

Assessing the differences in efficiency valuation of banks between stakeholder and shareholder centric models during times of crisis

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Abstract

As a result of the investor centric approach in corporate valuations, the return on equity (ROE) has for the longest time been the staple when it comes to assessing the performance of businesses and corporations. However, in recent years the realisation has set in that the focus on short term financial gains for the shareholders can often go against the benefits for the corporation in the long term. This has accumulated in a paper by the European Central Bank (ECB) which calls for new direction, to stop using the return on equity as the gold standard for banks' performance and to start looking for alternatives. This paper I will aim to do just that, by using an Alternative Performance Indicator (API) system and compare the performance of both groups during times of financial difficulty in the COVID-19 pandemic years.

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Introduction

The usage of the return on average equity (ROAE) as the staple to determine a firm's performance is as close to an industry standard as you can get. The ROAE shows the returns an equity investor can expect for its investment, after all payments have been made and only profit (pre-tax) is left. It shows the simplest answer to the most basic question: "How much do I stand to gain from this investment?". However, its simplicity is also its Achilles' heel: Due to its short-term focus and insensitivity to underlying issues, it is easy for management to project a better picture than the reality would warrant. This is, among various reasons, why the ECB decided to put out a report calling for a shift away from ROAE supremacy and towards a model that values banks on their overall performance towards all stakeholders, rather than just the shareholders. In this paper, I will propose therefor analyse the available literature regarding stakeholders versus shareholder focus, the performance of banks during financial crisis and the effects of the COVID-19 pandemic. After that, I aim to combine these findings and propose a model aimed at taking into account the interests of all stakeholders and analyse how it compares to performance based on the ROAE.

Literature review

In the literature, it long has been established that banks play a central and essential role within a country's financial system and its successes and failures. These institutions operate on all sides of the financial system, as both money lenders, borrowers and advisers on all kinds of financial transactions. Their operations and methods thus hugely influence the market and all kinds of different stakeholders (Wu, Hou, & Cheng, 2010) (Derbali & Hallara, 2016) (Lin, Sun, & Yu, 2018). Their centrality in the economic system makes them a prime object of research and analysis, as their influence is far greater than their size, even when their size is already quite considerable. The common way of valuing these essential institutions was by treating them as any other company, by analysing and grading them on their return-on-equity. This ROE centric view is in line with assessing the performance of other companies, as it simply shows the returns provided per dollar invested by the shareholders. In the classical view, shareholders are the owners of the company and therefor the sole job of the company should be to maximise the value for the shareholders. This view was shared by banks and similar financial institutions before the economic crisis of 2008.

But ever since the financial crisis of 2007-2008, there has been an increasing focus on moving away from the ROE centric view held by banks, with the European Central Bank (ECB) writing a report that calls for alternative ways to measure the performance of banks (ECB, 2010). The report states that the focus on short to medium term gains of ROE often create hidden costs endured by other stakeholders, and that these costs rear their head during crises. I therefore argue that it is necessary to identify those hidden costs and ensure that proper compensation is taken into account for those actors that endure them, as I believe that the fair distribution of costs and compensation is essential for building strong and fair institutions.

Other academic literature has taken another approach by focusing on the performance of cooperative banks during and after the economic crisis of 2007-2008 and found that these

banks outperform their commercial counterpart, partly due to their focus on their clients, general stakeholder management and interest in long term stability over short term gains (Groeneveld & Vries, 2009). I see these findings as arguments in favour of more generally moving away from a ROE centric model and towards something more inclusive of all stakeholder interests.

All the while other researchers focus on arguing against the main arguments that lay the foundation of an ROE centric approach, debasing some of its more fundamental assumptions and debasing it as a good strategy (Admati, DeMarzo, Hellwig, & Pfleiderer, 2013) (Sikka & Stittle, 2017). The performance of banks will be a hotly debated topic for many years to come. Their importance in the economy, their influence on everyday life and the sometimes-polarizing measures taken to protect them will flair up during and after each economic downturn.

As the shortcomings of the ROE are becoming more apparent, looking at the alternatives to measure a bank's performance is essential. One such alternative could be using a multiple stakeholder perspective model (Avkiran, 2015). Using such a model, instead of looking at a singular business output, the researcher can analyse the performance of the institution based on a multitude of inputs and outputs, spread over multiple stakeholders. In most cases, stakeholders have opposing interests and a model should reflect this. High salaries are appreciated by the employees but turn up as costs on the income statement. High returns on equity are sought after by the shareholders, but it means that the customers paid more than necessary. A good performance model should take these different viewpoints into account and weight them against each other. Which in turn can be used to offer methods to improve operations in the most efficient way possible, rather than focussing on an increase in return on equity (Yang & Morita, 2013). In such a model, the return on equity is a part of the evaluation, as the shareholders are also stakeholders, however it will also take into account the needs of the employees, customers, government and other parties that have an interest in the operations of the financial institutions. It has been argued that exactly this type of management style, in which all stakeholders are taken into account, offers better resistance to economic downturns and long-term stability (Fatma & Chouaibi, 2021). The argument goes that short term return on equity are often times anathema to long term survivability. In essence, an investor does not care what happens to the investment after their investment horizon. They are just going to invest in another asset. Whereas employees, customers and the government do care about long term stability, as moving jobs or losing savings is a lot more of a hassle than switching investments, especially during a global economic downturn.

Which was already proposed by Groeneveld and Vries (2009) in their analysis of cooperative banks during the economic crisis of 2008. The main argument in favour of a multiple stakeholder perspective is that while the ROE displays everything that increases the ROE as a positive (such as a high debt-to-equity ratio) and everything that decreases the ROE as a negative (such as more generous payment for employees) as bad, a multiple stakeholder perspective might show that a low debt-to-equity ratio is preferred by customers and that it increase the bank's resilience in times of crisis and that a more generous payment package attracts better personal, more willing to put in extra hours and go the additional mile. With

other words, things that the classical model might dismiss as negative, might actually be positive in the medium to long term and especially during times of crisis or uncertainty. It is this resilience that makes it more interesting to look at, especially now, during times of unprecedented uncertainty. The current global political and economic climate does not offer the same safety as many policy makers, bankers and investors have grown accustomed to.

