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COVID-19 Impact on Bank Profitability in the Nordic Countries

A study on how lockdown affected Sweden compared to the other Nordic countries

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Abstract

The aim of this study is to investigate the impact of COVID-19 on bank profitability of 16 banks in the Nordic Countries during the period of 2019-2021. This study focuses on comparing the banking sector's financial performance in Sweden to Denmark, Finland, Iceland, and Norway during the COVID-19 pandemic restrictions. Bank data was accumulated from each of the country's leading bank's interim reports, while macroeconomic data such as quarterly GDP per Capita and CPI was retrieved from OECD Statistics and the Federal Reserve Economic Data respectively. Our sample data generates 192 observations for our quantitative analysis. The study is based on the Efficient-Structure theory and a simple panel data multiple regression methodology was followed in order to detect the significance of the independent variables, on the dependent variable "ROE", return on equity. We observe that all bank and macro-specific determinants, apart from bank size, total capital ratio and GDP per capita affect bank profitability significantly. The findings show that COVID-19 (lockdown) has caused a negative impact on bank profitability in the Nordic countries during the pandemic. Beside significant results in terms of ROE for the Islandic banks, our paper shows insignificant results in terms of ROE for banks in Denmark, Norway and Finland compared to banks in Sweden. Governments can use these findings to better cope with the uncreditable external shocks and forecast the right policy implications to support financial sectors.

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1. INTRODUCTION

The COVID-19 pandemic resulted in a remarkable economic contraction in almost every country in the world. According to the World Bank Data, the world annual GDP declined significantly from 2.6% to –3.3% from 2019 to 2020. Fortunately, the world economy is estimated to grow by 5.9% and 4.9% in 2021 and 2022 respectively. However, the 0.1% point lower for 2021 than in the 2022 July forecast can be due to the threat of new variants such as the Delta and Omicron (IMF, 2021). As a result, this slowed down the pace of which the economy can be recovered. At the time of writing this paper, the global economy continues to recover, but its growth rate remains shaped by the pandemic.

The economic consequences of the COVID-19 pandemic posed enormous challenges to the banking sector in Europe. This paper intends to analyze the impact of COVID-19 on the banking sector in the Nordic region. Furthermore, our paper aims to investigate the Nordic region solely, which has rarely been focused on in any research paper. The Nordic countries (Denmark, Iceland, Finland, Norway, and Sweden) are considered role models for governance, and economic stability, yet even such rich market economies with a well-functioning system and a strong economic record may end up in a financial crisis. Therefore, we aim to contribute with this paper's findings to future policy implications that could be of aid to future unforeseeable economic shocks. To elaborate, the shock of the pandemic did not originate in the financial system. It was rather an exogenous shock by the pandemic to the financial system (FSB, 2021). As the pandemic unfolded severe economic challenges, banks got exposed to threats concerning bank profitability, reduction of bank income and major losses due to borrower's inability to repay their debts (The World Bank, 2020).

Given the notable similarities of the Nordic countries, some of them have taken different measures facing the current COVID-19 pandemic. Whereas all the Nordic countries were quick to implement a full-scale lockdown and close their borders, Sweden took an alternative route by keeping public life as "normal" as possible despite the sharp increase in COVID-19 cases. Besides, the Swedish government issued several recommendations to help prevent the spread of Coronavirus, but none of which can be

considered a lockdown. According to Strang (2020), such a strategy might give the impression that "Swedes prioritize the economy over health and human life, or that they are making callous cost-benefit analyses". However, it could be argued that focusing on the health of the Swedish economy could significantly impact the health of the people.

Indeed, banks that are more profitable can better combat the negative shocks and support the stability of the financial system (Athanasoglou, Brissimis & Delis, 2008).

Previous studies have examined the impact of the pandemic as a whole in the financial sector, but no study has looked at the impact of the lockdown restriction on bank profitability at a regional level using return on equity "ROE" as a sole profitability measure, while controlling for bank and macro-specific factors. Therefore, this paper aims to investigate the performance of the banks in Sweden with the performance of the rest of the Nordic countries with regards to their response to COVID-19 of period 2019-2021. The bank specific data was collected from bank interim reports of each quarter, and macroeconomic specific data was collected from OECD Statistics the Federal Reserve Economic Data.

To find out how banks in the Nordic countries performed under the selected period, this paper uses a multiple linear regression model to test the relationship of our independent variables (Lockdown, Total Capital Ratio, Cost-to-Income Ratio, Loans-to-Deposit Ratio, Bank Size, Inflation, and GDP per Capita) with our dependent variable Return on Equity (ROE). Section 1 introduces the COVID-19's economic fallout, following the research problem and the purpose. Section 2 describes the background of COVID-19, and policy and restriction responses in Europe and the Nordic countries, Section 3, describes the efficient-structure theory, and mechanisms of lockdown. Section 4 refers to previous literature and our expectations on the determinants of bank profitability, and motivation as to why our study is important in addition to our contribution. Section 5 contains the methodology of this thesis. Firstly, we introduce the chosen research methods and how data is collected; Secondly, we explain the models and variables used; lastly, we state the hypothesis and demonstrate model used to run the data. Furthermore, section 6 exhibits our results and an interpretation for each variable is given. Finally, section 7 concludes this thesis with an emphasis on our expectation, and we present the limitations of this thesis in addition to policy implications and suggestions for future research.

Thus, this paper will attempt to examine the effect of lockdown on return on equity (ROE), which is one of the main measures of bank profitability by also analyzing several bank-specific and macroeconomic determinants of bank profitability.

2. BACKGROUND

On the 11th of March 2020, The World Health Organization declared the fast-spreading coronavirus disease, also scientifically known as SARS-CoV-2 virus, a global pandemic. People in countries all over the world were affected by this unprecedented health crisis. As of the 7th of March 2022, roughly two years after the outbreak, there has been a total of 445,096,612 confirmed cases and 5,998,301 reported deaths worldwide caused by the coronavirus (WHO, 2022).

To mitigate and contain the spread of the virus, the majority of the governments worldwide took necessary action by imposing different measures and restrictions such as social distancing, national lockdowns, and the closing of non-essential businesses that involve interpersonal contact (Kunt et al., 2021).

