The Impact of CEO Overconfidence on the Bank's Asset Quality

Maram Elkady

Assistant Lecturer- faculty of commerce- Accounting department- Cairo University

Mohamed Elbannan

Professor of Accounting at faculty of commerce- Accounting department- Cairo University

Emad Sayed

Lecturer of Accounting- Faculty of commerce- Cairo University

Abstract:

The prior studies defined overconfidence as a rise in one's self-confidence or self-assessment that leads to optimistic beliefs that can impact decisions. CEO overconfidence is one of the traits that has captured the interest of researchers during the past decades. Many studies have shed light on CEO overconfidence in the corporate environment, particularly in the context of financial markets, however, little is known about its impact on the banking sector. Our research seeks to fill a specific gap in the literature by examining the impact of CEO overconfidence on a bank's asset quality. We depend on an investment-based proxy to measure CEO overconfidence "CAPEX". Our analysis depends on a cross-country sample of sixty-six listed European banks from ٢٠١٤Q١-٢٠٢١Q٤. The empirical results show that overconfident CEOs tend to underestimate borrowers' creditworthiness and overestimate future returns from loans leading to poor asset quality, high non-performing loans, and high loan loss

provisions. This study contributes to a better understanding of the risk of overconfident executives and hence, the findings should be of interest to regulators and shareholders as it shows that overconfident CEOs can reduce the quality of the bank loans.

Keywords: CEO Overconfidence, Asset quality, NPLs.

١.Introduction

The banking industry is seen as the sustaining backbone of the economy since it offers credit and makes it possible for companies and people to save, invest, and grow their spending. The economy will be paralyzed without banks and access to credit. Thus, poor asset quality and high NPLs are one of the potential risks that could threaten the banking industry. The subprime crisis produced enormous volumes of NPLs, which impacted not only US banks but the whole financial system. During the financial crises, the effective performance of the Western economies which were largely funded by credit marked a sudden drop. There was a rapid deterioration in European banks' credit portfolios and an erosion of their capital base. According to the EBA (٢٠١٦), the grand financial crises (GFC) caused a significant decline in the credit portfolio of European banks, with the stock of non-performing loans climbing to ٩٠٠ billion euros at the end of ٢٠١٦, and the NPL ratio increasing from roughly ٣٪ in

٢٠٠٥ to more than ٧٪ in ٢٠١٦[١]. Although the rapid response of European regulators assisted in containing the spread of the high NPL issue the NPL ratio of EU financial institutions fell to ٣٪ in ٢٠١٩. However, the pool of non-performing loans (NPLs) remained at risky levels, reaching ٦٠٠ billion euros in June ٢٠١٩ (Velliscig, Floreani & Polato, ٢٠٢٣).

The vast majority of research on bank risk-taking to date does not take into account the influence of management traits, and biases on bank decisions. Thus, to fill this gap, this study will examine how behavioral biases particularly overconfidence among banking industry participants can explain how the banking sector fuels credit booms. The focus is on bank CEOs because, in a normal bank, the CEO is seen as the most powerful person and his/ her attitude affects the organization's overall risk preference (Ho et al., ٢٠١٦). In addition, CEOs are more likely to exhibit overconfidence bias than the general public (Malmendier, Tate, & Yan, ٢٠١١). According to Malmendier and Tate (٢٠١٥), the overconfidence bias is the most widespread prejudice that might possibly affect management decisions. They claimed that this was the case because the media exaggerated the size of the top management. These managers typically display extreme overconfidence in their capacity to manage their companies and

[١] Constancio, V. ٢٠١٧. Resolving Europe's NPL Burden: Challenges and Benefts. https://www.ecb.europa.eu/press/key/date/ ٢٠١٧/html/sp١٧٠٢٠٣.en.html

make judgments as a result. Overconfident managers usually overestimate returns while underestimating risk (Heaton, ٢٠٠٢) which can impact several aspects, including mergers and acquisitions (Malmendier & Tate, ٢٠٠٨), innovation (Hirshleifer et al., ٢٠١٢), company value (Ahmed & Duellman, ٢٠١٣).

The current study makes a number of contributions to the body of literature. The majority of research on psychological biases particularly overconfidence is applied to the corporate environment and very few research concentrates on the banking sector. Additionally, the scant research on overconfidence in the banking industry primarily considers how it affects systemic risk and overall risk-taking decisions. Thus, this work will add to the existing literature by examining its impact on the bank's asset quality in specific. Additionally, there has been extensive literature examining overconfidence in the US and some of the developed countries, but empirical studies on the impact of overconfidence in the European banking sector are quite few, so this paper will examine this issue in Europe. Furthermore, Applying to Europe will allow researchers to gain a more in-depth overview of the CEO overconfidence phenomenon in a diverse variety of banks from other countries.

The research findings show that banks with overconfident CEO have lower asset quality. Overconfident CEOs were found to underestimate the customer's creditworthiness and to

overestimate future returns such as loan collection resulting in higher NPLs and LLPs ratios.

This work is organized as follows: The second section will discuss a theoretical background of research variables, the third section will present the literature review and the main predictions; the fourth section will provide the methodological aspects and the research model. The fifth section will show the analysis and finally the conclusion.

٢. Theoretical Background

٢،١. Asset Quality

The loans provided by commercial banks are listed as assets on the balance sheet and are considered the most sizable items in the bank's assets. The quality of those assets indicates the banks' credit risk (Athanasoglou, Brissimis & Delis, ٢٠٠٨). Asset quality is one of the crucial factors in assessing a bank's general condition and indicates its profitability (Salike and Ao, ٢٠١٨). It works as an important tool for the resilience of the financial system and the enhancement of economic development.

The ongoing reduction in the bank loan quality as shown by the huge amounts of non-performing loans (NPLs), ruins the public trust in the financial sector and discourages banks from providing fresh loans. It also decreases private investment and impacts economic growth (Arrawatia; Dawar; Maitra & Dash,

٢٠١٩). The subprime mortgage crisis left a sizable amount of NPLs which posed a threat to the banking system around the world, making even the most powerful economies appear vulnerable (Jabbouri, Naili & Nouina ٢٠١٩). According to Beltrame et al., (٢٠١٨), Higher NPLs lower the banks' profitability because banks have to bear the costs of loans that are no longer generating income. NPLs also limit managerial productivity and necessitate increased capital buffers to protect against high loan losses (Berger and DeYoung, ١٩٩٧).

In the previous research, different macroeconomic factors were examined as determinants for the increasing amounts of NPLs and low asset quality such as; the level of unemployment, GDP, interest rate, and inflation, however; literature is scarce about the impact of behavioral biases (i.e. overconfidence bias) on a bank's asset quality.

The following is an explanation of the independent variable "CEO overconfidence".