Open hostility between global superpowers creates high tension, hybrid warfare creates unfamiliar risk, trade wars between allies seem to be back on the menu. All this calls for a new approach that looks at how well banks survive crises, rather than thrive in prosperous times.

To understand the problems that can arise during a crisis, I will focus on one such crisis, the COVID-19 pandemic. The COVID-19 pandemic is generally believed to have started in December 2019, when an outbreak of pneumonia of unknown origin was reported in Wuhan, China. It was given the official name of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) but was mostly known by the names of corona virus or COVID-19. On March 12, 2020 the World Health organization declared it an official pandemic (Ciotti, et al., 2020).

As a result of this, many ports and airports were closed, travel was severely restricted and global trade grinded to a halt. The main focus of the governments around the world became the eradication of this virus. In today's global economy, supply chain shocks are more devastating than ever. Even small delays can throw a wrench in the carefully set-up just in time logistics systems spanning the globe. A full lockdown of the world's largest manufacturing nation, soon followed by large lockdowns in the world's largest consumer markets were therefore devastating to the supply and demand of goods. Production dropped and unemployment rose. Due to the recession that followed, there was a major downturn in retail sales and service activity, which in turn also lead to a drop in manufacturing (Ingham, 2022).

Especially China, the epicentre of both the COVID-19 pandemic and global manufacturing, was hit hard by travel restrictions and lockdowns (Naseer, et al., 2023). At the same time, governments acted quickly. Not only focussing on the virus itself, but also on the economic effects it has. The rising inflation meant that interest rates had to increase, and some companies even thrived under the circumstances, mostly digital companies or healthcare providers. This all created a very volatile environment in which banks, which tend to thrive under stable and predictable circumstances, had to adept to an ever-changing combination of volatile demand for capital, an increase in impairments on loans due to bankruptcy, rising interest rates and uncertain market conditions.

As previously established, banks hold a central function within an economy and it thus follows those banks also felt the effects of the recession caused by the pandemic. Higher default rates meant that banks had to recognize major impairments, which soured their balance sheets. The lower supply due to supply chain disruptions meant that prices rose quickly. As a result, central banks chose to increase interest rates to combat the inflation, which put a severe damper on the lending activities of banks. Companies chose to put investments on hold and stopped financial activities such as issuing new stocks and bonds, which hurt many banks' investment banking activities. While at the same time, companies were looking for liquidity to make up for the shortfall in revenues to cover their costs and

many governments provided various stimulus packages in an effort to prevent a global economic meltdown, to various degrees of success. (Colak & Öztekin, 2021) (Dimirgüç-Kunt, Pedraza, & Ruiz-Ortega, 2021) It meant that multiple forces worked in multiple directions, making it hard to predict how the future was going to be.

Hypothesis

As I have concluded from the literature, the focus on the return on equity is no longer considered adequate. The ECB in their report clearly state that a focus on the ROAE as opposed to other metrics facilitate short term gains over long term stability. To achieve a move away from this system, a new definition of “high performer” is necessary, which needs a new method of assessing performance. A method that takes the interests of other stakeholders, such as the employees and customers into account. To fill this research gap, it is my goal to analyse whether banks that perform well according to multiple stakeholders outperform those that focus on shareholder wealth maximalisation during moments of crisis and high volatility. It is already posed that cooperative banks outperform ROE focussed banks during the financial crisis of 2008 (Groeneveld & Vries, 2009). As cooperative banks tend to focus more on other stakeholders besides owners, I argue that this focus on other stakeholders improves their performance.

Hypothesis: The control group (the group of banks that score a high ROE) overall underperforms the sample group (the group of banks that score high on the multiple stakeholder model) both by having lower averages and higher standard deviation.

The null hypothesis: There is either no difference, or the control group outperforms the sample group.

To test this hypothesis, I will analyse whether the performance of “High performers” pre-volatile times changes during adverse time, and whether that change is significantly different between the two groups. As I have shown using the literature, having broad interest in all stakeholders, for example by using the cooperative model, tends to create better performance during crisis. My goal is to see whether the alternative performance indicators, as explained later on, are a good way to measure this focus on other stakeholders and whether the performance is thus better. The idea behind it is that banks that have this stakeholder focus create long-term sustainable operations, that are less susceptible to volatility. While it does not mean that the specific variables themselves are necessarily causing this lower volatility, but rather that banks that score well on the API model are more likely to care about stakeholders in general, which leads to lower volatility. The variables are indicators of the underlying overall operations of the bank, just like the ROAE is an indicator of how a bank performance. To assess this, a group of high performing banks based on ROAE is taken as the control group and a group of high performing banks based on alternative performance indicators are taken as the sample group. By comparing their performance before, during and after the COVID-19 crisis I aim to analyse whether performance pre crisis influences performance during and after the crisis. To divide the time periods, the years 2018 and 2019

are chosen as the pre-crisis years, as the economic effects in Europe of the initial outbreak are mostly focused on the start of 2020, further illustrated by the MSCI Europe index (Graph 1) which shows a clear decline at the start of 2020. While the end date is a less clear cut, most lockdowns and similar restrictions ended mid to late 2021, with other, less invasive restrictions being phased out in 2022. Furthermore, I argue that the exact end date of the economic impact is even less clear cut, if it even exists, due to a variety of factors. First of all, at the end, firms were adapted to the environment and able to cope with the restrictions, especially given that most restrictions had lessened. This means that even before the “official” end date, the firms were already operating under “normal” conditions. Second of all, a lot of the measures taken to boost the economy, such as financial support, lead to a higher inflation. This high inflation has continuously influenced the economy and the economic policy well after the end of the pandemic, and last, the Russian full-scale invasion of Ukraine in 2022 led to a new market crash, again illustrated by the MSCI Europe index (graph 1) which makes it even more difficult to see any positive or negative effects surrounding the ending of the pandemic. This large part is especially disruptive for an “after-crisis” view point, as one crisis is almost immediately followed by the next crisis. I will have to be content with the fact that the invasion has less direct impact on the internal operations of the European Union, in the sense that it led to higher inflation, but not necessarily led to obstructions in the operations of businesses in the same sense that the pandemic did.