As might be expected, these unprecedented measures took a halt on the global economy as economic activity plummeted and led to a global recession. This is evidenced by a sharp decrease in the global GDP to -3.3% in 2020, which is a significant decrease compared to the 2008 global financial crisis, where global GDP growth fell by -1.3% (The World Bank, 2022).

Although the virus originated in the city of Wuhan, China in early December 2019, the pandemic was soon declared a global health emergency including countries with high standard of living, like the Nordic countries.

2.1 POLICY RESPONSES TO COVID-19 IN EUROPE

As a result of the pandemic, most European countries responded with various monetary and fiscal policy measures to shield the financial sector from the pandemic fallout. In particular, fiscal measures supported around one-third of new lending in Europe (ESRB 2021). This was done by granting loans to firms, deferrals of tax, moratoria, and

compulsory payments to ensure liquidity support to households and firms (European Central Bank, 2020). Such measures stabilized lending, hence, ensuring that financial markets could continue functioning, even with high levels of economic uncertainty.

Moreover, the European countries also used monetary policy measures to support the financial system and mitigate the effect of the COVID-19. In 2020, a press release by the Central Bank of Europe announced a new temporary asset purchase programme of €750 billion (PEPP, 2020) which was set to decrease borrowing costs and encourage lending in the euro zone. In addition to that, ECB increased the amount of money available that European banks can borrow through them to aid small and medium-sized firms. In addition, monetary policy measures maintained asset prices stability and enabled funding conditions for banks (ESRB, 2021). Combining these policies at an EU level proved to be effective, thus providing enough support to mitigate the risk of a total economic failure.

2.1 POLICY RESPONSES AND RESTRICTIONS IN THE NORDICS COUNTRIES

Like the majority of countries in Europe, the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) used various fiscal and monetary policy measures to confront the economic crisis caused by COVID-19. However, the countries adopted different strategies in order to mitigate the economic consequences of the pandemic despite the geographical proximity and common roots.

2.2.1 SWEDEN

Sweden's no-lockdown strategy is what makes Sweden stand out from its neighboring Nordic countries. Unlike most countries, which used various preventative measures, Sweden's initial pandemic prevention was slow and insufficient to limit the spread of the virus in the country. Instead of doing a full-scale lockdown, the Swedish government introduced guidelines on how to help flatten the curve such as frequent hand washing, social distancing, banned gatherings, and non-priority travel to name a few (Forbes 2020). This resulted in a global controversy, as the Swedish government leaned towards prioritizing the health of Sweden's economy. Indeed, this led to

relatively higher COVID-19 related deaths and cases than the other Nordic countries (Andersen et al., 2022). Anders Tegnell, the state epidemiologist in Sweden, argued that "this is a disease we must learn to live with… And more and more countries are taking that position, because even with a fantastic vaccine, we can control it, but we cannot eradicate it" (UNHERD, 2021).

As COVID-19 spread rapidly in March, however, there was a decline in the economic activity in Sweden. According to the 2020 spring European Economic Forecast, the real GDP is estimated to fall by around 6% in 2020, however, 2021 is forecast to a strong comeback fueled by private consumption, hence, contributing to the overall recovery of the economy.

Looking at the fiscal policy measures, the Swedish government introduced capital injections, liquidity support and guarantees aggregate to SEK 803 billion (IMF, 2021) Some measures include i) additional expenditures on wage subsidies for short-term leave; ii) temporarily more generous unemployment benefits, and iii) tax deferral (IMF, 2021). With respect to monetary policy measures, the Riksbank introduced a new and large-scale asset purchase program in early 2020, lowered interest rates on loans, and lending operations to banks (Andersen et al., 2022).

2.2.2 OTHER NORDIC COUNTRIES

Among the Nordic countries, Denmark, Iceland, Finland, and Norway implemented stricter measures to contain the pandemic. To support, Norway sent employees home, switched to home schooling, and closed its borders. Similarly, Denmark proceeded with closing public organizations such as schools. In addition, Finland was quickly to declare a state of emergency in the country during the first half of 2020 and implement a fullscale lockdown. Moreover, the Icelandic government responded with restrictions and quarantine. However, the country never closed its borders completely. This is because tourism is one of the main pillars of the Icelandic economy. Instead, travelers were able to visit Iceland under the condition for self-quarantine for 14 days on arrival (Guide to Iceland, 2022).

Fiscal policy measures were used to support the loss of income for firms and households. In particular, the Nordic countries made decisions on several discretionary

fiscal measures to mitigate the impact of COVID-19. Some measures include i) expenditure measures such as temporary layoffs, more generous unemployment benefits; ii) revenues measures such as lowering of reduced VAT rate, and deferral of various tax payments; iii) temporary liquidity measures such as tax deferrals, and government guarantees (IMF, 2021).

Monetary policy measures increased liquidity and provided support to firms and households with higher insolvency. The central bank of each Nordic country used their own appropriate measures in the acute phase of the crisis for. In Denmark, the Danish kroner is pegged to the Euro, which limits the use of monetary policy measures. However, the Danish government introduced Swap lines and credit facility to banking sector to avoid liquidity deficiency in the financial system. The Central Bank of Iceland (CBI) reduced deposit institutions' average reserve requirements from 2% to 1% to support liquidity relief. Additionally, CBI reduced the countercyclical capital buffer from 2% to 0% (IMF, 2021). Finland is a part of the Euro area, so it was eligible for the monetary policy regime by The European Central Bank (ECB). Most notable being the new asset purchase program PEPP of 1,850 billion euro introduced to lower costs of borrowing and increase lending in the economy of Euro area. In Norway, the main monetary policy instrument was in the reduction of interest rate to 1% at the on onset of the COVID-19 crisis and gradually reduce it to 0%. In addition to that, the provision of additional liquidity, and less restrictive regulations on collateral were introduced.

Altogether, the implementation of both fiscal and monetary policy measures as well as unconventional policies in the Nordic countries were crucial to mitigate economic fallout and using either one or another could have deepened the recession (Andersen et al., 2022).

3. PROFITABILITY THEORY

In this section, we will discuss a relevant theory that relates to our research topic in which we can refer to and create our own frame of reference.

