Group Part

A Work Project, presented as part of the requirements for the Award of a Master's degree in Management from the Nova School of Business and Economics.

How does the female gender impact the financial performance of the banking sector in the European Union? With an analysis of the impact of older aged employees, higher number of employees and central and southern countries

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Abstract

This paper focuses on the impact of the female gender on the financial performance of banks, in the European Union, within the timeline of 2005 and 2022. A comprehensive analysis of gender tells us that in the banking sector, throughout the years, there have always been more male workers than female ones. Using an Ordinary Least Squares regression model, we could conclude that gender does not play a role in explaining the economic well-being of banks, meaning no correlation or impact exists. Similar studies have reached the same findings.

Keywords: Gender, Financial Performance, Banks, European Union

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1 Introduction

The role of the female gender on society has been a recent topic of the last decades, with its focus being on the gender discrimination present in the professional environment. This is due to the disparity of wages observed between male and female, as showcased, by a study published by the World Economic Forum, covering 144 emerging and dominant economies, in 2017. The focal point was the Global Gender Gap Index, a measurement of gender disparities across four dimensions (being Economical, Educational, Health and Political), in the European Union. In addition, another reason for the trending topic of gender discrimination in the workplace is the low gender diversity seen in higher positions in corporations, with it being increasingly discussed nowadays. Papers such as the one from the European Women on Boards (2021), demonstrate how the majority of the European Countries have a Gender Diversity Index of women on boards and in corporate leadership way below 1 (which would be a representation of perfect gender equality), where of 668 companies studied, only 35% had women on their boards and just 19% had females in executive levels of decision making. One key aspect that may be affecting the low number of women on boards is the assumption that they are more risk averse than males. For example, if a bank takes a considerable amount of risk, it is less likely to choose a female for the board, since they are perceived to be less probable to make the dangerous judgments required for a bank's performance (de Cabo R, Gimeno R & Nieto M, 2012).

In that sense, we were intrigued by how impactful the female gender could be in the corporate environment, if there were real correlations between gender and the performance of companies. Are men intrinsically better workers than female and do they contribute positively for the economic well-being of companies? Could that be the reason why more men reach higher positions than women? These doubts went through our minds and for that matter, our project revolves around the following question: “How does the female gender impact the financial

performance, of the banking sector in the European Union?". With this being said, we want to find out whether or not female workers, impact the financial performance of banks, and if so, positively, or negatively? This work seeks to truly broaden the findings of the impact that women have in the business area, with the center of attention being the banking sector, within the European Union countries.

The posterior study is organized as such: Section 2 is dedicated to the review of the literature into the topic of the financial impact of females on the corporate world, in particular the banking sector; Section 3 focuses on the description of the database, the data collection process and the analysis of that input, specifically the variables of interest for our paper; Section 4 develops the empirical approach and methodology to reach our findings; Section 5 presents and debates the results obtained, at the end Section 6 concludes all the thoughts and discoveries of this paper.

2 Literature Review

2.1 Gender within Financial Performance

The prime works of Rosa, Hamilton, Carter, and Burns (1994 and 1996) testified that different genders had an impact and would generate distinct outcomes of performance, in businesses, namely in the country of observation - United Kingdom (Europe). In posterior years, following studies reinforced that same idea, in unalike geographical areas: such as Shrader, Blackburn, and Iles (1997) in the United States of America (North America) and Khalife, and Chalouhi (2013) in Lebanon (Asia).

With this being said, Rosa, Hamilton, Carter, and Burns (1994) stated that female owners performed less well than male owners in some measurements. Sharing the same deduction, authors Khalife, and Chalouhi (2013) proved that female owned in small firms generated lower gross revenues (once again in some metrics) than male owned. However, they saw no

significant differences of performance in some other measurements, such as incomes. In the opposite pole, we have Shrader, Blackburn, and Iles (1997) that defended that firms of bigger sizes with higher number of female managers were correlated with higher profitability ratios.

Taking this into account, in posterior years, the study of gender impact evolved, due to the definition of focal points and specific parameters. In other words, the focal point dispersed, and some papers focused on the study of gender within the board. Showing the opposite pole of the argument stated in prime works, there was Rose (2007), stating that no correlation existed between the representation of female on the board of companies and their performance, in

Denmark (Europe). Another supportive study of the same idea was of Carter, D'Souza, Simkins, and Simpson (2010), where there was no evidence of a significant relationship between gender and/or diversity of the board and performance financially of corporations in the United States of America. Finally, Haslam, Ryan, Kulich, Trojanowski and Atkins (2010) defended that there was no connection between the proportion of female workers, in the board, and the financial ratios, such as Return on Assets and Return on Equity, within the United Kingdom.