Methodology

To analyse the hypothesis, I use by “Moody’s bank focus”. The data is collected for a 6 years period: 2018 to 2023. After cleaning the data, removing the no longer active banks, removing duplicates and banks with missing data, there are 1108 banks left. These are all the banks in Europe that operated during the full 6 years period that provided all the necessary data. To determine the control group, I rank the data on highest average return on average equity (ROAE) over the first 2 years. This determines the banks that have the most efficient operations during normal times according to the ROAE valuation.

To determine the sample size, first it is necessary to calculate whether the data is normally distributed. I used the D’Agostino and Pearson test to find out. The reason for choosing the test is that it is preferable over the Shapiro-Wilk test when working with larger samples. As the total dataset it is used on consists of 1108 banks, the dataset qualifies as a larger sample. Furthermore, D’Agostino and Pearson also checks both the skewness and kurtosis, which makes it effective at evaluating both the tail shape and the centricity of the data. There are some limitations to this method. The small group of stakeholders exclude important groups such as unions and the government. While it could be argued that unions are represented via the stakeholder group of employees, and the government should have the same interests as the customers, it could prove too restrictive of an assumption and an opportunity for future research would be adding more stakeholder groups. Furthermore, the shorter timeframe could prove to encapsulate too much volatility in the sample groups. Also, by choosing the high performers, outliers cannot be dismissed.

After I have determined whether the data is normally distributed, I use a sample size method that fits both the size of the data set and the distribution.

Normality test

By employing this test, I found a test statistic of 220.550, and a p-value of 0.000. As this is below the common threshold of 0.05, the conclusion stands that the ROAE data is not normally distributed. When looking at [graph 1], it is shown in the QQ-plot that most of the non-normal distribution comes from the fair end of the tails. However, as it is my goal to compare the best performing banks in both categories, removing the tail ends of the data would severely impact the integrity of the research.

The same statistical methods are used on the API group. This time, the D'Agostino and Pearson test statistic is 1177, and the P value is again 0.000. The API group is also not normally distributed. The same sample size can be used, which results in a sample group of the 176 best performing banks using the API.

Both groups (control and sample) are not normally distributed. I will argue that this can be explained by a few factors. First, it is difficult to have a high achieving bank, and as there are a lot of smaller banks in the EU, that are less likely to perform at the highest level due to a higher difficulty in attracting talent and acquiring customers that enable high performance. Also, high performers tend to be rewarded, whereas low performers tend to fade out or be acquired by the high performers. At the same time, there is only so much room for high performers in the market, implying a skewed graph with a larger population on the left side, and large outliers on the right side.

Sample size calculation

With the knowledge that the data is not normally distributed, I perform a power analysis using Cohen's D effect size to determine the necessary sample size. With a small effect size of 0.3, a significance level of 5% and a desired statistical power of 80% the test finds a sample size of 176. As such, there is a control group of the 176 banks with the highest average ROAE.

As both the samples are taken from the same data set and the ROAE is both the main factor of the control group as well as a part of the API, overlap could be of interest to the analyses of the results. Which is why an independence calculation is also necessary.

Alternative performance indicators

To determine the Alternative performance indicator, I employ the methodology of Yang and Morita (2013). Their methodology consists of collecting various data points of the banks, and dividing them into output and input categories for each stakeholder. In their paper they themselves base themselves on the work of Avkiran and Morita (2015), who interviewed members of the various stakeholder groups to determine what is of interest to the stakeholder group, how they perceive the various variables and if they think of them as inputs and

outputs, which resulted in table 1. For this analysis, the owners and management will be taken as one stakeholder group. There is extensive literature already available about aligning owner and management interests, and I will make the assumption that these methods are effective and management operates as an extension of the will of the owners. I make this assumption to make the model less susceptible to the differences shareholders might introduce in management incentives. Thus, three groups of stakeholders are created: owners, employees and customers. Each have a different view of the various variables. For example, the profitability, measured by using the ROAE, is seen as an output by the shareholders and the employees, as high performance is beneficial for them. For customers, it is input, as high profitability means that they are overpaying for the services. Per year, each bank has thus 3 stakeholder performance grades, one of each stakeholder. These grades are construed by the following formula: $\frac{x*Output}{y*Input}$, where the output and input are based on the data of the individual bank. The x and y multiplier are shared among all stakeholders of a specific group (owner, customer, employee) across the different banks in a given year. They are chosen in such a way that the grades are maximised, without any of the banks getting a grade or score higher than 1. It determines which bank is the most efficient in obtaining the highest output, given a certain level of input and allows to compare various banks with various output and input level. The various stakeholder viewpoints will not be weighted, as the decision whether one stakeholder's view of the operation is more important than another is a discussion beyond the scope of my research. Furthermore, by weighting the importance of one viewpoint over another, it would provide a dangerous possibility to manipulate the outcome of this research, as the objective value of a viewpoint is impossible to assess, and its influence too great on the overall outcome. This calculation results in a score for each bank which is the sum of the scores of each individual stakeholder, and thus between 0 and 3. Using these scores, for each year a ranking is constructed and the banks with the highest average score over the first two years are chosen as the sample group.

Statistical analysis

For the analysis of the data and to see whether I can reject the hypothesis, a multitude of analytical methods is needed. First, descriptive statistics such as the mean, median standard deviation, upwards and downwards movement etc are established, as these are essential to form a conclusion on the performance of the groups. The Mann-Whitney U test is performed to indicate whether the two groups are independent. If not, it would mean that the API method is not a good indicator for performance, as the performance is similar to that of the ROAE group. To assess the volatility, the coefficient of variation (CV) methods will be employed. The coefficient of the variation standardizes the standard deviation, and so can be used to show whether the volatility between the API and ROAE itself is different. If the CV of the ROAE is lower for example, it would mean that ROAE is a more stable metric than the API, even taking the higher average value of ROAE into account. This could show that firms that focus on the ROAE are better able to keep up their performance during times of volatility, which in turn would mean that they could be a better investment, as high returns with low volatility are something investors prefer.

