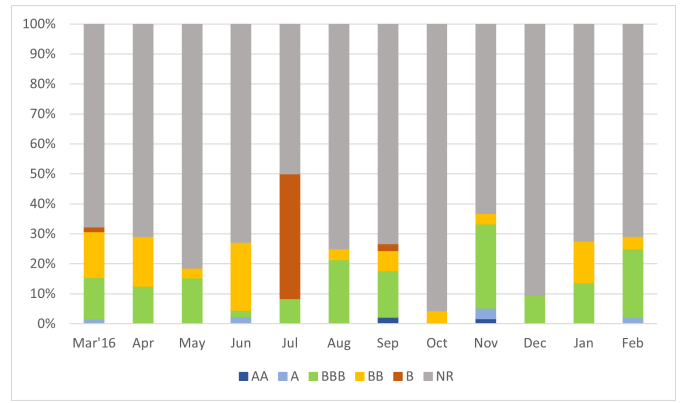


(d) Normal: Issue rating

Figure 3: **Principal Amount ($M): Rating Composition**

The left graph shows the percentage of principal amount ($M) issued by Nordic non-financial firms per rating group during each month of the COVID-19 period respectively. The right graph shows the accumulated principal amount ($M) issued per rating group. Variable definitions are in Table 1.



(a) Capital raised per rating group



(b) Accumulated capital raised per rating group ($M)
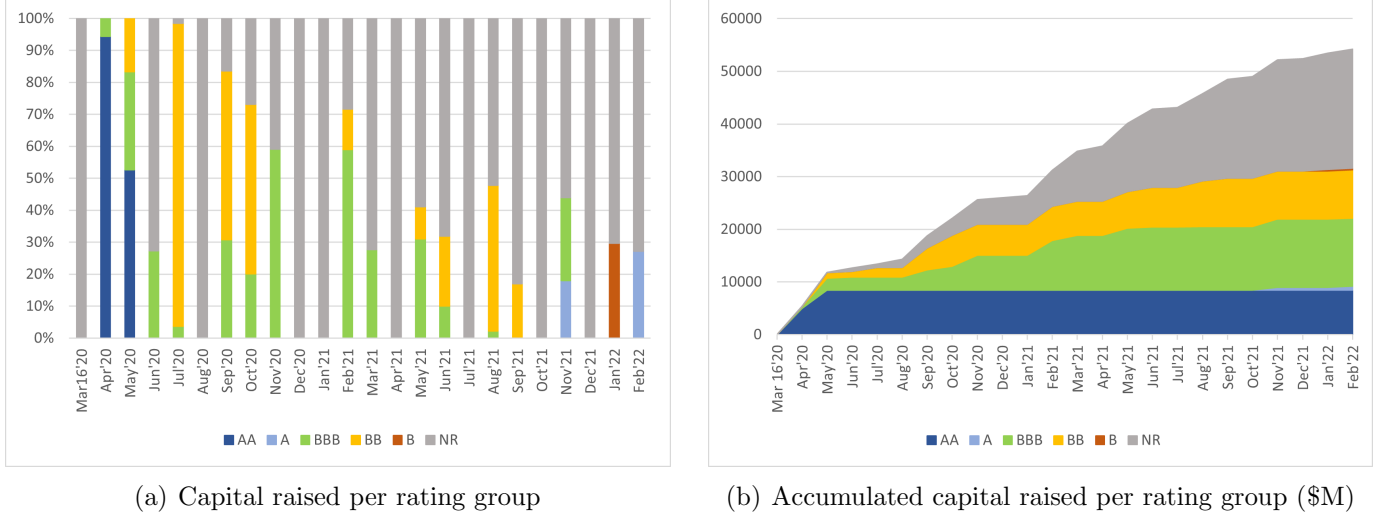
Figure 4: **Bond Issuance: Country**

The left graph shows the percentage of number of bond issues per country during the COVID-19 period. The right graph shows the percentage of principal amount ($M) per country during the COVID-19 period. Variable definitions are in Table 1.