The efficient-structure theory includes two hypotheses which are the X-efficiency and scale efficiency hypotheses (Jeon & Miller, 2005). The X-efficiency hypothesis states

that banks can raise more profit by having better management skills to control and manage cost levels. Scale efficiency on the other hand argues that banks that are scaleefficient tend to have lower costs and hence increase their profitability levels.

The former hypothesis, X-efficiency, is the most fitting to our topic since COVID-19 might have influenced the banks' cost and income levels, and therefore, decreased their bank profitability. We can expect that banks might have had some difficulties managing and adjusting cost levels considering the emergence of the pandemic as it was an unprecedented external shock. Moreover, bank revenue levels are also anticipated to decrease as the typical economic activity declined, affecting all business sectors. Consequently, an increase in bank cost levels and a decrease in bank income levels will result in a larger cost-to-income ratio which results in banks being less efficient.

The lockdown enforcement is predicted to have worsened economic activity even more, as people, who are important economic agents, decreased their personal consumption as they were urged to stay home and social distance. Also, we can expect that in times of crisis, people will have no incentive to spend more money due to uncertainty. This of course would also apply to the banking sector as it does to other business sectors.

According to Hladika (2021), there has been a significant decrease in the demand for products and services within the banking sector due to the pandemic. This of course will affect the banks' operations and will subsequently decrease operating revenues (Hladika, 2021).

Additionally, the volume of bank transactions, card payments and the use of ATM cash machines have experienced a decline worldwide due to the emergence of the pandemic (Ozili & Arun, 2020). As a result, bank profits have declined due to a fall in fees collected by the banks. Apart from a decrease in profitability, the spillover of the pandemic to the banking sector also resulted in high exposure to credit risk as nonperforming loans (NPL) grew by 25% (Ozili & Arun, 2020). As a result, this will affect the banks' profitability levels.

A decrease in a bank's cost-to-income ratio, which means that income is greater than costs, implies that there is an increase in efficiency and therefore higher profitability. On the contrary, an increase in a bank's cost-to-income ratio, which means that costs are

larger than income, implies that there is a decrease in efficiency hence a decrease in profitability.

4. LITERATURE REVIEW

This section of the research paper aims to point out the important findings and results of previous empirical studies concerning the determinants of bank profitability within different countries and time periods. To clarify, bank profitability is a measure that uses the universal determinants regardless of what country banks operate in. Therefore, the bank–specific determinants macroeconomic determinants expected impact on ROE in the Nordic countriees in this paper will be based on the common results of the following previous studies

4.1 PREVIOUS EMPIRICAL STUDIES

Bank profitability is the most common used factor measuring bank performance, in comparison to efficiency, liquidity, credit risk performance and solvency. (Gunnarsdóttir & Mostepan, 2013).

Bank profitability can be determined by internal factors which are the bank–specific determinants and external factors like macroeconomic determinants which are unrelated to bank management but can have an impact on bank profitability during certain circumstances. As for the measure of bank profitability, the vast majority of previous studies have used either return on assets (ROA) or return on equity (ROE), or both.

Elnahas, Trinh & Li (2021) examined the impact of the pandemic on global banking stability. A total of 1090 banks from 116 countries were analyzed from the first quarter of 2019 to the second quarter of 2020. What was discovered is that the COVID-19 outbreak has significantly reduced bank profitability as well as other key factors such as cost efficiency, financial stability, and stock-market valuations. This research was done by examining the effects on banks' accounting-based, market-based, and risk-based performance measures before and after the emergence of the pandemic. Return on assets (ROA), return on equity (ROE), return on average assets (ROAA) and return on average equity (ROAE) are all accounting-based performance indicators that measure how profitable a bank is. According to Elnahas et al, the higher the indicators are, the higher

a bank's profitability level is. Some control variables used in this research are bank specific factors including bank size (log total assets), bank age and financial leverage as well as a macro-economic factor being GDP per capita.

The preliminary result of their paper is that the means for the ratios of ROA and ROE plummeted within the first two quarters of 2020. The results also showed that during the emergence of the global pandemic, the banking sector was confronted with higher insolvency risk which indicates that the banks could face difficulties sustaining financial stability. Furthermore, the cost efficiency of the banking sector has also declined as the mean ratio of the cost/income ratio has increased, meaning that cost levels overpowered income levels. As for one the control variables, the value of total assets in the global banking sector, which influences bank size, experienced a significant drop in the first quarter of 2020. The coefficient of bank size was found to be significantly and positively associated with ROE but significantly and negatively associated with ROA. Furthermore, Elnahas, Trinh & Li (2021) conducted an additional test to compare the effects of COVID-19 on bank profitability on larger banks and smaller banks. The results show that despite the differences in size, both large and small banks have been severely affected by the pandemic as the coefficients of COVID-19 associated with ROA and ROE are negatively significant. As for the macroeconomic factor, GDP per capita (log GDP per capita), the research paper found that GDP per capita is positively and significantly associated with ROA and ROE.

From a different angle, Hladika (2021) investigates and analyzes the impact of COVID19 on the quality of loans, the calculation of expected credit losses and provisions, and profitability of the banking sector in Croatia. The author of this paper explains how the shock of the virus outbreak deteriorated the global economy and caused systemic risk to the global financial system due to the uncertainty of the pandemic's duration and development. The results of this paper find that the impact of the pandemic has been significant on bank profitability in Croatia. Total profit decreased tremendously in 2020 in comparison to 2019, where profits generated in the banking sector of Croatia were 53.1% less than profit levels generated in 2019 prior to the pandemic (Hladika, 2021). In particular, ROAA and ROAE declined by 1% and 5.5% respectively.

Another study by Dong (2021) examined the impact of the COVID-19 pandemic on the banking sector of China and the U.S. ROA was used as a measure of bank profitability while capital adequacy ratio, non-performing loan ratio, efficiency ratio and loan-to-deposit ratio were all used as bank-specific determinants. The results of the OLS regression model showed that the COVID-19 variable had a significant and negative impact on ROA of both US and Chinese banks. The capital adequacy ratio (CAR) was found to have a positive and significant effect on the ROA of US and Chinese banks which the author explains that higher CAR means the more efficient and profitable a bank is. In addition to that, the efficiency ratio (cost-to-income ratio) had a negative and significant relation to ROA of the banks of both countries.