Results

The results, as shown in tables 2 to 9, state that the null hypothesis of this paper cannot be rejected. When comparing the performance of the control group to the sample group, the control group outperformed the API in the ROAE before, during and after the crisis. The only metric the sample group outperforms the control group in is the mean and median of the API, which is a given as the sample was chosen on their performance in that category. Which means that at no point did the sample group outperform the scores of the control group, it even did considerably less well during and after the crisis. Across all metrics (API and ROAE, with and without the overlapping banks), the sample group had a higher coefficient of variance during and after the crisis. This implies that the API is not a suitable metric to look for low volatility banks, as the highest performers based on the API are more volatile, both in API and ROAE, before during and after the crisis. This means that the API as previously established does not find firms that are better prepared to handle volatility. If an investor invested in these firms, their returns would be considerably less stable over this period of time. Furthermore, as I have argued that volatility in banks is considered a bad thing, using the API is not the model to minimize this. Banks should perform as stable as possible, to inspire confidence and minimize the changes of a banking crisis. However, the API is not able to show which banks operate in a way that is volatility reducing.

To further underline the limitations of the model, when the results of table 2 to 9 are compared with the data in tables 10 and 11, which consists of the data of the entire population, it is clear that the highest performers perform very differently from the average. Because the data is not normally distributed, it makes it difficult to extrapolate the findings on the highest performers to the population overall.

Discussion

The higher volatility of the API model shows that it does not lend itself to be used to qualify high performers, if the goal of the qualification is to find banks that are more stable during volatile times. While it still holds that the ROAE is not a preferable option to estimate performance over the long run, as the short-term benefits of high ROAE often outweighs the long-term implications of such strategies. Also, the higher performance of cooperative banks during the 2008 crisis implies a care for employees and customers is repaid during times of uncertainty, the API is simply not the model to quantify these factors. There are a variety of reasons that could be given for the results. The model used to construct the API was not intended to compare and pick high performers, it was constructed to seek points of improvement within each individual bank. It was not necessarily meant to separate high performance from low performers, but more so to see how to improve low performers, using high performers as an example. This difference might have led to a bad sample to compare to the ROAE. Another reason might have been the choice of the sample banks. The two years before the start of the COVID-19 pandemic might be too small of a window to get an accurate read on the higher performers, and a longer pre-crisis timeline could have been used

to get a better, more stable sample. This however should then also be done for the control group, so there is no guarantee that it would be more stable in the end. Further research should focus on a way to quantify these stakeholder interests in a way that enables the model to compare against other metrics. One way of achieving this could be by working in reverse order, by analysing cooperative banks, taking the characteristics that set them apart from high achievers and see how other banks that share those characteristics fare in adverse time. Further steps should be taken to understand the goals of stakeholders and what they expect to gain from interacting with the banks. Once this has been made clear, it will be easier to find an alternative model better able to predict resistance to future volatility.

Conclusion

To conclude, the literature has established a need to move away from the return on (average) equity towards a more inclusive system that takes into account the many stakeholders and the central role banks play in the economy and society as a whole. To add to the discussion, I aimed to look towards an alternative performance indicator that adds more value to the views of non-owner stakeholders. I used a variety of statistical methods established by the literature and found that banks that perform well using the API model tend to perform worse during and after a crisis, in this case the COVID-19 pandemic, and I therefore make the argument against using this model as an assessment model. The literature is clear that a new model is needed, however, I was unable to find an alternative in the form of this specific multiple stakeholder model. Further research could be aimed at focusing on specific volatility reducing metrics, or at long term performance pre-crisis, as well as better describing the wants and needs of non-owner stakeholders.

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Tables

Five performance attributes and corresponding input/output classification with four perspectives.

Category	Parameter	Description	Perspectives			
			Shareholder	Customer	Management	Employee
Soundness	CAR (%)	Capital adequacy ratio	Output	Output	Output	Output
Credit Quality	NIA/SE (%)	Net impaired assets per Shareholders' equity	Output	Input	Output	Input
Profitability	ROAE (%)	Return on average equity	Output	Input	Output	Output
Efficiency	C/I (%)	Cost per Income	Input	Output	Input	Output
Valuation	DPS	Dividends per share	Output	Input	Input	Input

Table 1: Yang, X. Morita, H. (2012) Efficiency improvement from multiple perspectives: An application to Japanese banking industry, *Omega* 41, 501 – 509

Statistics For Control ROAE :											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	24.910167	20.823458	13.494582	9.027759	83.016251	2.103448	4.720564	0.000000	False	0.934208	54.172989
2019	20.459779	17.582905	10.700695	-1.080153	76.426840	1.862363	5.251860	0.000000	False	0.934208	52.301127
2020	13.776209	11.687172	10.715720	-48.596774	52.007114	-0.122077	6.849866	0.045412	False	0.934208	77.784244
2021	8.683201	7.884788	11.801666	-67.666547	52.179011	-1.919992	13.380036	0.000000	False	0.934208	135.913772
2022	10.667110	11.199485	12.945123	-70.097762	50.821661	-1.355683	9.542986	0.000000	False	0.934208	121.355484
2023	11.085900	11.597954	15.843869	-118.307381	60.396510	-3.216455	26.643718	0.000000	False	0.934208	142.919104

Statistics For Sample ROAE:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	12.124591	9.755246	13.089993	-35.368460	72.491508	1.545760	6.777748	0.000000	False	1.771284	107.962347
2019	9.953876	7.025744	10.936726	-16.154288	55.197514	1.443563	2.928942	0.000001	False	1.771284	109.874043
2020	6.376179	5.343406	12.740209	-54.736565	52.007114	-0.661462	7.236841	0.000091	False	1.771284	199.809463
2021	3.476707	3.441222	12.685159	-67.666547	52.179011	-1.960546	12.599318	0.000000	False	1.771284	364.861318
2022	5.909995	4.603357	11.862809	-70.097762	50.821661	-0.861295	11.363886	0.000000	False	1.771284	200.724518
2023	6.182615	4.961264	14.665903	-118.307381	51.577281	-3.110344	30.272307	0.000000	False	1.771284	237.211973