(a) Number of bond issues per country



(b) Principal amount ($M) per country

50
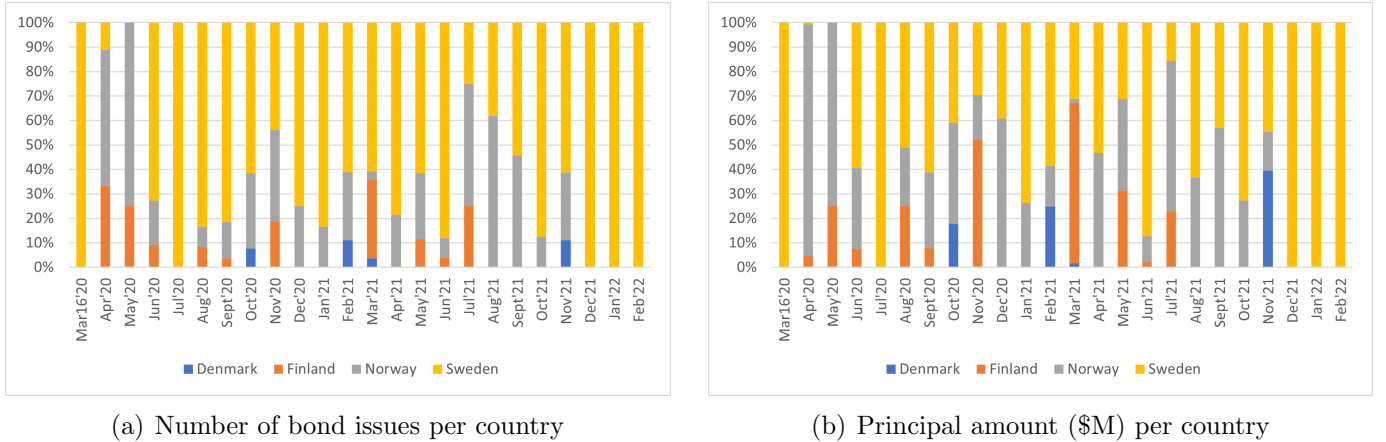
Figure 5: **Principal Amount ($M): Key Industries**

The graphs show the accumulated principal amount ($M) issued by the four key industries: manufacuring, natural resources, real estate, and RRHT (Restaurants, retail, hospitals, and transportation), in the four Nordic countries respectively. Variable definitions are in Table 1.
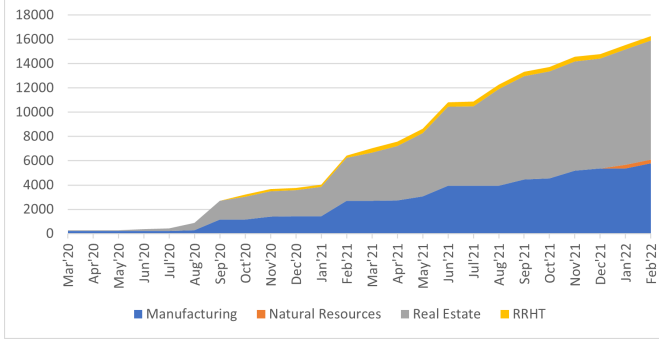