٢,٢. CEO Overconfidence

CEOs are the most influential personnel in the banks as they can influence risk decisions with their powers and attitudes. According to the prior literature, some CEOs can have psychological biases such as overconfidence that are said to impact the bank's risk-taking and overall performance and could lead to economic swings (Malmendier and Tate ٢٠٠٥).

The concept of overconfidence was shown in the psychology literature in the ١٩٦٠s (Adams & Adams, ١٩٦٠). Later on, researchers started to incorporate results from psychology into economic models. They started to explore the influence of overconfidence in the areas of financial markets and corporate finance (Niu, ٢٠١٠; Malmendier and Tate, ٢٠١٥; Daniel and Hirshleifer, ٢٠١٥). The word overconfidence was defined in prior research as an increase in one's self-confidence or self-assessment leading to optimistic beliefs about judgments, decisions, and estimations (Hayward and Hambrick, ١٩٩٧; Hiller and Hambrick, ٢٠٠٥). It was sometimes used interchangeably with hubris (Hayward and Hambrick, ١٩٩٧) and optimism (Bouwman, ٢٠١٤). Overconfidence was illustrated in the prior research through ٤ concepts namely: over-precision, over-estimation, over-placement, and over-optimism. Over-precision refers to people's excessive belief that they know the truth, they also overstate the accuracy of information and forecasts (Ben-David & Graham, ٢٠١٣). Over-estimation means that decision-makers overestimate their abilities, performance, level of control, and chances of success (Moore & Healy, ٢٠٠٨; Bollaert & Petit, ٢٠١٠). Over-placement is the perception of superiority over others (Merkle & Weber, ٢٠١١). Over-optimism is the propensity to have unrealistic expectations for the future and underestimate the likelihood that negative events will occur (Heaton, ٢٠٠٢; Campbell et al., ٢٠١١). These four aspects highlight various

sources of overconfidence, yet they all represent people's exaggerated beliefs of themselves.

Overconfidence has attracted research attention because this personality trait can affect the firm value and profitability. The prior literature explained overconfidence and its impact on risk-taking including through several theories as shown below.

٢,٣. Theories addressing how CEO overconfidence affects risk-taking choices

Overconfidence among some managers has captured the interest of researchers since this personality characteristic was claimed to reduce corporate value and impact its profitability. Several preceding theories, including the theory of Hubris, the theory of Positive illusions, and the Upper Echelons hypothesis, explain CEO overconfidence and its influence on risk-taking and asset quality.

First: the Theory of Hubris[٢]. According to Raj and Forsyth (٢٠٠٣), hubris is trust in one's talents. They explained that prior accomplishment is one of the hubris causes that contributes to a sense of superiority. Hubris is seen as one of the causes of organizational failure because of judgments made by managers based on their high self-confidence (Kahneman & Tversky, ١٩٩٥).

[٢] The term "hubris" has a Greek origin, it's described as a person's extreme self-confidence or pride that makes him/her avoid following rules and standards (Hayward and Hambrick, ١٩٩٧).

In the prior literature, some researchers presented three operative mechanisms that encourage hubris CEOs to take excessive risks in firms. The three mechanisms are The CEO's overestimation of his ability in problem-solving (Moore and Healy, ٢٠٠٨), the underestimation of needed resources, and the underestimation of the firm's uncertainties in the surrounding environment (Kahneman & Lovallo, ١٩٩٣). These mechanisms drive the overconfident CEOs to perceive decision situations as less risky than they are and overestimate the chances of project success, even though it is fraught with risk (Chatterjee and Hambrick, ٢٠٠٧). According to the behavioral theory of the company, this overestimation of success tends to raise the CEO's "aspiration level"; a criterion decision-makers use to assess organizational performance. When this aspiration level is increased, the attributed performance can get worse, and decision-makers can become more risk-takers (Cyert and March ١٩٦٣).

The second theory is the theory of positive illusions. Positive illusions are explained by (Taylor, ١٩٨٩, p. ٢٢٨) as "systematic small distortions of reality that make things appear better than they are". Positive illusions, in other words, are a person's systematic ability to have very optimistic impressions about himself/herself. According to this theory, when compared to a normal person, those who have positive illusions believe that the positive personality qualities describe them more, while the negative ones are believed to describe them less (Brown, ١٩٨٦). So, CEOs overestimate their

abilities because they have a positive self-image that increases their feelings of self-worth (Blanton, Pelham, DeHart & Carvallo, ٢٠٠١). Three positive illusions were used by researchers to describe overconfidence in the psychology literature, namely: the better-than-average effect, the illusion of control, and unrealistic optimism.

The better than the average effect is described by Brown, (٢٠١١) as the propensity for certain individuals to have an overly optimistic view of themselves. They think of themselves as extraordinary employees, especially in comparison to their counterparts. In addition to being more capable and less prone to mistakes, they think they have more morals, better talents, and they are less prone to errors.

The illusion of control occurs when people believe they can affect events that are controlled entirely by chance. For example, when people predict certain consequences and those events occur, they are more likely to assign them to their actions rather than chance (Taylor and Brown ١٩٨٨).

Unrealistic optimism was defined by Taylor and Brown (١٩٨٨, p. ١٩٧) as "*The future will be great, especially for me*". This exaggerated optimism makes them falsely assess future events because they see themselves as always winners and their chances of winning are better than all other people (Taylor and Brown, ١٩٨٨).

According to these three positive illusions, overconfident CEOs believe they are superior to others in terms of talents and managing ability. They are too hopeful about future prospects.

They also believe they are always winners, regardless of the circumstances, and as a result, overconfident CEOs overestimate future profits and pursue excessive risk-taking techniques that may ruin the firm's value.

The Upper Echelons Theory is the third theory. Hambrick and Mason initially proposed the Upper Echelons concept in ١٩٨٤. It asserts that senior executives' qualities and attributes can predict organizational results, planned decisions, and degree of performance (Hambrick and Mason, ١٩٨٤). It emphasizes the crucial importance of managerial behaviors, values, knowledge, and abilities in influencing strategic decisions made by the organization.

٣. Related literature and main predictions

CEOs are considered the spine of the bank, they are the most influential individuals since they can influence risk decisions with their powers and attitudes. They participate in essential investment and financing decisions. However, some of them can have psychological traits such as overconfidence which is claimed to affect the bank's operations, and risk-taking, and cause economic swings (Malmendier and Tate ٢٠٠٥).