Table 2 and 3, Descriptive analytics control and sample group, ROAE

Statistics For Control ROAE wo overlap:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	24.409507	20.907019	12.797357	9.027759	83.016251	2.374586	6.497802	0.000000	False	0.768920	52.427757
2019	19.272298	16.567053	10.323282	-1.080153	76.426840	2.401038	8.807697	0.000000	False	0.768920	53.565392
2020	13.190776	11.795767	7.921757	1.168386	38.907745	1.150697	1.264319	1.696405	False	0.768920	60.055277
2021	9.094271	8.332140	7.842961	-37.468669	32.264426	-0.000001	9.938460	0.000010	False	0.768920	86.240678
2022	11.238788	11.265814	9.268976	-28.162542	42.118022	0.000000	4.851114	2.858543	False	0.768920	82.473092
2023	11.167588	11.597954	10.970045	-44.913341	60.396510	-0.000001	9.540061	0.000057	False	0.768920	98.231104

Statistics For Sample ROAE wo overlap:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	7.099804	8.035667	7.266075	-35.368460	24.718672	-2.334438	11.135134	0.000000	False	1.766778	102.341910
2019	5.048921	5.119961	5.115822	-16.154288	16.751792	-0.805062	2.659966	5.430831	False	1.766778	101.325055
2020	3.172273	3.388575	9.429516	-54.736565	25.222987	-3.138845	16.460204	0.000000	False	1.766778	297.247935
2021	2.045480	3.096608	9.144056	-67.221805	17.920679	-4.196315	26.903806	0.000000	False	1.766778	447.037175
2022	4.798386	4.156781	6.781237	-24.873377	33.934247	-0.209116	5.276129	9.194640	False	1.766778	141.323291
2023	4.529295	4.141530	7.814918	-21.080869	36.273714	-0.135987	3.556096	287.247500	False	1.766778	172.541599

Table 4 and 5, Descriptive analytics control and sample group, without the overlapping banks, ROAE

Statistics For Control API:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	0.089436	0.064708	0.096981	-0.066341	1.001800	5.784595	47.079552	0.000000	False	1.125619	108.436200
2019	0.069968	0.052282	0.070558	-0.126079	0.706108	5.618395	44.247268	0.000000	False	1.125619	100.843243
2020	0.015878	0.010438	0.023268	-0.038135	0.247539	6.855334	60.414628	0.000000	False	1.125619	146.542386
2021	0.034610	0.026728	0.036125	0.012786	0.378521	6.715635	54.878126	0.000000	False	1.125619	104.377348
2022	0.117015	0.093185	0.090267	0.063921	1.013766	6.615864	58.102337	0.000000	False	1.125619	77.141392
2023	0.140374	0.113580	0.102858	0.043781	0.879755	4.194092	22.065752	0.000000	False	1.125619	73.274253

Statistics For Sample API:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	0.154976	0.105156	0.160251	-0.200366	1.053960	3.156620	13.438817	0.000000	False	1.248295	103.403753
2019	0.131480	0.104547	0.173058	-0.163585	2.007877	7.946408	80.697275	0.000000	False	1.248295	131.623061
2020	0.056731	0.020508	0.119594	-0.008433	1.028535	5.020570	30.613009	0.000000	False	1.248295	210.808905
2021	0.083895	0.045074	0.142004	-0.016474	1.128200	5.384234	32.921130	0.000000	False	1.248295	169.263961
2022	0.244857	0.161191	0.238813	-0.135616	1.377578	2.903821	9.105735	0.000000	False	1.248295	97.531620
2023	0.194393	0.151723	0.156675	-0.370567	1.025926	2.286427	9.007366	0.000000	False	1.248295	80.597038

Table 6 and 7, Descriptive analytics control and sample group, API

Statistics For Control API wo overlap:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	0.061342	0.054372	0.028209	-0.066341	0.151872	0.211407	3.253540	400.516900	False	0.692255	45.986437
2019	0.048939	0.047486	0.020141	-0.126079	0.095024	-4.824308	43.926267	0.000000	False	0.692255	41.155316
2020	0.011324	0.009819	0.007899	-0.038135	0.059153	0.855157	24.086045	0.000000	False	0.692255	69.754504
2021	0.025074	0.023964	0.007124	0.012786	0.054112	0.928042	1.461268	20.838890	False	0.692255	28.411901
2022	0.090827	0.087726	0.018404	0.063921	0.173727	1.519769	3.652934	0.000038	False	0.692255	20.262697
2023	0.109894	0.107035	0.029645	0.043781	0.193838	0.539724	0.527083	21531.320000	False	0.692255	26.597595

Statistics For Sample API wo overlap:											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	0.150072	0.100409	0.160702	-0.200366	1.053960	3.076797	13.121491	0.000000	False	1.29426000	107.083267
2019	0.132217	0.104404	0.186964	-0.163585	2.007877	7.940786	75.683902	0.000000	False	1.29426000	143.471717
2020	0.066633	0.023979	0.135768	-0.008433	1.028535	4.437368	23.359942	0.000000	False	1.29426000	203.754896
2021	0.091798	0.047414	0.160456	-0.016474	1.128200	4.881090	26.122393	0.000000	False	1.29426000	174.792479
2022	0.263904	0.173663	0.260575	-0.135616	1.377578	2.634241	7.238658	0.000000	False	1.29426000	98.738556
2023	0.183028	0.145057	0.151363	-0.370567	1.025926	2.395369	11.579905	0.000000	False	1.29426000	82.699368