(a) Sweden
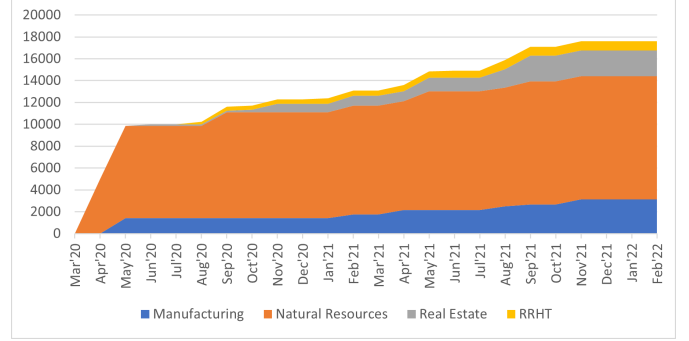


(b) Norway
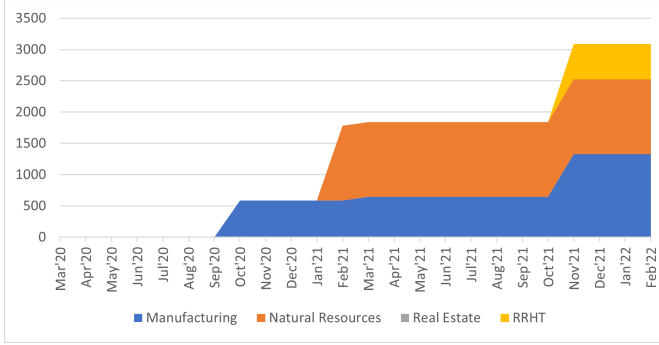


(c) Denmark
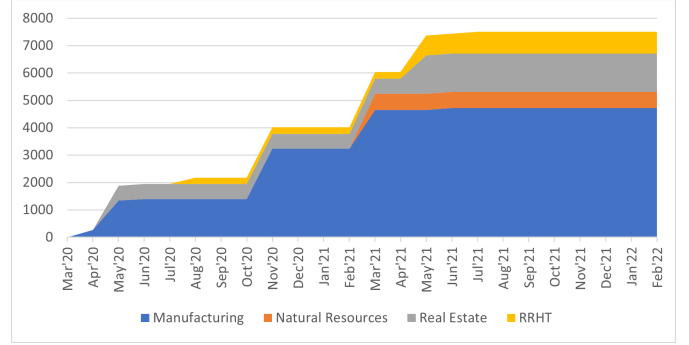


(d) Finland

Figure 6: **Bond Issuance: Currency**

The left graph shows the percentage of number of issues per currency during the COVID-19 period. The right graph shows the percentage of principal amount ($M) per currency during the COVID-19 period. Variable definitions are in Table 1.
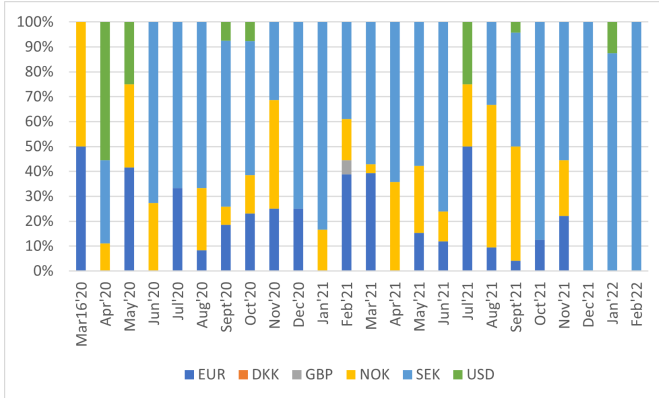


(a) Number of issues per currency
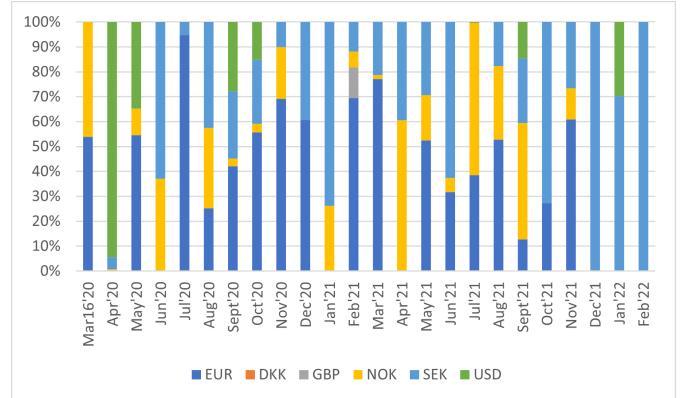


(b) Principal amount ($M) per currency

Figure 7: **Bond Issuance: Coupon and Maturity**

The left graph shows the average coupon rate (%) of bonds issued during the COVID-19 period and the historical average coupon rates (%) of bonds issued by the same issuers. The right graph shows the average maturity (year) of bonds issued during the COVID-19 period and the historical average maturities (year) of bonds issued by the same issuers. Variable definitions are in Table 1.