Overconfidence has been extensively researched in the corporate environment, particularly in the context of financial markets. Several studies provided evidence that overconfident CEOs increase the firm's risk-taking and the likelihood of corporate failure. For example, using a sample of Chinese public

companies from ٢٠٠٠-٢٠١٧, Ali and Tauni (٢٠٢١) showed that overconfident CEOs mistakenly believe they are taking actions to maximize shareholder value, when in fact they are increasing the company's future level of risk. However, they also found that institutional investors such as mutual funds and foreign institutional investors play a role in corporate governance by minimizing the impact of CEOs' over-confidence on the level of corporate risk. In the United States, Lin, Chen, Ho & Yen, (٢٠٢٠) show that overconfident CEOs can increase corporate risk through collateral. They illustrate that banks typically ask high-risk borrowers only to pledge collateral. Overconfident CEOs, on the other hand, may give downside protection to banks even if their firms' failure probability is low and banks are ready to lend without collateral or covenants. They do so because they perceive themselves as better than others when they negotiate a lower interest rate. Furthermore, Aabo, Hvistendahl & Kring, (٢٠٢١) show through a ten-year investigation from ٢٠٠٧ to ٢٠١٦ of ١٥٠٠ S&P companies that firms with overconfident CEOs are associated with a ٦ % increase in corporate risk, especially when they are paid higher incentive compensation.

Leng, Ozkan & Trzeciakiewicz, (٢٠٢١) show that entities operated by overconfident CEOs in the UK are more likely to fail. This has been found in firms with more R&D spending because overconfident CEOs have better chances to take more risks in innovative environments. It was also pronounced in

businesses with inadequate accounting conservatism because overconfident CEOs delay their response to bad news. Their analysis also shows that both internal and external corporate governance mechanisms can reduce the effect of overconfidence on bankruptcy risk.

In addition, several researchers prove that overconfident managers are inclined to make more investments and choose risky projects because they overestimate both the future cash flows from these investment projects and their ability to achieve promising results (Goel and Thakor, ٢٠٠٨; Campbell et al., ٢٠١١). Malmendier and Tate (٢٠٠٥) show that after observing negative feedback about certain projects, rational CEOs would lower their expectations about these projects, however, overconfident CEOs attempt to ignore the negative feedback and continue to perceive these projects as value-creating. Thus, overconfident CEOs can proceed with negative NPV projects for extended periods leading to bad news hoarding until poor performance gets accumulated causing a stock price crash (Kim et al., ٢٠١٥; Liang et al., ٢٠٢٠).

Concerning financing decisions, the pecking order theory states that corporations prioritize their sources of financing based on their costs (Myers, ١٩٨٤). Corporations prefer internal financing first, then debt, and, as a last resort, obtaining new equity (Myers, ١٩٨٤). However, even though they have access to

public securities markets, overconfident managers invest in more debt than equities (Malmendier et al., ٢٠١١; Huang, Tan & Faff, ٢٠١٦; He, Chen & Yue, ٢٠١٩). They overestimate their ability to repay short-term debt at a reduced rate in the future if favorable news emerges (Huang et al., ٢٠١٦). However, this often leads to a huge reduction in the shareholder's wealth and, large losses that can exceed millions of dollars (Malmendier et al., ٢٠١١).

In the banking sector, limited studies show how overconfident CEOs impacted risk-taking in banks. Liu, Le, & Thompson, (٢٠٢٠) empirically show that banks with overconfident CEOs have higher systemic risk. They make more investments in mortgage-backed assets and engage in more debt, particularly during the financial crisis of ٢٠٠٧–٢٠٠٨. Their findings highlighted the importance of giving more focus to psychological traits rather than agency conflicts when explaining the bank's increased risk-taking activities. Safi et al., (٢٠٢١) examine how financial institutions participate in China's systemic risk. They show that banks particularly managed by overconfident CEOs have more contribution to China's systemic risk than normal banks. They argue that their results do not necessarily mean avoiding hiring overconfident managers but establishing policies and standards that can restrict their biases from impacting the whole economy. Niu, (٢٠١٠) constructed a data set of ١٠٨ publicly traded U.S. banks from ١٩٩٤ to ٢٠٠٢ and finds that banks operated by overconfident CEOs are ٧٪

riskier than regular banks. Besides, Mahdi and Abbes (٢٠١٨) used a sample of ٩٦ conventional and ٣٧ Islamic banks from ٢٠٠٥ to ٢٠١٦. They examine the impact of overconfidence on risk-taking and show that overconfident CEOs lead to excessive risk-taking, especially over the long term as a result of their underestimation of risk and their optimistic belief about future returns.

Using a data set of ٣٨٣ micro-finance institutions (MFIs), Fersi and Boujelbène, (٢٠٢١) argue that overconfident loan officers significantly increase the credit risk-taking in MFIs, reduce the asset quality and increase the bank's solvency risk. This is attributable to several factors: first, overconfident loan officers frequently underestimate the customer's creditworthiness which causes them to set lower interest rates and loan loss provisions. Second, overconfident loan officers may overestimate future returns from borrowers which results in aggressive lending decisions. Ho et al., (٢٠١٩) examine the impact of CEO overconfidence during the financial crises on NPLs and bank performance in a sample of US publicly listed banks between ١٩٩٤–٢٠٠٩. They find that before the crises, banks managed by overconfident CEOs were having higher leverage than other regular banks. During the crisis years, they had higher NPLs because they relaxed the lending standards assuming higher future returns. Bacha and Azouzi, (٢٠١٩) examine the impact of emotional and gender bias of the bank CEOs on the credit decision. They find that

overconfident male CEOs were more risk-takers and less conservative than their overconfident female counterparts.

As shown from the prior literature, CEO overconfidence can impact the bank's decisions and performance. It can also impact credit risk because they underestimate the customer's creditworthiness which makes them set lower interest rates and loan loss provisions. They also overestimate future returns from borrowers which results in aggressive lending decisions.

Accordingly, the following hypothesis can be reached

H: There is a negative association between CEO overconfidence and the Bank's asset quality

٤. Data and Methodology

This section shows the data collection sources and provides details about the sample composition. Furthermore, it focuses on discussing the measurements of Asset quality, CEO overconfidence, Board gender Diversity, and other control variables.

٤,١. Sample and Data.

The empirical analysis is based on unbalanced panel data of ٦٦ listed banks from ٢٠ European countries. It was selected according to the availability of quarter information on the commercial bank's asset quality and overconfidence measures.

The initial sample consisted of ١٧٦ banks from ٢٥ countries obtained from the Thomson Reuters Eikon database. The sample was reduced to include commercial listed banks only to concentrate on the type of banks that are most vulnerable to credit risk. To collect a sufficient number of observations, the sample period extends from Q١-٢٠١٤ to O٤-٢٠٢١. Data is trimmed at the ٥ and ٩٥ percentiles to reduce the influence of outliers. All data is in Euros. The sample countries and bank names are displayed in Appendix A.