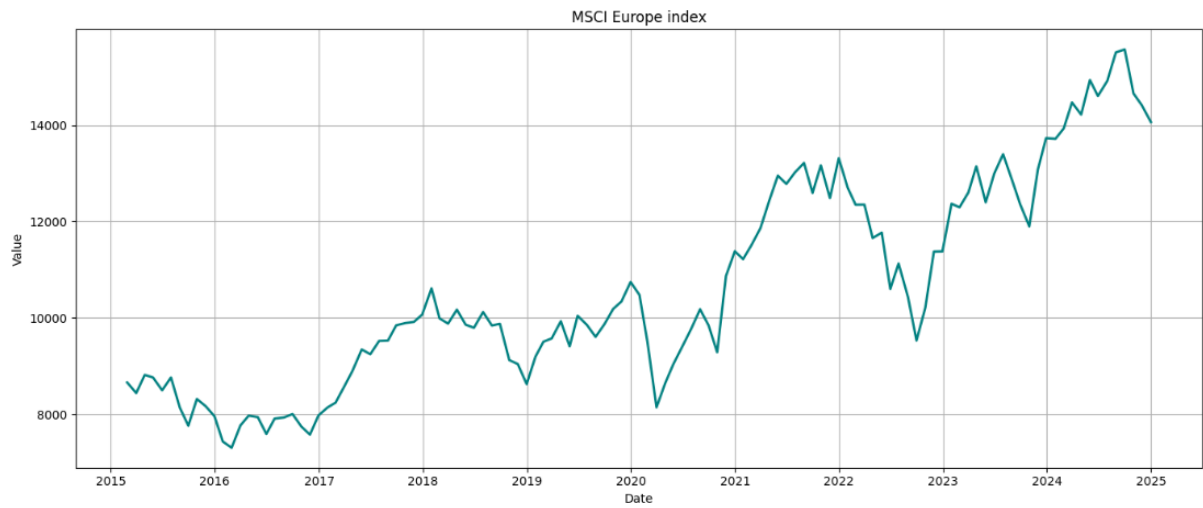
Table 8 and 9, Descriptive analytics control and sample group without overlapping firms, API

Descriptive statistics of the total population's ROAE											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	11,175146	10,477126	10,369028	-53,466895	83,016251	0,952462	13,246625	0,000000	False	0,927865	8,168817
2019	7,619698	6,591781	9,245773	-80,105908	76,426840	-0,105619	17,101642	0,000000	False	1,213404	6,352514
2020	5,901139	5,262386	8,716386	-85,954430	52,007114	-2,071739	23,969197	0,000000	False	1,477068	5,882328
2021	3,713694	3,784396	7,695291	-67,666547	52,179011	-2,502848	24,489872	0,000000	False	2,072139	4,316106
2022	5,843451	5,188690	7,580554	-70,097762	50,821661	-0,966102	16,879180	0,000000	False	1,297273	5,478053
2023	5,646495	5,015358	8,983920	-118,307381	60,396510	-2,857951	41,986770	0,000000	False	1,591061	5,624058

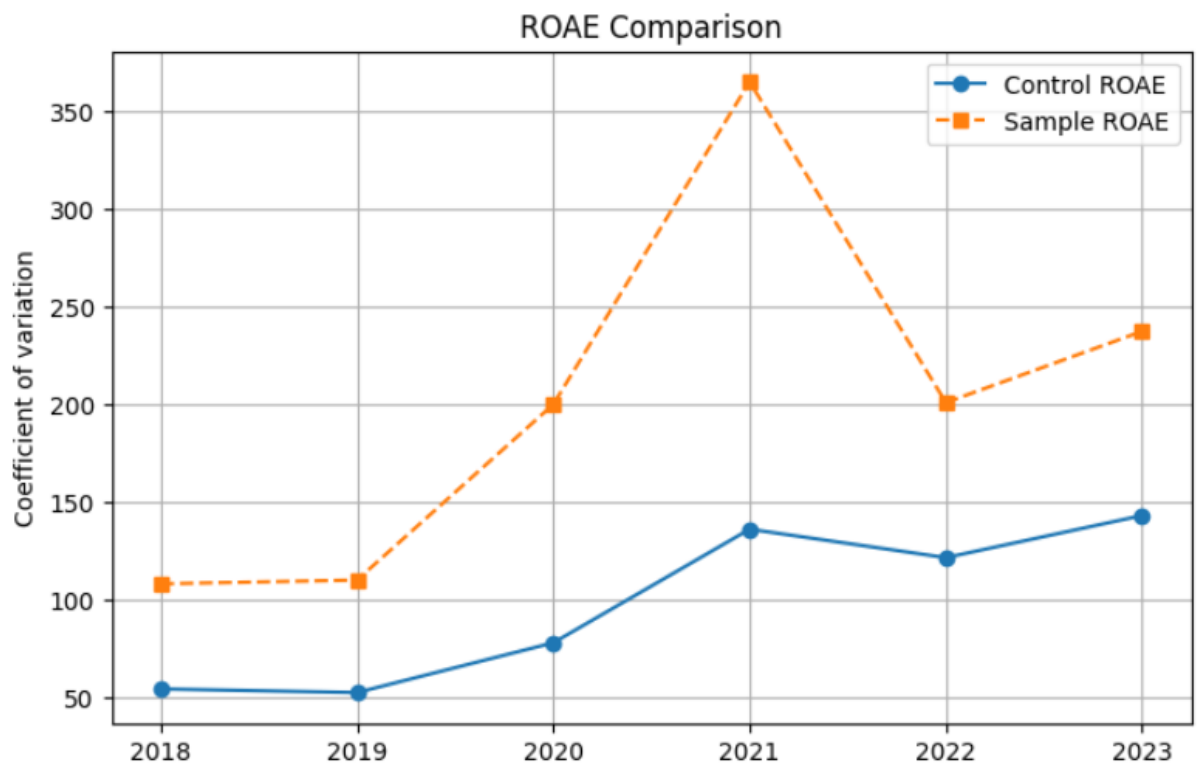
Descriptive statistics of the total population's API											
Year	Mean	Median	Standarddeviation	Min	Max	Skewness	Kurtosis	Normality (p-value)	Normally distributed?	Coefficient of Variation (CV)	Interquartile Range (IQR)
2018	0,071124	0,053030	0,078663	-0,426478	1,053960	6,206297	64,738911	0,000000	False	1,106000	0,039283
2019	0,061842	0,048010	0,082009	-0,753453	1,000000	12,644316	304,400947	0,000000	False	1,326101	0,025617
2020	0,018950	0,011098	0,098933	-2,586406	1,070670	-13,761973	458,824778	0,000000	False	5,220860	0,007531
2021	0,032178	0,022318	0,062300	-0,260950	1,128200	12,056703	183,474204	0,000000	False	1,936125	0,012119
2022	0,112297	0,088601	0,127985	-1,556128	1,377578	2,425019	64,711001	0,000000	False	1,139700	0,038337
2023	0,106354	0,093538	0,105804	-1,991343	1,025926	-5,750506	159,582757	0,000000	False	0,994835	0,048103

Table 10 and 11, Descriptive analytics on the total population of both the ROAE and API