Another research paper examines the profitability determinants using a sample of 16 banks in the Macedonian Banking Sector within the periods of 2005 till 2010 (Ćurak et al., 2012). Bankspecific, industry-specific as well as macroeconomic were used to determine the effects on bank profitability levels during the transformation of the Macedonian banking system driven by changes in the banking regulations, consolidation, entry of foreign banks and changes in bank activities and performances (Ćurak et al., 2012). Liquidity risk, which is a percentage of total loans to total deposits, is one of the factors analyzed within this paper. A smaller loans-to-deposits ratio implies higher liquidity levels due to higher levels of liquid assets. However, liquid assets do not have high returns, which could negatively influence profitability levels (Ćurak et al., 2012). This denotes that the higher the loans to deposits ratio, which means the less liquid assets a bank holds, the higher the profitability levels are. Therefore, the loans-to-deposits ratio and bank profitability levels have a positive relationship. GDP growth which was used as a macroeconomic determinant resulted in a positive and significant outcome. The authors of this paper explain that during cyclical growth, one can expect demand for lending to increase which is expected to increase bank profitability. On the contrary, when a country is undergoing a sort of crisis that causes adverse macroeconomic conditions, banks may suffer a decrease of profits due to risk of increase in nonperforming loans (Ćurak et al., 2012).

Bank size is another commonly used bank specific factor that was chosen as one of the determinants of bank profitability within the referred study. Larger banks tend to have the advantage of economies of scale in certain transactions which could indicate higher

profits (Ćurak et al., 2012). On the other hand, there actually seems to be a negative relation between bank size and profitability which could be explained by diseconomies of scale which could be the case after larger banks experience periods of accelerated growth (Košak & Čok 2008).

In the findings of the authors' paper, it is apparent that size has no important impact on the profitability levels of the Macedonian banks (Ćurak et al., 2012). The authors support this finding with previous empirical research done by Goddard, Molyneux and Wilson (2004) in which bank size also seemed to have an insignificant effect on profitability measured by ROE. Given the various findings of the different research papers, the relationship between bank size and profitability is rather ambiguous.

Islam & Rana (2017) conducted a panel data analysis to examine the internal determinants that influence bank profitability concerning 15 selected private commercial banks in Bangladesh during the years from 2005 up until 2015. Their study focuses on 6 different bank specific factors consisting of the nonperforming loan ratio, cost to income ratio, loan to deposit ratio, commission fees, cost of fund and lastly operating expenses. What was discovered in the results of the analysis using a random effects model with robust estimation is that the cost to income ratio seems to affect ROA negatively and significantly but on the other hand, the cost to income ratio had a different effect on ROE where it was positively insignificant. Moreover, the results of the analysis indicate that the loans-to-deposits ratio has a positive yet insignificant effect on both measures of bank profitability, ROA and ROE (Islam & Rana, 2017).

Another study conducted by Boadi, Li and Lartey (2016) aims to determine the bank specific, macroeconomic and risk determinants of bank profitability of 114 rural and community banks in Ghana during the period 2005-2013 using a fixed effects panel regression analysis. Bank size, capital adequacy, liquidity management, GDP growth rate and inflation are some of the factors used to determine the ROA of the banks. The results of their regression show that capital adequacy has a positive and significant effect on profitability which is consistent with another study conducted by Athanasoglou et al. (2008) where capital also had a positive and significant relationship with profitability of Greek banks. Referring back to Boadi, Li and Lartey (2016), bank size measured by the natural logarithm of the banks' total assets revealed to have no

significant impact on profitability. As for inflation, it had a negative and significant impact on bank profitability of the rural and community banks of Ghana. The authors of this study explain that this could be the case when banks fail to anticipate future inflation which eventually affects their profitability levels due to unadjusted interest on loans (Boadi, Li and Lartey, 2016).

Ercegovac, Klinac & Zdrilić (2020) examine bank profitability of EU banks after the 2007 financial crisis. ROA and ROE were both used as measures of bank profitability, and factors consisting of bank size, non-performing loans ratio, regulatory capital ratio and cost-to-income ratio were chosen as the determinants. The results of the dynamic panel regression model using the Generalized method of moments (GMM) estimator show that the cost-to-income ratio, which measures the efficiency of a bank, has a negative and significant effect on ROE and ROA. Moreover, bank size (natural logarithm of total assets) gives a positive yet insignificant result. As for the regulatory capital ratio, which is another term for the total capital ratio, the results of the panel analysis show a positive yet insignificant impact on bank profitability.

Taking into consideration the various findings of previous research studies on the determinants of bank profitability, we expect the following results from our own analysis:

- *Total capital ratio* = **positive** relationship with ROE because the more capital a bank holds, the more efficient and profitable the bank is – supported by studies done by Dong (2021), Boadi, Li and Lartey (2016), Athanasoglou et al. (2008).

- *Cost-to-income ratio* = **negative** relationship with ROE because the higher the ratio is, the more costs a bank incurs and the less income it receives. This of course will cause the bank to be less efficient and decrease profits – supported by studies done by Dong (2021), Ercegovac, Klinac & Zdrilić (2020).

- *Loans-to-deposits ratio* = **positive** relationship with ROE because a higher ratio means that the bank holds fewer liquid assets which means the higher the profitability as liquid assets have low returns – supported by studies done by Islam & Rana (2017), Ćurak et al (2012).

- *Bank size* = **ambiguous (positive/negative)** relationship with ROE – supported by studies done by Elnahas, Trinh & Li (2021), Ćurak et al (2012), Boadi, Li and Lartey (2016).

- *GDP per capita* = **positive** relationship with ROE because we can expect that when GDP increases, demand for bank services increases, investment and consumption increase and vice versa – supported by studies done by Elnahas, Trinh & Li (2021), Ćurak et al (2012).

- *Inflation (CPI)* = **negative** relationship with inflation, especially if inflation is unanticipated and interest rates on loans have yet to be adjusted– supported by studies done by Boadi, Li and Lartey (2016).