(a) Coupon

(b) Maturity
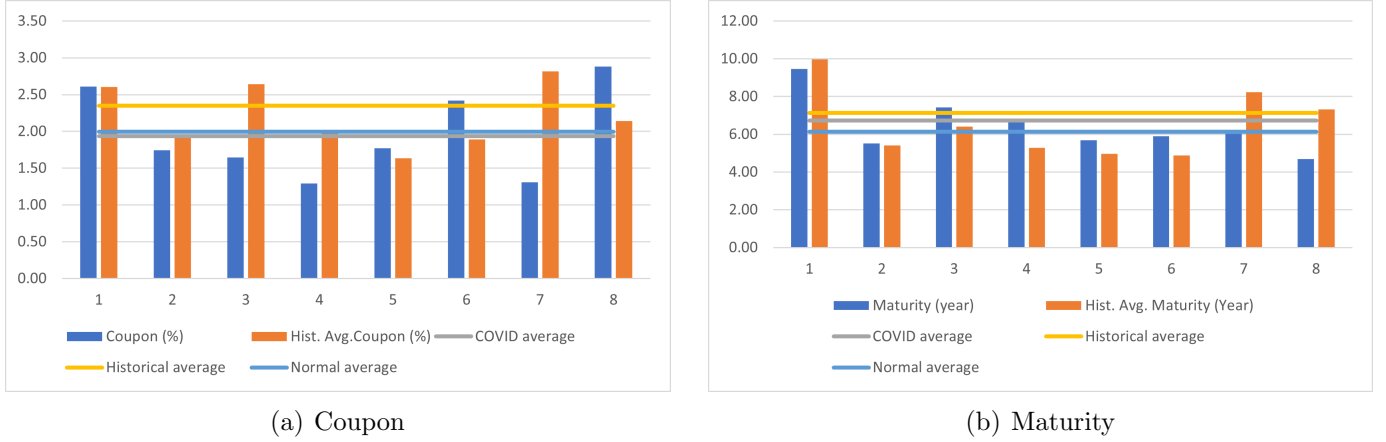
Figure 8: **Spread Analysis: Spread**

This graph shows the average spread (bps) of bonds issued during the COVID-19 period and the historical average spreads (bps) of bonds issued by the same issuers, corresponding to the data used in the regression analysis. Variable definitions are in Table 1.
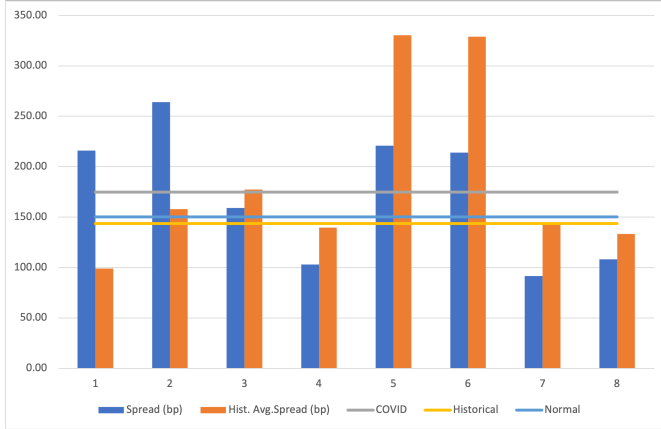
Figure 9: **Spread Analysis: Issuer characteristics**