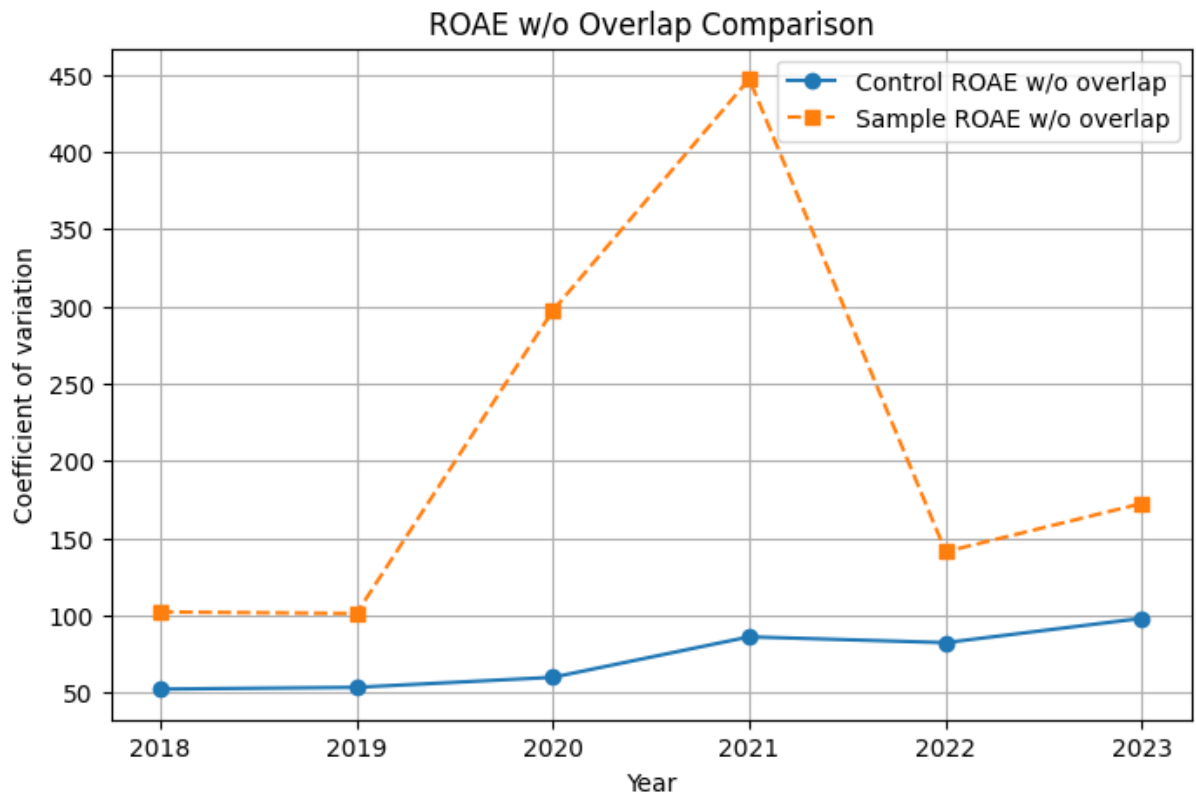
Graphs



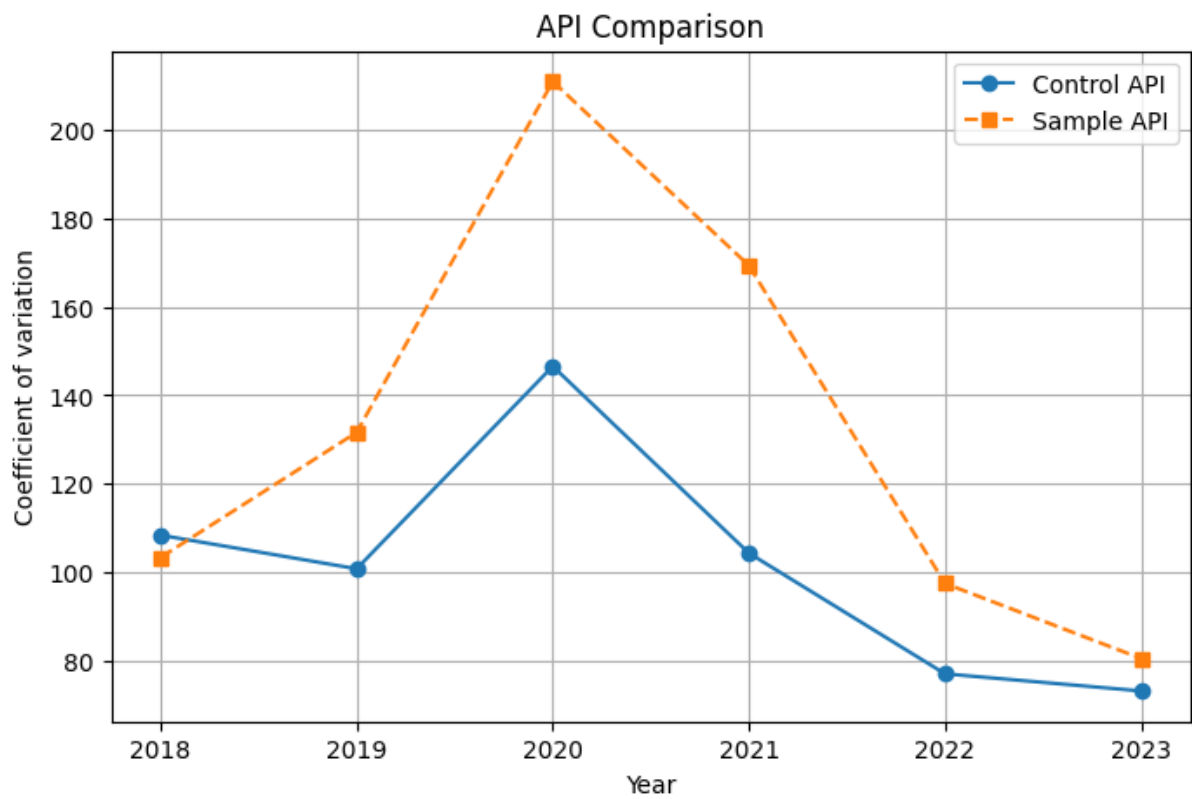
Graph 1: MSCI Europe index



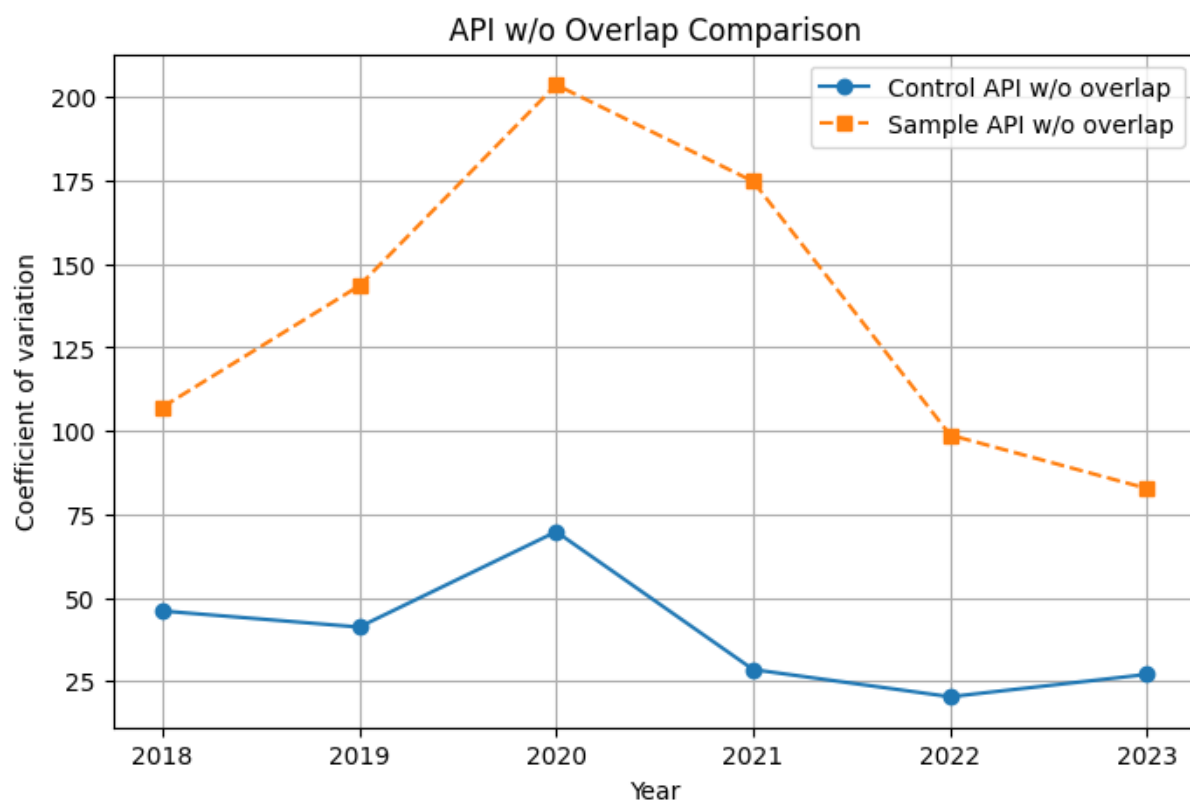
Graph 2: ROAE comparison Control and Sample group



Graph 3: ROAE comparison Control and Sample group, without overlapping banks



Graph 4: API comparison Control and Sample group



Graph 5: API comparison Control and Sample group, without overlapping banks

Appendix 1: Official statement of original thesis

By signing this statement, I hereby acknowledge the submitted thesis (hereafter mentioned as “product”), titled:

“Assessing the differences in efficiency valuation of banks between stakeholder and shareholder centric models during times of crisis”

to be produced independently by me, without external help.

Wherever I paraphrase or cite literally, a reference to the original source (journal, book, report, internet, etc.) is given.

By signing this statement, I explicitly declare that I am aware of the fraud sanctions as stated in the Education and Examination Regulations (EERs) of the SBE.

Place:

Rome, Italy

Date:

30.04.2025

First and last name:

Frederik Euwens

Study programme:

International Business, Spec. Strategic corporate Finance

Course/skill:

Master Thesis

ID number:

I6179621

Signature:

A handwritten signature in black ink, appearing to be 'Frederik Euwens', written over a horizontal line.

Appendix 2: Sustainable Development Goals (SDG) Statement

Name Frederik Euwens
ID I6179621
Supervisor Dr. Perluigi Murro
Date 30.04.2025

Through the research conducted for this master's thesis, I seek to contribute to one or more of the 17 SDG(s) set forth by the United Nations (<https://www.undp.org/sustainable-development-goals>). Specifically:



SDG Code(s): 8 & 16