The main contribution of this study is that it analyzes the impact of COVID-19, specifically during the presence of lockdown, on bank profitability while controlling for other bank and macroeconomic-specific determinants that also appear to be important factors. We believe that bank profitability matters for a country's financial stability, but that stability may become disrupted when a sudden shock hits the economy. That is, banks can become distressed as repayment of loans by businesses and households suddenly decline, resulting in a major credit source loss for the economy (Perkins et al., 2020). Thus, understanding the impact of lockdown on bank financial management may enhance banks' ability to maintain stable profitability in times of crisis.

5. DATA AND EMPIRICAL ESTIMATIONS

In this paper, a sample of the largest 16 banks from the Nordic countries (Denmark, Iceland, Finland, Norway, and Sweden) is studied, covering quarterly data from year 2019 till year 2021 and generating a total of 192 observations. Primarily data was collected through banks' interim reports, specifically the balance sheets, income

statements and key ratio figures. As for the macroeconomic determinants, quarterly GDP per capita was retrieved from OECD Statistics and quarterly CPI was retrieved from Federal Reserve Economic Data. The following banks chosen for each country are:

Denmark: Danske Bank, Nykredit, Sydbank

Iceland: Landsbankinn, Islandsbank, Arion Bank

Finland: OP Financial Group, Ålandsbanken, Aktia Bank Group

Norway: DNB, Sparebank 1 SR Bank, Storebrand

Sweden: Swedbank, SEB, Nordea, Handelsbanken

The banks above are considered the leading and largest banks in each of the Nordic countries. The banks selected for our sample were based on annual revenues, number of branches and ATM locations as well as the number of customers with active accounts.

5.1 DEPENDENT VARIABLE

As mentioned in the introduction, Return on Equity (ROE) is an important measure of bank profitability and a signal of a bank's health.
Therefore, the dependent variable will be bank profitability measured by Return on Equity. As pointed out by Berzkalne and Zelgalve (2014), ROE is a ratio that refers to how much profit banks make for every monetary unit of equity invested in banks and is displayed as a percentage. Generally speaking, the higher a return on equity is, the better because it is an indicator of how much a bank's capital is being reinvested. To calculate ROE, the following formula is used:

$$\text{Return on Equity Formula (ROE)} = \frac{Net\ Income}{Sharehoulder's\ Equity}$$

5.2 INDEPENDENT VARIABLES

The main *independent variable* is the variable *"Lockdown"*, created to determine the level of the restrictions imposed in the Nordic countries during our time period 2019 – 2021 and ranges from 0 to 3. As expressed in the table below, the value "0" indicate the period of pre COVID-19. Therefore, the whole quarters of 2019 for all the Nordic countries are equal to "0". The value "1" indicates the presence of COVID-19 but no lockdown; This is a case unique to Sweden since it is the only country to avoid lockdown. The value "2" indicate a lockdown but with normal restrictions, while the value "3" indicate a lockdown but with stringent restrictions. In the case of the Nordic countries, all countries except for Sweden hold a value equal to "3" during the first quarter of 2020 but change to value "2" during the last three quarters of 2020 and the entire year of 2021.

		Sweden	Denmark	Norway	Finland	Iceland
No COVID-19	2019 Q1	0	0	0	0	0
	2019 Q2	0	0	0	0	0
	2019 Q3	0	0	0	0	0
	2019 Q4	0	0	0	0	0
COVID-19	2020 Q1	1	3	3	3	3
	2020 Q2	1	2	2	2	2
	2020 Q3	1	2	2	2	2
	2020 Q4	1	2	2	2	2
	2021 Q1	1	2	2	2	2
	2021 Q2	1	2	2	2	2
	2021 Q3	1	2	2	2	2
	2021 Q4	1	2	2	2	2

Table 1 – Lockdown severity for each country during each quarter in the years 2019-2021

Furthermore, we will use *control variables* consisting of the following factors:

Bank-specific factors:

Total Capital ratio (TCR)	Calculated by dividing total capital (tier 1 capital + tier 2 capital) held by a bank by its risk-weighted assets, expressed in percentage
Cost-to-income ratio (CI)	Calculated by dividing the operating costs by the operating income
Loan/Deposit Ratio (LD)	Calculated by dividing total loans by the total deposits
Bank Size (logtotalassets)	Is measured as the natural logarithm of the value of total assets in an expressed currency

*Macroeconomic factors***:**

Inflation (CPI)	Consumer Price Index, 2015 = 100
GDP per Capita (logGDPperCp)	Calculated by dividing a country's GDP by its total population

5.3 DUMMY VARIABLES

We chose a dummy variable for each Nordic country, bearing in mind that Sweden is the base category, in order to account for differences between the countries in terms of ROE throughout the whole time period. Next, we chose a dummy variable for *quarters* taking value 1 to 4 for each quarter. Finally, we chose a dummy variable for *year* to

control for factors changing each year that are common to all Nordic countries for a given year, in which the year 2019 is chosen as the base category.

6. METHODOLOGY

6.1 HYPOTHESIS

The quantitative analysis of this research paper will be completed using panel data multiple linear regression using STATA in order to study the coefficients and significance of the independent variable and the control variables on the dependent variable. By doing so, we can then answer our research question and test the hypothesis of whether the pandemic, specifically LOCKDOWN, had an impact on the bank profitability of the Nordic countries and if Sweden performed better than its neighboring countries during the entire period of 2019-2021. Additionally, we did a placebo test which is a robustness check to see whether we would get different results when altering the LOCKDOWN variable. What we did is assume that lockdown happened in 2019 instead of 2020.

Lockdown is our main independent variable and we expect it to have a negative impact on profitability. We predict this outcome because the emergence of the pandemic was an exogenous and unprecedented shock to the economy and the banking sector. As we have discussed above in the theory section, we expect lockdown to have affected bank profitability through the decrease in economic activity which of course will result in a decrease in demand of banking services as well as demand for goods and services from other business sectors.

Hypothesis 1 (H1): COVID-19 (lockdown) had a negative impact on bank profitability in the Nordic countries.

Hypothesis 2 (H2): Swedish banks performed better than other banks in the Nordic countries, on average during the whole time period.