٤,٢. Methodology

The following OLS regression model is used to examine our hypothesis

$$AQi,t = \alpha + \beta_1 \text{ CAPEX}_{i,t} + \beta_2 \text{ BANK-SIZE}_{i,t} + \beta_3 \text{ PROF}_{i,t} + \beta_4 \text{ AGE}_{i,t} + \beta_5 \text{ BOARD-SIZE}_{i,t} + \varepsilon_{i,t}$$

Where $AQ_{i,t}$ = is a dependent variable that defines Asset Quality for bank i in quarter t,. $CAPEX_{i,t}$= independent variable representing the capital expenditure used to measure CEO overconfidence for bank i in quarter t. $BANK\text{-}SIZE_{i,t}$= the bank size for bank i in quarter t. $PROF_{i,t}$ = bank's profitability. $AGE_{i,t}$= bank age for bank i in quarter t . $Board\ SIZE_{i,t}$=Board size for bank i in quarter t.

Below are the measures of each of the research variables

٤,٢,١. **Asset Quality:** The first measure of asset quality used in this paper is the ratio of non-performing loans (NPLs) to gross loans (Kadioglu and Telceken, ٢٠١٧; Balakrishnan and Ertan, ٢٠١٨) where a higher ratio shows a lower bank's asset quality. NPLs are defined as loans where borrowers have defaulted, or are no longer able to repay the loan with its interest for a specific period (Alton and Hazen, ٢٠٠١). Higher non-performing loans impact the bank's profitability and lead to bank failures because banks have to bear the costs of loans that are no longer generating income (Beltrame, Previtali & Sclip, ٢٠١٨). This measure will be referred to as AQ١

Another measure of asset quality is the loan loss provision (LLP) ratio (LLP/GL%). When borrowers fail to repay all or part of their loans, banks keep appropriate provisions for losses on defaulted loans. So, the ratio of LLP to GL is an indicator of loan portfolio problems. Higher provisioning shows that a greater portion of risk has already been taken into account in the profit and loss statement, leading to lower asset quality (Velliscig, Floreani, Polat, ٢٠٢٣). This measure will be referred to as AQ٢

٤,٢,٢. **CEO Overconfidence:** Overconfidence was defined in prior research as an increase in one's self-assessment leading to optimistic beliefs about judgments, decisions, and

estimations (Hayward and Hambrick, ١٩٩٧). The prior literature showed how CEO overconfidence affects the investment choices made by firms (Malmendier and Tate, ٢٠٠٥, ٢٠٠٨; Ben-David, Graham, and Harvey, ٢٠١٠). So, depending on the CEO's recent investment choices, we employ an investment-based overconfidence proxy (CAPEX) which is a dichotomous variable set equal to one if the capital expenditures divided by total assets in a given quarter is greater than the median level in that quarter/, otherwise zero. This proxy is used by Ahmed and dulleman, (٢٠١٣) and it is based on research from Ben-David, Graham, and Harvey (٢٠١٠) that shows businesses with overconfident CEOs spend more on capital projects, as well as research from Malmendier and Tate (٢٠٠٥) that shows overconfident managers overinvest in capital projects.

٤,٢,٣. Control Variables

We use the following explanatory variables in the analysis.

٤,٢,٣,١. Bank size (BANK SIZE $_{it}$):

According to the prior literature; larger banks have greater access to capital markets, impose higher interest rates on the provided loans and invest in risky assets (Ariss, ٢٠١٠). Although large banks are expected to have better risk management strategies and effective monitoring of the borrowers and default rates, however; some researchers found that this can be difficult since large banks take large risks. However; another strand of

literature argues that the larger banks are less prone to risk, as they have better diversification (Kabir and Worthington, ٢٠١٧), and have larger buffers that make them cover future uncertainties such as liquidity problems or obligations, also they have better risk management systems and better asset quality and a lower amount of (NPL) (Kabir and Worthington, ٢٠١٧). Thereby, the bank size impact on asset quality and non-performing loans is still ambiguous. Bank size is measured as the natural logarithm of the total assets of bank $_{i}$ at year $_{t}$.

٤,٢,٣,٢. Bank's Profitability ($Prof_{it}$)

There are two opposing views in the literature concerning the impact of the bank's profitability on the bank's risk-taking and asset quality. One view finds that banks with higher profits are expected to grant more risky loans, thus having higher non-performing loans and affecting the bank's asset quality (Delis and Kouretas, ٢٠١١; Sarkar and Sensarma, ٢٠١٦). The other view finds that banks with higher profits are more conservative when taking risk, they have higher cushions to absorb losses and they can get through financial crises successfully compared to lower profitability banks (Holod, Kitsul & Torna, ٢٠٢٠; Mohsni and Otchere, ٢٠١٨). Bank's profitability is measured through the ROA ratio (which is the ratio of Net-income after taxes to total assets of bank i at year t) since it shows how the management can generate profits from its assets effectively (Khan, Scheule & Wu, ٢٠١٧).

٤,٢,٣,٣. Bank's Age ($AGE_{i,t,}$)

It is acknowledged that the older the bank age, the more experienced officers they have. They select better investment projects and engage in less risk, thus higher asset quality. Bank's age is measured as the number of years since incorporation (Berger et al., ٢٠٠٥).

٤,٢,٣,٤. Board Size (BOARD-SIZE $_{it}$)

According to Andres and Vallelado (٢٠٠٨), a large board should be preferred over a small one, because it allows for more efficient monitoring and advisory tasks. Larger boards have individuals with various experiences that assist management in making better decisions for the firm, including credit risk (Nakano and Nguyen, ٢٠١٢; Switzer and Wang, ٢٠١٣). However, this may be outweighed by the added cost of poor communication and decision-making associated with larger groups (Yermack, ١٩٩٦). Furthermore, Abou-El-Sood (٢٠١٧) showed that smaller-sized boards are associated with less risky investments. Thus the impact of board size on asset quality is still ambiguous. Board size is measured by the total number of directors on the bank board at the end of each fiscal year.

The variables measures are presented in Appendix B

٥. Results

٥,١. Descriptive statistics

Table ١ presents the descriptive statistics of the dependent variable Asset quality measured by NPL/GL and LLP/GL, the independent variable measured by CAPEX, and finally control variables. This table shows the summary statistics for the whole sample, as it presents the mean, median, standard deviation, minimum and maximum values, p٩٩, skewness, and Kurtosis of each variable used in the analysis. The NPL/GL mean (median) is ٠,٠٩١ (.٠٤٦٣٨٢), and its min and (max) are ٠,٠٠٥(٠,٤٣٥). LLP/GL mean (median) is .٠٠١٥٨ (.٠٠٠٩٢٠), and its min and (max) are ٠ (٠,٠٠٧). The CAPEX mean (median) is ٠,٤٩٩ (٠) and the BGD mean (median) is ٥٣,٢٩١ (٥٦,٠٠٤٩), its min and (max) are ٠ and ٩٧,٦١٩. All variables are normally distributed.