The graphs show the (a) Net Book Leverage, (b) Size, (c) Profitability, (d) Tangibility and (e) Market-to-Book ratio of the issuers that issued bonds during the COVID-19 period and the same characteristics for issuers that issued bonds in 2019, corresponding to the data used in the regression analysis. Variable definitions are in Table 1.
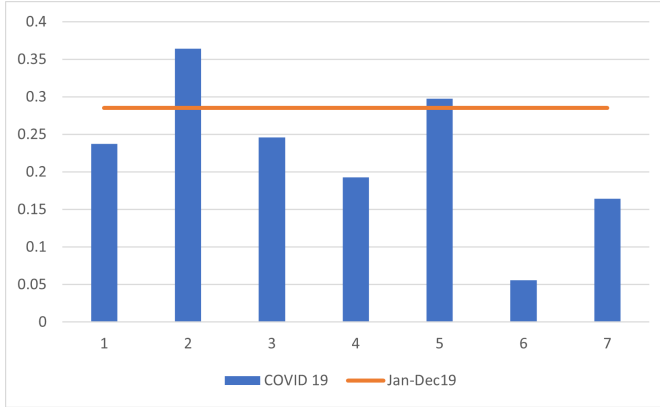


(a) Net Book Leverage
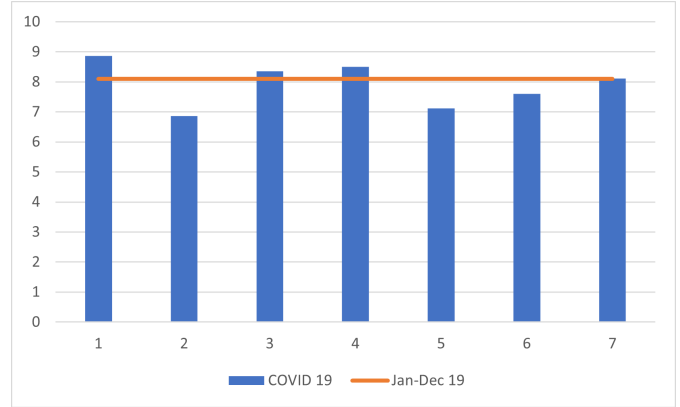


(b) Size
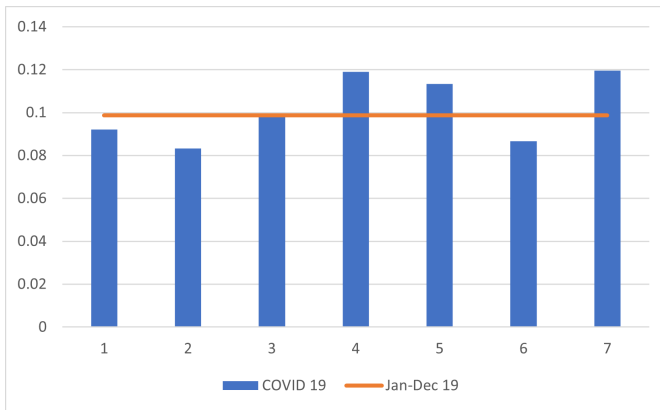


(c) Profitability
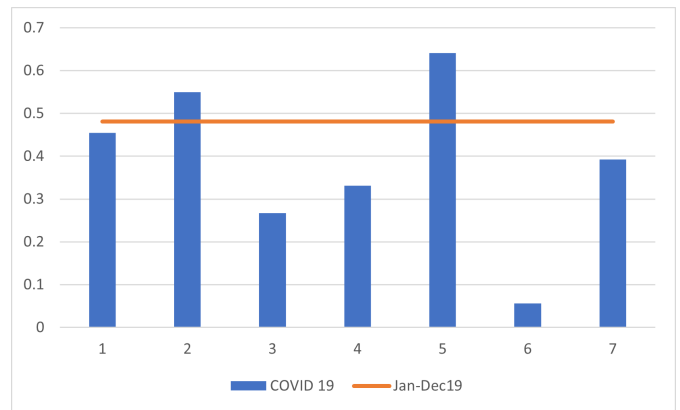