6.2 MULTIPLE LINEAR REGRESSION

$\text{ROE} = \beta_0 + \beta_1\,\text{LOCKDOWN} + \beta_2\,\text{TCR} + \beta_3\,\text{CI} + \beta_4\,\text{LD} + \beta_5\,\text{logtotalassets} + \beta_6\,\text{logGDPperCp} + \beta_7\,\text{CPI} + \beta_8\,\text{Norway} + \beta_9\,\text{Denmark} + \beta_{10}\,\text{Finland} + \beta_{11}\,\text{Iceland} + \beta_{12}\,\text{Quarter2} + \beta_{13}\,\text{Quarter3} + \beta_{14}\,\text{Quarter4} + \beta_{15}\,2020 + \beta_{16}\,2021 + \varepsilon$

- β_0 is the intercept

- β_1 is the coefficient of the independent variable (LOCKDOWN)

- β_2 is the coefficient of the Total Capital Ratio (TCR)

- β_3 is the coefficient of the Cost-to-Income ratio (CI)

- β_4 is the coefficient of the Loans-to-Deposits ratio (LD)

- β_5 is the coefficient of Bank Size (logtotalassets)

- β_6 is the coefficient of GDP per Capita (logGDPperCp)

- β_7 is the coefficient of Inflation (CPI)

- β_8 is the coefficient of the dummy variable for Norway

- β_9 is the coefficient of the dummy variable for Denmark

- β_{10} is the coefficient of the dummy variable for Finland

- β_{11} is the coefficient of the dummy variable for Iceland

- β_{12} is the coefficient of the dummy variable for Quarter2

- β_{13} is the coefficient of the dummy variable for Quarter3

- β_{14} is the coefficient of the dummy variable for Quarter4

- β_{15} is the coefficient of the dummy variable for the year 2020

- β_{16} is the coefficient of the dummy variable for the year 2021

- ε is the error term

7. RESULTS AND ANALYSIS

7.1 THE MAIN MODEL

Linear regression

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LOCKDOWN	-1.972	.856	-2.30	.023	-3.662	-.281	**
TCR	-.169	.112	-1.51	.133	-.389	.052	

CI	-.125	.025	-5.07	0	-.173	-.076	***
LD	-.018	.007	-2.60	.01	-.032	-.004	**
logtotalassets	-.447	.288	-1.55	.123	-1.015	.122	
logGDPperCp	-17.492	12.69	-1.38	.17	-42.537	7.554	
CPI	.873	.259	3.37	.001	.361	1.384	***
Norway	-3.647	3.184	-1.15	.254	-9.931	2.637	
Denmark	2.121	1.485	1.43	.155	-.81	5.053	
Finland	-.493	2.703	-0.18	.856	-5.828	4.842	
Iceland	-10.224	2.549	-4.01	0	-15.255	-5.193	***
2019b	0	.	.	.	.	.	
2020	.239	1.87	0.13	.899	-3.452	3.93	
2021	1.688	1.67	1.01	.314	-1.608	4.983	
Quarter : base 1	0	.	.	.	.	.	
2	.458	.747	0.61	.541	-1.017	1.933	
3	-.064	.841	-0.08	.939	-1.723	1.595	
4	.527	.984	0.54	.593	-1.416	2.47	
Constant	132.471	149.823	0.88	.378	-163.222	428.164	

Mean dependent var	9.136	SD dependent var	4.549
R-squared	0.519	Number of obs	192
F-test	11.780	Prob > F	0.000
Akaike crit. (AIC)	1019.225	Bayesian crit. (BIC)	1074.603

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 2 – Linear Regression results

We used the Breusch/Pagan-Cook-Weisberg test for heteroskedasticity on our model to confirm that we have constant variance. Referring to appendix 2, the p-value resulted in 0.2134 which is insignificant at every alpha level (1%, 5%, 10%). We therefore can ascertain the claim that our error term has no heteroskedasticity.

We also used the Wooldridge-test for autocorrelation in panel data to check for autocorrelation. Referring to appendix 3, the p-value (0.1861) appears insignificant at every alpha level (1%, 5%, 10%) which means that we can confirm that there is no firstorder autocorrelation.

R-squared, which is the coefficient of determination, has a value of 0.519. This means that approximately 52% of the variation of ROE are explained by our regression model.

The p-value for "LOCKDOWN" is significant at value of $0.023 < 0.05$ and 0.1 and negative at a coefficient of -1.972 with respect to ROE. To further elaborate, this implies that the banks of the countries that enforced a national lockdown experienced a decrease in ROE by approximately 2 units. These results support the first hypothesis 1 that COVID-19 (lockdown) had a negative impact on bank profitability in the Nordic countries. Therefore, "LOCKDOWN" has a negative impact over the ROE, thus, we accept the first hypothesis (H1). This confirms our expectations that lockdown has had a negative impact on the banks' profitability, specifically ROE. As we've discussed earlier in our paper, we anticipated that national lockdown would deteriorate economic activity even more because of social distancing and decrease in consumption.

As for our control variables, Total Capital Ratio (TCR) is negatively insignificant in relation to ROE at a value of –0.169. Capital Adequacy is insignificant and therefore it cannot explain the dependent variable (ROE). We believe that the insignificance is resulted due to using a small sample size that is rather insufficient in explaining the variation. In this case, we used a time period of 3 years while previous study done by Boadi, Li and Lartey (2016) used a 9-year period which allowed significant results.

As for the CI ratio, it has a negative and significant effect on ROE at a value of –0.125 which implies that a 1% increase in the cost-to-income ratio results in a 12.5% decrease in ROE. This result supports the findings of Ercegovac, Klinac & Zdrilić (2020) that examined the relationship between the cost-to-income ratio and ROE. As discussed in the theory section, this is an expected relationship as cost-to-income ratio increases which decreases bank efficiency and therefore, causes a decrease in bank profitability (ROE).