Table ١: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Median	p٩٩	Skew.	Kurt.
AQ١	٢٠٠٧	٠,٠٩١	٠,١١٥	٠,٠٠٥	٠,٤٣٥	.٠٤٦٣٨٢	٠,٤٣٥	١,٩٤	٥,٧٠٥
AQ٢	٢٠٣٤	.٠٠١٥٨	.٠٠١٨٦٩	٠	٠,٠٠٧	.٠٠٠٩٢٠	٠,٠٠٧	١,٤٩٨	٤,٤١٢
CAPEX	١,٨٨٠	٠,٤٩٩	٠,٥٠٠١	٠	١	٠	١	٠,٠٠٤	١
Prof	٢٠٤٨	٠,٠٠٢٧	٠,٠٠٢	٠,٠٠٠	٠,٠٠٦	.٠٠١٤٨٤	٠,٠٠٦	١,٠٤٢	٣,٩٦٤
Bank SIZE	٢٠٤٨	٢٥,٠٣٩	١,٩٤٨	١٩,٦٣٣	٢٨,٦٠٤	٢٤,٩٧٨٧	٢٨,٤٥٣	-٠,٢٥٥	٢,٤٠٥
Board SIZ	١٩٥٢	٢,٤٨٨	٠,٣٥٨	١,٣٨٦	٤,١٤٣	٢,٤٨٤٩٠	٣,٠٩١	-٠,٣٩٣	٣,٨٤٢
AGE	٢٠٧٣	٥,٠٤٤	٠,٩٧٦	٢,١٩٧	٦,٦٩٥	٤,٧٩١٦٤	٦,٦٦٩	-٠,٠٦٩	١,٩٨٩

٥,٢. Pairwise correlations

Table ٢: Pairwise correlations

Table ٢ depicts the correlation among all variables embedded in the research model. Moreover, it shows the collinearity between variables. NPL/GL & LLP/ GL are positively correlated with CAPEX at a significant level of ٠,٠١ which implies that higher levels of overconfidence measured by CAPEX are significantly correlated with higher levels of AQ١ measured by NPL/GL and higher levels of AQ٢ measured as LLP/ GL.

Regarding the multicollinearity, coefficients obtained from all explanatory variables in Pearson's correlation matrix are all below ٠,٨ thus there is no multicollinearity between predictors.

Table ٢: Pairwise correlations

Variables	(١)	(٢)	(٣)	(٤)	(٥)	(٦)	(٧)	(٨)
(١) AQ١	١,٠٠٠							
(٢) AQ٢	٠,٤٢٣	١,٠٠٠						
	(٠,٠٠٠)							
(٣) CAPEX	٠,١٥٠	٠,٢٥٨	١,٠٠٠					
	(٠,٠٠٠)	(٠,٠٠٠)						
(٤) Prof	-٠,٠٩٩	-٠,٠٢٦	٠,١٣٩	١,٠٠٠				
	(٠,٠٠٠)	(٠,٢٣٤)	(٠,٠٠٠)					
(٥) BANK-SIZE	-٠,١٥٦	-٠,٠٧٢	-٠,٣٢٣	-٠,٣٧٨	١,٠٠٠			
	(٠,٠٠٠)	(٠,٠٠١)	(٠,٠٠٠)	(٠,٠٠٠)				
(٦) BOARD-SIZE	-٠,١٣٨	-٠,٠٧٦	٠,١٥٥	-٠,٢٢٤	٠,٣٨٤	١,٠٠٠		
	(٠,٠٠٠)	(٠,٠٠١)	(٠,٠٠٠)	(٠,٠٠٠)	(٠,٠٠٠)			
(٧) AGE	٠,١٣٠	٠,٠٥٦	٠,٠٤٨	-٠,٢٨٣	٠,٢٠٤	٠,١٩٣	١,٠٠٠	

	(٠,٠٠٠)	(٠,٠١١)	(٠,٠٣٥)	(٠,٠٠٠)	(٠,٠٠٠)	(٠,٠٠٠)		
(٨) COVID	-٠,١٨٥	-٠,٠٢٧	٠,٠١٢	-٠,٠٧٣	٠,٠٥٢	-٠,٠٠٦	٠,٠٤٣	١,٠٠٠
	(٠,٠٠٠)	(٠,٢١٣)	(٠,٦٠٥)	(٠,٠٠١)	(٠,٠١٨)	(٠,٧٩٣)	(٠,٠٥٠)	

٥,٣. Regression Results

Table (٣) OLS Regression

	Asset quality					
Variables	**AQ١ (A)**			**AQ٢ (B)**		
	Pred	**Coeff**	**P-value**	**Pred.**	**Coeff**	**P-value**
CAPEX	+	.٠٢٠١٢***	٠,٠٠٠	+	.٠٠٠٦٨٢***	٠,٠٠٠
PROF	-	-٧,٠١٨***	٠,٠٠٠	-	-.٠٢٤٨٩	٠,٣٢٦
Board Size	-	-.٠٣٣٢***	٠,٠٠٠	-	-.٠٠٠٨٨***	٠,٠٠٠
Bank Size	-	-.٠٠٧٨***	٠,٠٠٠	-	-.٠٠٠٦**	٠,٠٤٧
Age	-	-.٠٠٥٨***	٠,٠٠٤	-	-.٠٠٠٩***	٠,٠٠٨
COVID	+	.٠٠٩٤٦*	٠,١٠٠	+	.٠٠٠٦٥***	٠,٠٠٠
Bank Fixed Effect	Yes			Yes		
Country Fixed Effect	Yes			Yes		
Year Fixed Effect	Yes			Yes		
P-value	٠,٠٠٠٠			٠,٠٠٠٠		
R-Square	٠,٦٢٩٧			٠,٤٥٨٤		
Adjusted R-squared	٠,٦٢٤٣			٠,٤٥٠٦		
Observations	١,٨١٦			١,٨٣٨		
Number of Banks	٦٦			٦٦		

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

Table (٣) shows that an OLS panel estimator with bank cross-section fixed effects is used. This test works well when evaluating a

sample with a large number of cross-sectional observations over a short period, which matches the sample structure employed in this article. The regression used the two proxies of Asset quality: AQ١ (NPL/ GL), AQ٢ (LLP/GL), and the OVC measured by CAPEX. Model (A) where AQ١ is used, shows that the coefficient of CAPEX is positive and statistically significant at a p-value less than ١٪ suggesting a negative association between OVC and asset quality. Model (B), where AQ٢ is used shows also a positive coefficient and is statistically significant at the ١٪ level. Consequently, these results confirm H١. This shows that banks with higher overconfidence have lower asset quality. These results support prior literature findings that overconfident CEOs undertake more risk than normal CEOS (Niu, ٢٠١٠; Liu, Le, & Thompson, ٢٠٢٠). They underestimate the customer's creditworthiness and are more optimistic about future returns such as returns from loan collection. Accordingly, they set lower interest rates, relax the lending standards and exhibit higher loan growth rates which result in higher NPLs and higher provisions and lower credit quality (Ho et al., ٢٠١٩, Mahdi and Abbes ٢٠١٨; Bacha and Azouzi, ٢٠١٩; Fersi and Boujelbène, ٢٠٢١). As for the control variables, all variables (except for profitability in the second model) are with significant coefficient estimates and they all possess the expected sign in all model variations.