(d) Tangibility
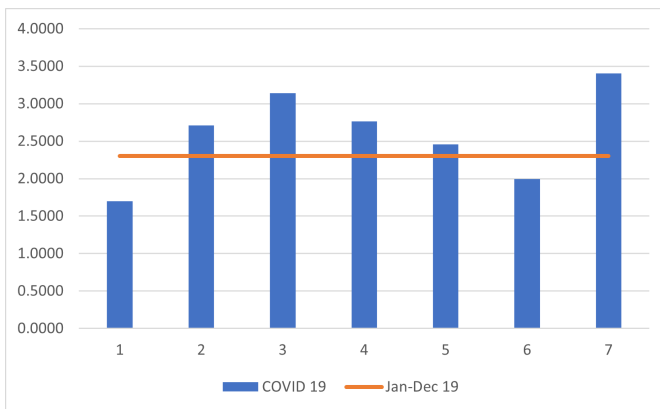


(e) Market-to-Book

Figure 10: **Spread Analysis: Rating composition**
The graphs show information on ratings corresponding to the data used in the regression analysis.
The left graph shows the rating compositions of issuers that issued bonds during the COVID-19
period and during the normal period. The right graph shows the rating compositions of issues
during the COVID-19 period and during the normal period. Variable definitions are in Table 1.
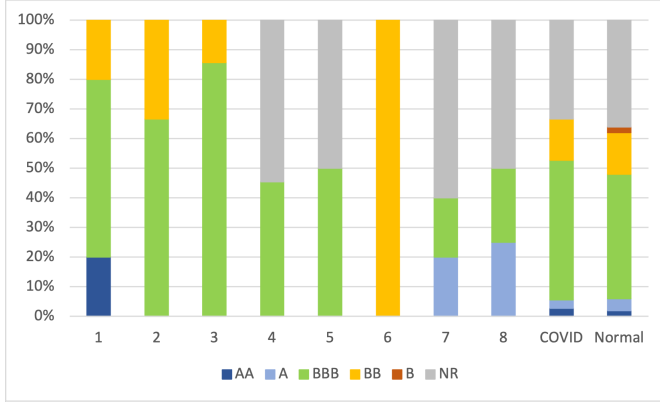