Furthermore, the LD ratio has a negative coefficient of –0.018 and significant effect on ROE which indicates that a 1% increase in the loans-to-deposits ratio results in a 1.8% decrease in ROE. This outcome is rather inconsistent with the studies conducted by Islam & Rana (2017) and Ćurak et al (2012). In their study, loans-to-deposits ratio is expected to have a positive and significant relationship with bank profitability because the higher the ratio, the less holdings of liquid assets, indicating higher profitability. However, a negative relationship between the loans-to-deposits ratio and ROE could arise if there is higher loans-to-deposits ratio — loans are greater than the bank's

deposits. Although loans are classified as assets for the banks, they could be a liability if they are considered bad loans (a bad loan or a non-performing loan - arises when the borrower is no longer meeting with the terms of the loan). As a result, this could negatively affect profitability. Moreover, a higher loans-to-deposits ratio also indicates lower bank deposits, which decreases profitability as banks have less money to lend and earn interest on.

The last bank-specific factor, which is bank size (logtotalassets), has a negative coefficient yet is insignificant which is consistent with the findings of Goddard, Molyneux and Wilson (2004) which they also found that bank size has an insignificant effect in relation to ROE. This could be the case since our sample consisted of the largest best in each country, therefore, there is little variation for this variable to have a significant impact.

Moving along to the macroeconomic factors, GDP per capita (logGDPperCp) is negatively insignificant in relation to ROE with a coefficient of −17.492. This result goes against Elnahas, Trinh & Li's (2021) examination on the impact of the pandemic on global banking stability. The insignificance of this variable could mean that an increase in GDP per capita does not necessarily mean that it will increase the banks' profitability and therefore has insufficient explanation on the dependent variable of (ROE).

In addition, CPI (inflation) is positively significant in relation to ROE with a coefficient of 0.873 which implies that a 1% increase in CPI causes an increase in ROE by approximately 0.9 units. The results are rather inconsistent with the study done by Boadi, Li and Lartey (2016) where they discovered that inflation has a negative and significant impact on ROE which is the case when banks do not anticipate future inflation. We could justify that inflation measured as CPI has a positive impact on ROE by saying that the selected banks in the Nordic region have successfully anticipated future inflation and therefore adjusted interest rates on loans and deposits accordingly. This means they did not suffer from a loss in profits in the presence of higher inflation.

Moving along to the country dummy variables, where Sweden is the reference category, the p-value of Norway is equivalent to 0.254 > 0.01, 0.05 and 0.1, we can conclude that it is insignificant. As for the coefficient, it holds a value of −3.647 which indicates that

Norway performed worse than Sweden in terms of ROE throughout the whole period of 2019-2020. However, it cannot be statistically verified due to insignificance. This means that we cannot indicate any difference between the banks' ROE in Norway and those in Sweden for the whole period between 2019 and 2021.

The p-value of Denmark is equivalent to 0.155 > 0.01, 0.05 and 0.1 which means that it is insignificant. This means that we cannot indicate any difference between the banks' ROE in Denmark and those in Sweden for the whole period between 2019 and 2021. In addition to that, the coefficient holds a positive value of 2.121 which indicates that banks in Denmark performed better than Sweden in terms of ROE throughout the whole period of 2019-2021. However, it cannot be statistically verified due to insignificance.

The p-value of Finland is equivalent to 0.856 > 0.01, 0.05 and 0.1 which means that it is insignificant. This means that we cannot indicate any difference between the banks' ROE in Finland and those in Sweden for the whole period between 2019 and 2021. In addition to that, the coefficient holds a value of -0.493 which indicates that banks in Finland performed worse than Sweden in terms of ROE throughout the whole period of 20192021. However, it cannot be statistically verified due to insignificance.

The p-value for Iceland is equal to 0 < 0.01, 0.05 and 0.1 which means that it is highly significant. The variable holds a coefficient of -10.224 which indicates that banks located in Iceland did indeed perform worse than banks in Sweden in terms of ROE throughout the whole period of 2019-2021. Although we picked the largest banks in each country in terms of total assets, the accumulated banks in Iceland hold relatively smaller total assets in comparison to those in Sweden which may justify the higher negative coefficient for Iceland.

7.2 ROBUSTNESS TEST

For the robustness test, we conducted a placebo test where we pretended that lockdown happened in 2019 before the emergence of the pandemic rather than 2020. We did this in order show that the association and result between lockdown and ROE which we have discovered in the previous model are not due to chance. LOCKDOWNP is the new variable with the modified data.

Linear regression – placebo test

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LOCKDOWNP	1.048	.821	1.28	.204	-.573	2.669	
TCR	-.168	.113	-1.49	.138	-.392	.055	
CI	-.125	.025	-5.02	0	-.175	-.076	***
LD	-.018	.007	-2.54	.012	-.032	-.004	**
logtotalassets	-.45	.291	-1.54	.124	-1.024	.125	
logGDPperCp	-25.843	12.303	-2.10	.037	-50.125	-1.561	**
CPI	.74	.252	2.93	.004	.242	1.238	***
Norway	-3.655	3.276	-1.12	.266	-10.12	2.811	
Denmark	-.372	1.323	-0.28	.779	-2.983	2.239	
Finland	-4.216	2.432	-1.73	.085	-9.016	.585	*
Iceland	-11.842	2.671	-4.43	0	-17.114	-6.57	***
2019b	0	.	.	.	.	.	
2020	-3.562	.775	-4.60	0	-5.092	-2.032	***
2021	.785	1.865	0.42	.674	-2.895	4.465	
Quarter : base 1	0	.	.	.	.	.	
2	1.176	.75	1.57	.119	-.305	2.657	
3	.893	.803	1.11	.268	-.691	2.477	
4	1.659	.912	1.82	.071	-.142	3.459	*
Constant	236.224	143.578	1.65	.102	-47.144	519.591	

Mean dependent var		9.136	SD dependent var	4.549
R-squared		0.509	Number of obs	192
F-test		11.318	Prob > F	0.000
Akaike crit. (AIC)		1023.177	Bayesian crit. (BIC)	1078.554

*** *p<.01, ** p<.05, * p<.1*

Table 3 – Linear Regression results for placebo test

We used the Breusch/Pagan-Cook-Weisberg test for heteroskedasticity on placebo test model to confirm that we have constant variance. Referring to appendix 4, the p-value resulted in 0.1367 which is insignificant at every alpha level (1%, 5%, 10%). We therefore can ascertain the claim that the error term has no heteroskedasticity.