٦. Conclusion

The main objective of this research work is to study the bank's asset quality through overconfidence behavioral bias. This

objective is achieved through the empirical verification of the hypothesis stating that CEO overconfidence has a negative significant influence on the bank's asset quality. The analysis was conducted using OLS regressions for a sample of ٦٦ listed commercial banks from ٢٠ European countries during the period of Q١٢٠١٤-Q٤٢٠٢١.

The empirical analysis confirmed the first hypothesis by revealing the significant negative influence of CEO overconfidence on the bank's asset quality using its two proxies (NPL/GL & LLP/GL). This finding suggests that overconfident CEOs' risk-taking attitudes may be influenced by an underestimation of risk, an overestimation of future returns, and an overestimation of risk management capabilities. The impact of overconfidence on asset quality can be explained in ٢ ways. First, overconfident CEOs tend to underestimate borrowers' creditworthiness, which leads them to impose lower interest/profit margins. Second, overconfident CEOs may overestimate future returns from loan collection and their ability to withstand future downturns, which results in following aggressive loan strategies and highly non-performing loans.

Overall, the study highlights the importance of monitoring CEO behavior and its impact on bank asset quality. Banks should recognize the potential hazards posed by CEO overconfidence and take appropriate measures like enhancing their credit risk management strategies. This may involve stricter lending

standards, improving credit assessment processes, and monitoring loan portfolios more closely to identify potential risks and take timely corrective actions. Furthermore, banks should carefully evaluate and select CEOs. They should identify and select executives possessing the necessary skills and risk management capabilities. Moreover, selection should not only depend on technical expertise but also on leadership qualities and behavioral traits that promote responsible decision-making.

Future research in this area can focus on exploring the underlying causes of overconfidence and how it can be minimized. Additionally, researchers can examine the impact of different management structures as independent and diverse boards on this association. There are few limitations to the study; the generalizability of the results is subject to certain limitations. It only depends on ٢٠ from ٥٠ European countries due to the unavailability of data. Therefore, the study cannot generalize the results to all the European banking systems. Furthermore, the study relies on an investment-based proxy only "CAPEX" to measure CEO overconfidence and does not take into account other proxies such as options or net stock purchases also due to the unavailability of data.

References:

- Aabo, T., Hvistendahl, N. T., & Kring, J. (٢٠٢٠). Corporate risk: CEO overconfidence and incentive compensation. *Managerial Finance*, ٤٧(٢), ٢٤٤-٢٥٥.

- Abou-El-Sood, H. (٢٠١٨). Corporate governance and risk-taking: the role of board gender diversity, *Pacific Accounting Review.*
- Adams, P., A., & Adams, J., K. (١٩٦٠). Confidence in the Recognition and Reproduction of Words Difficult to Spell. *The American Journal of Psychology*. *73*(٤), ٥٤٤-٥٥٢.
- Ahmed, A.S. and Duellman, S. (٢٠١٣) Managerial Overconfidence and Accounting Conservatism, *Journal of Accounting Research*, ٥١, ١-٣٠.
- Ali, Z. & Tauni, M.Z. (٢٠٢١), CEO overconfidence and future firm risk in China: the moderating role of institutional investors, *Chinese Management Studies*, ١٥(٥),١٠٥٧-١٠٨٤
- Alton, R.G. and Hazen, J.H. (٢٠٠١), "As economy flounders, do we see a rise in problem loans", Federal Reserve Bank of St. Louis, ١١(٤), ٤٥-٦٥.
- Andres, P. de, & Vallelado, E. (٢٠٠٨). *Corporate governance in banking:* The role of the board of directors. *Journal of Banking & Finance*, ٣٢(١٢), ٢٥٧٠–٢٥٨٠.
- Ariss, (٢٠١٠), Competitive conditions in Islamic and conventional banking: A global perspective, Review of Financial Economics, ١٩(٣), ٩١-١٣٥
- Arrawatia, R.; Dawar, V.; Maitra, D.; Dash, S.(٢٠١٩). Asset quality determinants of Indian banks: Empirical evidence and policy issues. *Journal of Public Affairs.*
- Athanasoglou, P.P., Brissimis, S.N. and Delis, M.D. (٢٠٠٨), Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions & Money*, ١٨(٢), ١٢١-١٣٦.
- Beltrame, F.; Previtali, D.; Sclip, A. (٢٠١٨). Systematic risk and banks leverage the role of asset quality. *Finance Research Letters, (27), 113-117.*
- Ben-David, I. and Graham, J.R. (٢٠١٣). Managerial Miscalibration. *The Quarterly Journal of Economics*, ١٢٨, (٤), ١٥٤٧-١٥٨٤.

- Berger, A. N., & DeYoung, R. (١٩٩٧). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance*, ٢١(٦), ٨٤٩-٨٧٠.
- Blanton, H., Pelham, B. W., DeHart, T., & Carvallo, M. (٢٠٠١). Overconfidence as Dissonance Reduction. *Journal of Experimental Social Psychology*, ٣٧(٥), ٣٧٣–٣٨٥.
- Bollaert, H., & Petit, V. (٢٠١٠). Beyond the Dark Side of Executive Psychology. *European Journal of Management, 28*, ٣٦٢-٣٧٦.
- Bouwman, Christa H.S. (٢٠١٤). Managerial optimism and earnings smoothing. *Journal of Banking & Finance*, ٤١(C), ٢٨٣-٣٠٣.
- Brown, J. D. (١٩٨٦). Evaluations of Self and Others: Self-Enhancement Biases in Social Judgments. *Social Cognition*, ٤, ٣٥٣-٣٧٦.
- Brown, J. D. (٢٠١١). Understanding the Better Than Average Effect. *Personality and Social Psychology Bulletin*, ٣٨(٢), ٢٠٩–٢١٩.
- Campbell, C.; Gallmeyer, M.; Johnson, S.; Rutherford, J.; Stanley, B. (٢٠١١). CEO optimism and forced turnover, *Journal of Financial Economics*, ١٠١, ٣, ٦٩٥-٧١٢
- Chatterjee, A., & Hambrick, D. (٢٠٠٧). It's all about me: Narcissistic chief executive officers and their Effects on company strategy and performance. *Administrative Science Quarterly,* ٥٢: ٣٥١–٣٨٦.
- Cyert, R., & March, J. ١٩٦٣. *A behavioral theory of the firm.* Englewood Cliffs, NJ: Prentice-Hall.
- Daniel, K. & Hirshleifer, D. (٢٠١٥). Overconfident investors, predictable returns, and excessive trading, *The Journal of Economic Perspectives*, ٢٩ (٤), ٦١-٨٨
- Delis, M. and Kouretas, G.(٢٠١١). Interest rates and bank risk-taking, *Journal of Banking & Finance,* ٢٠١١, vol. ٣٥, issue ٤, ٨٤٠-٨٥٥
- European Banking Authority (٢٠١٦). Dynamics and drivers of non-performing exposures in the EU banking sector.