(a) Issuer
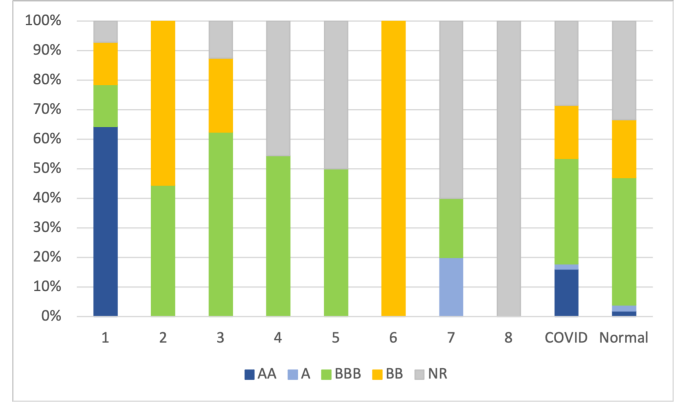
(b) Issue

Figure 11: **Equity Issuance**
The left graph shows the number of equity issues by Nordic non-financial firms, including both
secondary offerings and IPOs. The right graph shows the capital raised ($M) through secondary
offerings and IPOs. Variable definitions are in Table 1.
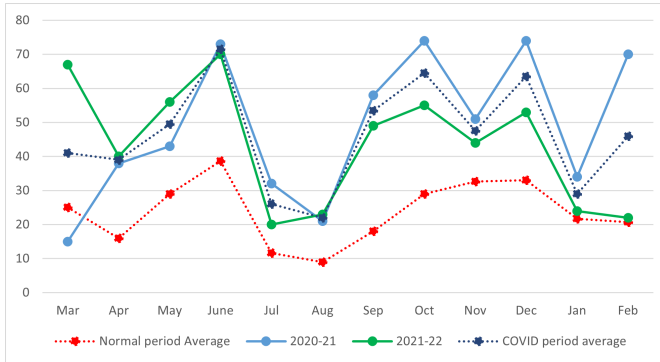


(a) Number of equity issues
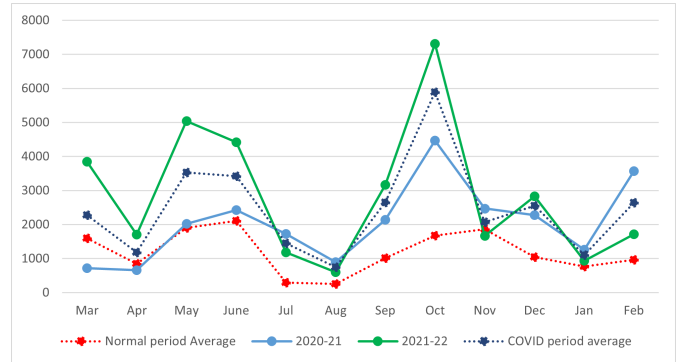
(b) Equity capital raised ($M)

Figure 12: **Equity Issuance: Country**

The left graph shows the percentage of number of equity issues per country during the COVID-19 period. The right graph shows the percentage of equity capital raised ($M) per country during the COVID-19 period. Variable definitions are in Table 1.
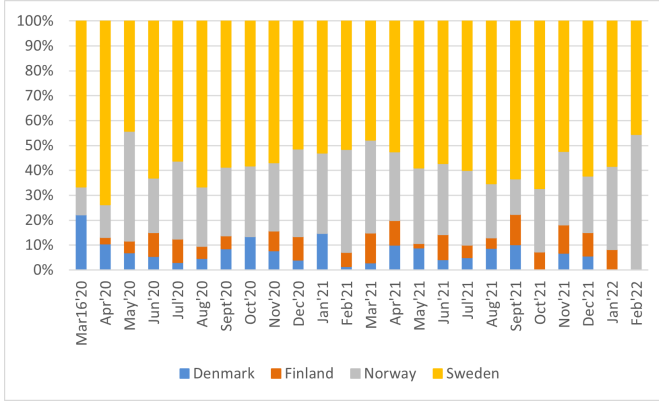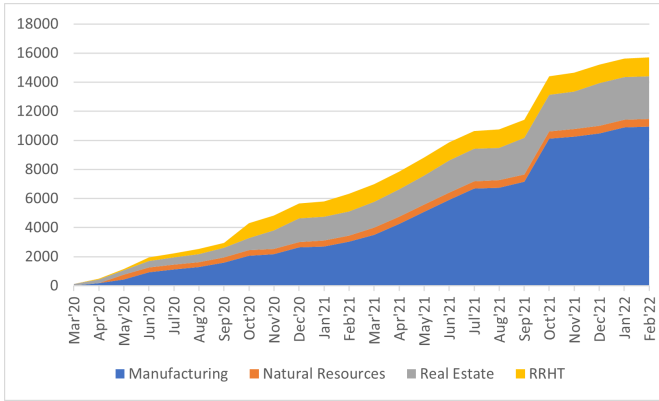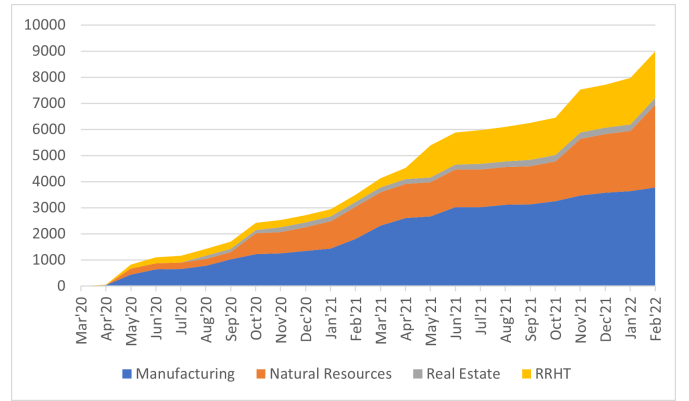