We also used the Wooldridge-test for autocorrelation in panel data to check for autocorrelation. Referring to appendix 5, the p-value (0.3293) appears insignificant at

every alpha level (1%, 5%, 10%) which means that we can confirm that there is no firstorder autocorrelation.

R-squared, which is the coefficient of determination, has a value of 0.509. This means that approximately 51% of our results of the variation of ROE are explained by our regression model.

The p-value for "LOCKDOWNP" is insignificant at a 1% 5% and 10% alpha level. In addition to that, the coefficient holds a positive value of 1.048. The results from the placebo test indicate that "LOCKDOWNP" has a positive impact over the ROE, which goes against our expectation and the first hypothesis (H1). Hence, the placebo test did show us that that our "LOCKDOWN" variable in our model has a negative and significant effect over ROE that is not due by chance.

As for the other variables, CI, LD, logGDPperCp and CPI are all negatively significant in relation to ROE. These results are consistent with our initial model, apart from logGDPperCp which was in fact insignificant. TCR and logtotalassets are both insignificant which we also observed in our initial model. As for the country dummy variables, Iceland is negatively and highly significant while Denmark, Norway and Finland all resulted in insignificant outcomes.

8. CONCLUSION

The COVID-19 pandemic had and still has a substantial impact on the banking sectors at a global level. In this paper, the focus was to investigate and analyze the impact of lockdown on the return on equity of banks in the Nordic countries during the period of 2019, 2020, and 2021. The results of the analysis showed that COVID-19 did have a negative impact on bank profitability which was evident in the previous literature review. Table 2 validates the argument as the variable "LOCKDOWN" is negatively significant with respect to return on equity (ROE). In addition to that, our control variables "CI", "LD", and "CPI" are significant with respect to return on equity, while TCR, bank size, GDP per capita are negatively insignificant with respect to return on equity. Furthermore, the results suggest that the countries that imposed a national lockdown, Denmark,

Norway, Finland and Iceland, experienced lower profitability (ROE) than countries that did not impose a lockdown, such as Sweden.

For future research, we suggest conducting the same research question with a longer time span including future years because although it may seem that the global economy is now in the recovery phase of the pandemic, there are still some lingering effects to the virus as unprecedented new mutations and variants emerge. Therefore, it could be relatively early to assess the full impact of the pandemic on the banking sectors as we are still going through the last waves of the pandemic and emergence of new variants. Furthermore, as it is a new and recent topic to research on, there is an abbreviated time to analyze and a limit to previous extensive research that connects both the pandemic and the bank-specific and macroeconomic determinants.

Moreover, considering bank size, we only used amongst the largest banks in each country without considering smaller banks with lower asset levels. This means that our study has a selection bias as we only look at large banks which could be the reason why bank size was insignificant in our analysis. This could be considered a limitation as we have nothing to compare the large banks to and whether we can conclude that large banks do in fact have higher profitability levels than smaller banks. Future studies could expand the sample size by looking at both large and small banks and the diverse types of banks to compare bank size on profitability between those banks. Thus, we recommend that future studies use a larger sample size with more banks as well as a longer time period in order to achieve more accurate results.

Lastly, we only used ROE as a measure of bank profitability due to lack of data and insufficient time to calculate ROA ourselves, so we do recommend that future studies use ROA as well as ROE as it is perceived as a superior measure of bank profitability. In addition, lockdown seems to have had a negative impact on bank profitability, therefore, recommending against it as lockdown enforcement is rather harmful to the health of the economy and the banking sector. Furthermore, we assume that smaller banks in the Nordic region may have been negatively affected too, perhaps even worse. Finally, banks could adjust to stricter supervision and increase their regulatory scrutiny to protect them from any potential external threat. As we currently are writing this paper, a viral zoonosis outbreak called Monkeypox emerged on the 13th of May, and a

few cases have been confirmed globally (World Health Organization, 2022). Although we cannot yet confirm if this virus will have severe economic deterioration as the noble COVID-19 virus, we believe that governments should anticipate the worst and monitor the development of this virus in order to control potential financial consequences.

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10. APPENDIX

Appendix 1

Variable	Obs	Mean	Std. Dev.	Min	Max
ROE	192	9.136	4.549	-5.9	21.2
LOCKDOWN	192	1.229	.987	0	3
TCR	192	21.392	3.023	0	27.6
CI	192	51.025	15.262	15	92
LD	192	140.332	44.185	49.7	227
logtotalassets	192	25.809	2.978	20.802	29.044
logGDPperCp	192	10.862	.1	10.665	11.07
CPI	192	108.393	4.506	102.66	119.897
ID	192	8.5	4.622	1	16
quarter	192	241.5	3.461	236	247
Sweden	192	.25	.434	0	1
Norway	192	.188	.391	0	1
Denmark	192	.188	.391	0	1
Finland	192	.188	.391	0	1
Iceland	192	.188	.391	0	1

Descriptive statistics

Appendix 2: Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of

ROE H0: Constant variance

chi2(1) = 1.55 Prob > chi2 =

0.2134

Appendix 3: Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 15) = 1.920

Prob > F =   0.1861

Appendix 4: Breusch-Pagan/Cook-Weisberg test for heteroskedasticity (placebo test)

Assumption: Normal error terms

Variable: Fitted values of ROE

H0: Constant variance chi2(1)

= 2.21 Prob > chi2 = 0.1367

Appendix 5: Wooldridge test for autocorrelation in panel data (placebo test)

H0: no first-order autocorrelation

F (1, 15) = 1.017

Prob > F = 0.3293

Appendix 6: Time dummy variable

We also added two-time dummy variables in our model, Quarter and Year, to capture time-related effects. The 1st quarter is our reference group for the Quarter variable and 2019 is our reference group for the Year variable, therefore they have a coefficient equal to 0. What can be seen from the results is that 2020 and 2021 have positive coefficients but are insignificant at every alpha level (1%, 5%, 10%). This means we have no strong evidence to indicate any differences between the years and 2019 as it is the reference group. Regarding the quarters, quarters 2 and 4 have positive coefficients but quarter 3 has a negative coefficient. However, all quarters are insignificant at every alpha level (1%, 5%, 10%).