- Fersi, M. & Boujelbène, M. (٢٠٢٠). Overconfidence and credit risk-taking in microfinance institutions: a cross-regional analysis, *International Journal of Organizational Analysis*, ahead-of-print No. ahead-of-print.
- Goel, A. M., & Thakor, A. V. (٢٠٠٨). Overconfidence, CEO Selection, and Corporate Governance. *The Journal of Finance, 63*(٦), ٢٧٣٧–٢٧٨٤.
- Hambrick, D. & Mason, P. (١٩٨٤). Upper Echelons: The Organization as a Reflection of Its Top Managers, *The Academy of Management Review*, ٩(٢), ١٩٣-٢٠٦.
- Hayward, M. L., & Hambrick, D. C. (١٩٩٧). Explaining the premiums paid for large acquisitions: Evidence of CEO hubris, *Administrative Science Quarterly*, ١٠٣-١٢٧.
- He, Y., Chen, C., & Yue, H. (٢٠١٨). Managerial Overconfidence, Internal Financing, and Investment Efficiency: Evidence from China. *Research in International Business and Finance, 47*, ٥٠١-٥١٠.
- Heaton, J.B. (٢٠٠٢) Managerial Optimism and Corporate Finance. *Financial Management*, ٣١, ٣٣-٤٥.
- Hiller, N.J. and Hambrick, D.C. (٢٠٠٥) Conceptualizing Executive Hubris: The Role of (Hyper-) Core Self-Evaluations in Strategic Decision-Making. *Strategic Management Journal*, ٢٦, ٢٩٧-٣١٩.
- Hirshleifer, D., Low, A., & Teoh, S. H. (٢٠١٢). Are overconfident CEOs better innovators? *Journal of Finance*, ٦٧, ١٤٥٧–١٤٩٨.
- Ho, P.P; Huang, C.; Lin, C. Yen, Ju-F. (٢٠١٩), CEO overconfidence and financial crisis: Evidence from bank lending and leverage, *Journal of Financial Economics*, ١٢٠, (١), ١٩٤-٢٠٩.
- Holod, D. ; Kitsul, Y. & Torna, G. (٢٠٢٠). Market risk-based capital requirements, trading activity, and bank risk, *Journal of Banking & Finance*, ١١٢(C).

- Huang, R.; Tan, K., Keng; Faff, R.. (٢٠١٦). CEO overconfidence and corporate debt maturity. *Journal of Corporate Finance*, ٣٦,.٩٣-١١٠.
- Jabbouri, I; Naili, M. & Nouina, C. (٢٠١٩). Ownership identity and cost of debt in an emerging market: pre- and post-crisis analysis, *International Journal of Corporate Governance*, ١٠(٣/٤), ٣١١-٣٣٤.
- Kabir, Md. Nurul & Worthington, Andrew C., ٢٠١٧. The competition–stability/fragility' nexus: A comparative analysis of Islamic and conventional banks, *International Review of Financial Analysis*, ٥٠(C), pages ١١١-١٢٨
- Kahneman , D. & Lovallo, D. (١٩٩٣). A Cognitive Perspective on Risk Taking, Management Science, ٣٩ (١) ١٧-٣١
- Khan, M. Scheule, H. & Wu, E. (٢٠١٧), Funding liquidity and bank risk-taking, *Journal of Banking & Finance*, ٨٢, ٢٠٣-٢١٦.
- Kim, J.B.; & Wang, Z. & Zhang, *L. (2015)* CEO Overconfidence and Stock Price Crash Risk. *Contemporary Accounting Research*
- Liang, Q., Ling, L., Tang, J., Zeng, H., & Zhuang, M. (٢٠١٩). Managerial overconfidence, firm transparency, and stock price crash risk. *China Finance Review International*, ١٠(٣), ٢٧١–٢٩٦.
- Lin, J.; Lee, J.; Zhao, Y.; Lin, E. (٢٠١٩). Bank Systemic Risk and CEO Overconfidence, *The North American Journal of Economics and Finance (54).*
- Lin, C.; Chen, Y.; Ho, P. & Yen, J. (٢٠٢٠), CEO overconfidence and bank loan contracting, *Journal of Corporate Finance*, ٦٤.
- Liu, L., Le, H., & Thompson, S. (٢٠٢٠). CEO Overconfidence and Bank Systemic Risk: Evidence from U.S. Bank Holding Companies. *International Journal of Finance and Economics*.
- Leng, J., Ozkan, A., Ozkan, N., Trzeciakiewicz, A. (٢٠٢١) *CEO overconfidence and the probability of corporate failure: evidence*

from the United Kingdom. European Journal of Finance, ٢٧ (١٢). pp. ١٢١٠-١٢٣٤.

- Mahdi, I.B.S. & Abbes, M.B. (٢٠١٨). Risk and inefficiency: Behavioral explanation through overconfidence in Islamic and conventional banks, *Managerial Finance*, (٦), ٦٨٨-٧٠٣.
- Malmendier, U & Tate, G. (٢٠٠٥), CEO overconfidence and corporate investment, *Journal of Finance*, ٦٠ (٦), ٢٦٦١-٢٧٠٠.
- Malmendier, U & Tate, G (٢٠٠٨). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics, 89(1), 20–43.*
- Malmendier, U.; Tate, G. & Yan, J., (٢٠١١). Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. *Journal of Finance*, ٦٦, ١٦٨٧-١٧٣٣
- Malmendier, U., & Tate, G. (٢٠١٥). Behavioral CEOs: The Role of Managerial Overconfidence. *Journal of Economic Perspectives*, ٢٩(٤), ٣٧–٦٠.
- Merkle, C., & Weber, M. (٢٠١١). True overconfidence: The inability of rational information processing to account for apparent overconfidence. *Organizational Behavior and Human Decision Processes, 116*(٢), ٢٦٢–٢٧١.
- Mohsni, S. and Otchere, I. (٢٠١٨). Does regulatory regime matter for bank risk-taking? A comparative analysis of the US and Canada. *Journal of International Financial Markets, Institutions, and Money*, ٥٣,١-١٦.
- Moore D, Healy P. ٢٠٠٨. The trouble with overconfidence. Psychological Review ١١٥: ٥٠٢–٥١٧.
- Myers, S. (١٩٨٤), The Capital Structure Puzzle, *the Journal of Finance*, ٣٩(٣), ٥٧٤-٥٩٢