(a) Number of equity issues per country
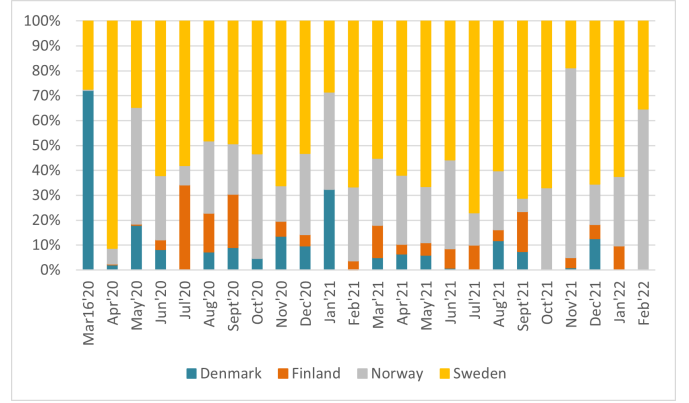


(b) Equity capital raised per country ($M)
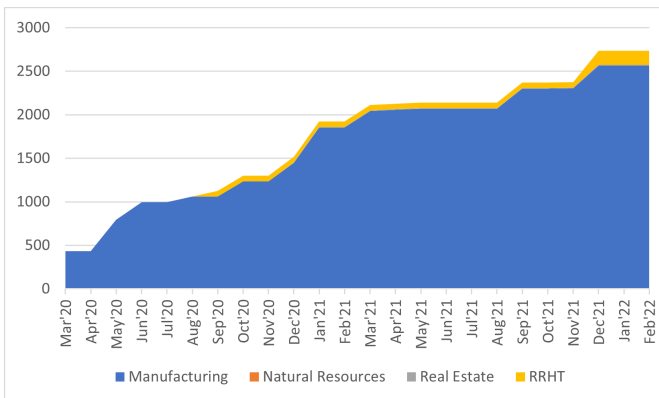
Figure 13: **Equity Capital Raised ($M): Key industries**

The graphs show the accumulated equity capital raised ($M) by the four key industries: manufacturing, natural resources, real estate, and RRHT (Restaurants, retail, hospitals, and transportation), in the four Nordic countries respectively. Variable definitions are in Table 1.
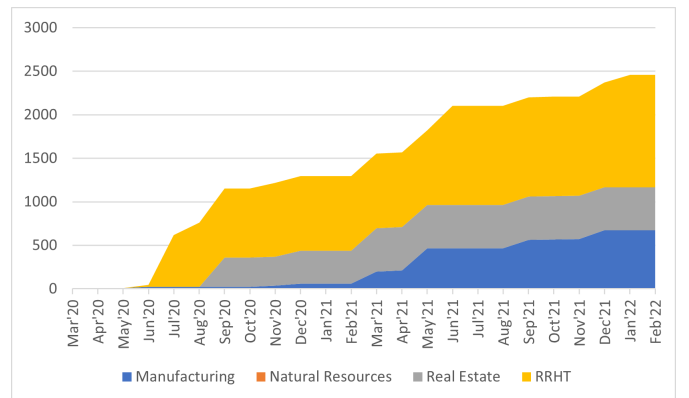


(a) Sweden



(b) Norway



(c) Denmark



(d) Finland