Explanation: Banks are an fundamental aspect of a country's economy. Many crises were created and averted by the operations of the banks within that system. Crises involving banks often create economic turmoil, loss of jobs across an economy and destabilised institutions. Now that the realisation has set in that banks should focus on more than just the return on equity, it is important to understand how banks should operate, what the focus should be and how to compare their operations.

Appendix 3: Statement on the use of Generative AI (GenAI) in the master thesis

I hereby certify that I adhered to the SBE guidelines on the use of GenAI tools such as ChatGPT in the master thesis. In the box below, I document how and for what purposes I used GenAI.

During the preparation of this work, I used GenAI for the following purposes:

- Search engine: ChatGPT, used to list and compare various statistical models that could be used in the various scenarios considered.
- Explanation provider: ChatGPT, used to explain various statistical models, as well as helping interpreting the results
- Other: ChatGPT, used to help with the programming of the statistical analysis.

After using any tool, I reviewed, quality-checked, and edited the content as needed and take full responsibility for the content of the thesis.

By signing this statement, I explicitly declare that I am aware of the fraud sanctions as stated in the Education and Examination Regulations (EERs) of the SBE.

Place:

Rome, Italy

Date:

30/04/2025

First and last name:

Frederik Euwens

Study programme:

International business, Spec Strategic corporate finance

Course/skill:

Master Thesis

ID number:

I6179621

Signature:

A handwritten signature in black ink, appearing to be 'F. Euwens', written over a horizontal line.