On the contradictory spectrum, we have Adams, and Ferreira (2009), that do not share the same idea, stating that female vs male directors on the board do have an impact on the firm's output, however it showcased the effect of gender diversity in firms from the United States is negative in their overall performance. On the other hand, we have Campbell, and Mínguez-Vera (2008) defending that gender diversity on the board generates economic benefits for the companies, in Spain (Europe). Another study within the same ideal was the paper of Lenard, Yu, York, Wu (2014), that found that a higher number of female workers in the board of directors leads to diminishing variability in the return of the stock market, meaning lower risk faced by the company. This was based on a gathering of firms from the Compustat database, with no country

of focus. Authors, such as Lückerath-Rovers (2013) and Nguyen, Ntim and Malagila (2020), agreed that a higher proportion of women on boards, impact positively the performance of companies, as well. Post and Bryon (2013) and Joecks, Pull and Vetter (2013) supported the same idea, the company's financial performance is greater when there is more gender diversity than if the board is entirely composed of men.

One of the many other focal points was within the gender of top managers, meaning how the amount of female or male in top management would affect the performance of companies. Authors Smith, Smith, and Verner (2006) showcased results where the proportion of female at top management work beneficiated the performance of firms, within Denmark. Another paper that supported the same deduction was from Francoeur, Labelle, and Sinclair-Desgagné (2008), with a bolder statement such as that higher proportion of female's officers leads to atypical positive returns, within the country of Canada. On the contrary, we have the study of GallegoÁlvarez, García-Sánchez, and Rodríguez-Dominguez (2010) where findings show that gender diversity at top management does not showcase higher performance than other firms with lower proportion of female vs male, concluding that gender does not influence financial performance of companies. This study was done within a sample of Spanish firms (Europe).

Despite the seemingly widespread contrary opinions, we need to consider that these are done with different measurements and in divergent countries. With this being said, it is clear that authors have witnessed difficulty to draw a general conclusion about the direction of the influence of female vs male. This is due to the complexity of the question and the divergent results observed on numerous variables used as well as among different sectors. Meaning, we cannot just conclude that females impact negatively or positively businesses since it is not that linear. We can only take deductions about specific metrics associated in particular sectors, within precise geographical areas.

Our research aimed to explore the specific impact and correlation of gender in the financial performance of the banking sector, in the European Union. An interesting study was made, in Bangladesh (Asia), by authors Dutta, and Bose (2007), however no conclusions were drawn since the sample was too small, suggesting to future researchers for larger samples with the focus on other industries as well as other performance measures. In 2012, Ekadah, and Kiweu concluded that in Kenya (Africa), there was not enough evidence to assume that gender diversity had an effect on banks performance. Due to recent years, the innovation on methodologies allowed for deeper studies to be developed and the paper of Pathan and Faff (2013) is evidence of that. It showcased the impact of board structure on banks performance, within size and gender diversity, amongst United States corporations. The findings supported a positive correlation between gender diversity on the board of banks and their financial performance.

Within our specific focus, a more up to date study of Andries, Mehdian and Stoica (2020) with the center of attention on the Central and Eastern European countries, exhibited that banks with higher portion of chairwoman lead to higher level of stability as well as profitability of the institutions, with a diminished level of credit losses. To finalize, the paper of Arnaboldi, Casu, Kalotychou, and Sarkisyan (2020) sums up the complexity of this study, since board heterogeneity and banks performance don’t have a determinant linear relationship and are influenced by market conditions and geographical culture.

2.2 Financial Performance

When it comes to the measurement of financial performance within corporations, there was a need to pursue a deep search into distinctive methodologies used, in order for us to employ the most appropriate assessment.

Moreover, the financial performance computations used, regarding accounting evaluations, were mainly sales turnover, value of capital assets, (Rosa, P., Hamilton, D., Carter, S. and Burns, H., 1994), gross revenue, owners' income (Khalife, D. and Chalouhi, A., 2013), among others. However, one study by Adam (2014) suggested the use of financial ratios in order to measure the financial performance of banks. The main examples are those of liquidity, solvency, profitability, efficiency, and leverage (as defended by Fatihudin D & Mochklas M, 2018). Nonetheless, in 1999, Seiford and Zhu argue that the Return on Equity (ROE) and Return on Assets (ROA) ratios were the ones that supplied adequate information to determine a bank's financial performance. In the following years, we could see that those ratios were the most commonly used in regard to this evaluation (Campbell, K. and Mínguez-Vera, A., 2008) (Lenard, M.J., Yu, B., York, E.A. and Wu, S., 2014) (Smith, N., Smith, V. and Verner, M., 2006) (Francoeur, C., Labelle, R. and Sinclair-Desgagné, B., 2008) (Adams, R.B. and Ferreira, D., 2009) (Dutta, P. and Bose, S., 2007) (Gallego-Álvarez, I., García-Sánchez, I.M. and Rodríguez-Dominguez, L., 2010) (Pathan, S. and Faff, R., 2013) (Arnaboldi, F., Casu, B., Kalotychou, E. and Sarkisyan, A., 2020) (Gilbert and Wheelock, 2007) (Hassan M & Adam M, 2014).