- Nakano, M., & Nguyen, P. (٢٠١٢). *Board Size and Corporate Risk Taking: Further Evidence from Japan. Corporate Governance: An International Review, 20(4), 369–387.*
- Niu, J. (٢٠١٠). The effect of CEO overconfidence on bank risk-taking, *Economics Bulletin*, ٣٠(٤), ٣٢٨٨-٣٢٩٩.
- Raj, M., & Forsyth, M. (٢٠٠٣). Hubris amongst UK bidders and losses to shareholders. *International Journal of Business*, ٨(١), ١-١٦.
- Safi, A.; Yi, X.; Wahab, S.; Chen, Y.; Hassan, H. (٢٠٢١), CEO overconfidence, firm-specific factors, and systemic risk: evidence from China, *Risk Management*, ٢٣, ٣٠ – ٤٧.
- Salike, N. & Ao., B, (٢٠١٨). Determinants of bank's profitability: role of poor asset quality in Asia. *China Finance Review International*, ٨ (٢), ٢١٦-٢٣١.
- Sarkar, S. & Sensarma, R. (٢٠١٦).The Relationship between Competition and Risk Taking Behavior of Indian Banks, MPRA Paper, University Library of Munich, Germany
- Switzer, L. and Wang, J. (٢٠١٣). Default Risk Estimation, Bank Credit Risk, and Corporate Governance, *Financial Markets, Institutions & Instruments*, ٢٢(٢), ٤٣ -١٧٠.
- Taylor, S.E. (١٩٨٩), Positive Illusions: Creative Self-Deception and the Healthy Mind, Basic Books, New York, NY
- Taylor S.; Brown J.D. (١٩٨٨), Illusion and Well-Being: A Social Psychological Perspective on Mental Health, *Psychological Bulletin*, ١٠٣(٢), ١٩٣-٢١٠.
- Velliscig, Floreani, Polato, (٢٠٢٣). Capital and asset quality implications for bank resilience and performance in the light of NPLs' regulation: a focus on the Texas ratio, *Journal of Banking Regulation*, ٢٤, pp ٦٦–٨٨.

Appendix A:

Displays the sample countries and bank names

Country	Bank Name	Number of Banks
	Erste Group Bank AG	
	Raiffeisen Bank International AG	
	BAWAG Group AG	
	BKS Bank AG	
Austria	Bank fuer Tirol und Vorarlberg AG	٥
Belgium	Kbc Groep NV	١
	Hellenic Bank PCL	
Cyprus	TCS Group Holding PLC	٢
Czech Republic	Komercni Banka as	
	Moneta Money Bank as	٢
	Danske Bank A/S	
	Jyske Bank A/S	
Denmark	Sydbank A/S	٣
	Alandsbanken Abp	
Finland	Nordea Bank Abp	٢
	Societe Generale SA	
France	Credit Agricole SA	٢
Germany	Commerzbank AG	١
	Piraeus Financial Holdings SA	
	Alpha Services and Holdings SA	
	National Bank of Greece SA	
Greece	Eurobank Ergasias Services and Holdings SA	٤

Hungary	OTP Bank Nyrt	١
	Intesa Sanpaolo SpA	
	UniCredit SpA	
	Credito Emiliano SpA	
	Bper Banca SpA	
	Mediobanca Banca di Credito Finanziario SpA	
Italy	Banca Monte dei Paschi di Siena SpA	٦
	ING Groep NV	
Netherlands	ABN Amro Bank NV	٢
	Sparebank ١ Sorost-Norge	
	Sparebanken Sor	
	DNB Bank ASA	
	Sparebank ١ Ringerike Hadeland	
	Sparebank ١ SMN	
	Sparebank ١ Nord-Norge	
	Sogn Sparebank	
Norway	Sparebank ١ Helgeland	٨
	Bank Millennium SA	
	ING Bank Slaski SA	
	mBank SA	
	Santander Bank Polska SA	
	Bank Handlowy w Warszawie SA	
	Bank Polska Kasa Opieki SA	
	Getin Holding SA	
	Powszechna Kasa Oszczednosci Bank Polski SA	
	BNP Paribas Bank Polska SA	
Poland	Alior Bank SA	١٠
Portugal	Banco Comercial Portugues SA	١
Russia	Sberbank Rossii PAO	١

	Banco Bilbao Vizcaya Argentaria SA	
	Bankinter SA	
	Banco Santander SA	
	Caixabank SA	
Spain	Unicaja Banco SA	٥
	Skandinaviska Enskilda Banken AB	
	Svenska Handelsbanken AB	
Sweden	Swedbank AB	٣
Switzerland	Valiant Holding AG	١
	Barclays PLC	
	Natwest Group PLC	
	Standard Chartered PLC	
	HSBC Holdings PLC	
United Kingdom	Bank of Georgia Group PLC	٥
٢٠ Country		**٦٦ Banks**

Appendix B:

Type of Variable	Name	Measure
Dependent Variables	**Asset Quality (AQ)**	***Measured by two proxies*** ١) ***NPL/Gl***. The ratio of non-performing loans to gross loans for bank i at quarter t. **(AQ١)** ٢) ***LLP/ GL*** The Ratio of Loan loss provisions to gross loans bank i at quarter t**.(AQ٢)**
Independent Variables	**CEO overconfidence (OVC)**	١) ***Measured by (CAPEX***) which is a

		dichotomous variable set equal to one if the capital expenditures divided by total assets in a given quarter is greater than the median level in that quarter/, otherwise zero banks i at quarter t.
Control Variables	١. **Bank Size (BANK-SIZE it)**	١) **Measured by** the natural logarithm of total assets of bank i at quarter t.
	٢. **Bank's Age (Age):**	٢) **Measured by** the number of years since it was founded.
	٣. **Bank's Profitability (PROFit)**	٣) **Measured by** the ratio of Net-income after taxes to total assets of bank i at quarter t. "ROA".
	٤. **Corona Virus (COVID)**	٤) **Measured as** a dummy variable takes ٠ before the pandemic and ١ afterward
	٥. **Board size (BOARD-SIZEit)**	٥) **Measured by:** The total number of directors on the bank board at the end of each fiscal year.