2.3 Legislation towards Gender Equality

Throughout the literature review, we found some authors highlighting the presence of certain legislation implemented by certain governments, in order to achieve gender equality in the corporate world. More precisely, within the hiring process, meaning, many European countries established a minimum quota of number of women in the institutions, as to reach a higher proportion of females, while other nations just incentivized and recommended firms to implement this employment behavior (Lückerath-Rovers M, 2013) (Valls Martínez, M. del C & Cruz Rambaud S, 2019).

In fact, the first country to execute regulations towards gender equality was Norway, in which the government decided to apply a quota of 40% of women represented within board members in corporations. Following the same example, we have Belgium (33.33% in 2017), Netherlands (30% quota in 2015), Italy (33% quota in 2015), France (40% quota in 2017), and Spain (40% quota in 2015). Despite these achievements, other countries of Europe, such as Finland, Germany, and Sweden, preferred to implement voluntary goals to increase the presence of the female gender in higher positions (De Cabo R, Gimeno R & Nieto M, 2012) (Xie J, Nozawa W & Managi S, 2020) (Adams R, 2016) (Seierstad C, Warner-Søderholm G, Torchia M & Huse M, 2017) (Valls Martínez M del C, Cruz Rambaud S & Parra OllerI M, 2019) (LückerathRovers M, 2013) (Valls Martínez M del C & Cruz Rambaud S, 2019) (Walby S, (n.d.).).

3 Data

3.1 Database

In order to obtain the necessary information that measure the impact gender has on the financial performance of the banking sector, within the European Union countries, we used two datasets: Bureau van Dijk BankFocus and Compustat, namely the Capital IQ. For our analysis, we needed information about employees' characteristics, such as their gender, age, level of responsibility, among others, which was taken from the first data set mentioned. On the other hand, to measure the financial performance of banks, we required accounting data, namely their total assets, total revenue, stockholders' equity, short-term debt, and other figures of the financial statements, which were removed from the Compustat database. As it is possible to understand there was not a possibility of extracting all the gender and financial information through a unique database. Although, with the help of the statistical program STATA, we accomplished the gathering of all the information through the merging of the two datasets.

This ended up giving us a sample size of 21533 observations in total. However, there were certain conditional statements involved in the work through the data, such as the erasing of all the findings that were blank, resulting in a closing of 3752 observations. It should be recalled that one observation equals a value from one variable from a specific year within each bank. To keep in mind that all the following scrutiny of the variables is thanks to the use of the program STATA.

Firstly, when it comes to the geographical area, we decided to focus on all countries of the European Union (Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, as well as Finland, France, Germany, Greece, Hungary, Ireland, Italy, adding up to Latvia, Lithuania, Luxembourg, Malta, Netherlands, ending up with Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden) (2022. "The European Union and Countries in the EU" *Schengen Visa*). As it is common knowledge, this economic community has been making efforts towards human rights, which includes gender equality, as mentioned before in 2.3 Literature Review Legislation. With this being said, we took an interest in understanding if these efforts were having an impact on gender equality and if there was a possible correlation between that and financial performance.

When it comes to the time period, the selection was between January of 2005 and January of 2022. This decision was made to be able to, primarily, have a time range of at least 15 years. This is because we assume these number of years are a good wide to incur conclusions, since it increases our sample size. Secondly, because we wanted to pick up the main cycles of economic disruption such as the debt crisis that happened in the European Union, specifically in the beginning of the year 2008, studied by Kenton, Will (2021) , along with the covid-19 crisis in early 2020 (Aiyar, Dao, Jobst, Mineshima, Mitra, and Pradhan (2021)).

Finally, when choosing the focus industry sector, we selected the banking sector due to sample size. This was the sector where we had the most amount of information out of the databases.

Notwithstanding, we were also intrigued by the fact that the European Union has banks known worldwide with huge impacts in the global economy, for example, BNP Paribas.

3.2 Descriptive statistics

Concerning the variables used for our analysis, only some variables were considered important for the study, in particular: Fiscal Year, Return on Equity, Return on Assets, Gender, Age, Age Bracket, Level of Responsibility, Total Number of Employees, Debt Ratio, Country. Some of the metrics were important for the model and a few were only used as information for the graphical analysis, such as the Fiscal Year and Age Bracket.

Regarding this topic, there are two types of variables: numerical (quantitative data) and categorical (qualitative data). As seen, the main difference between these two is the content of the information that each one provides. The first ones are represented by numbers with mathematical implications. On the contrary, the variables that do not imply mathematical calculations or values are defined as the latter one. All variables of the analysis will be explained in detail in its own section.

3.2.1 Return on Equity and Return on Assets

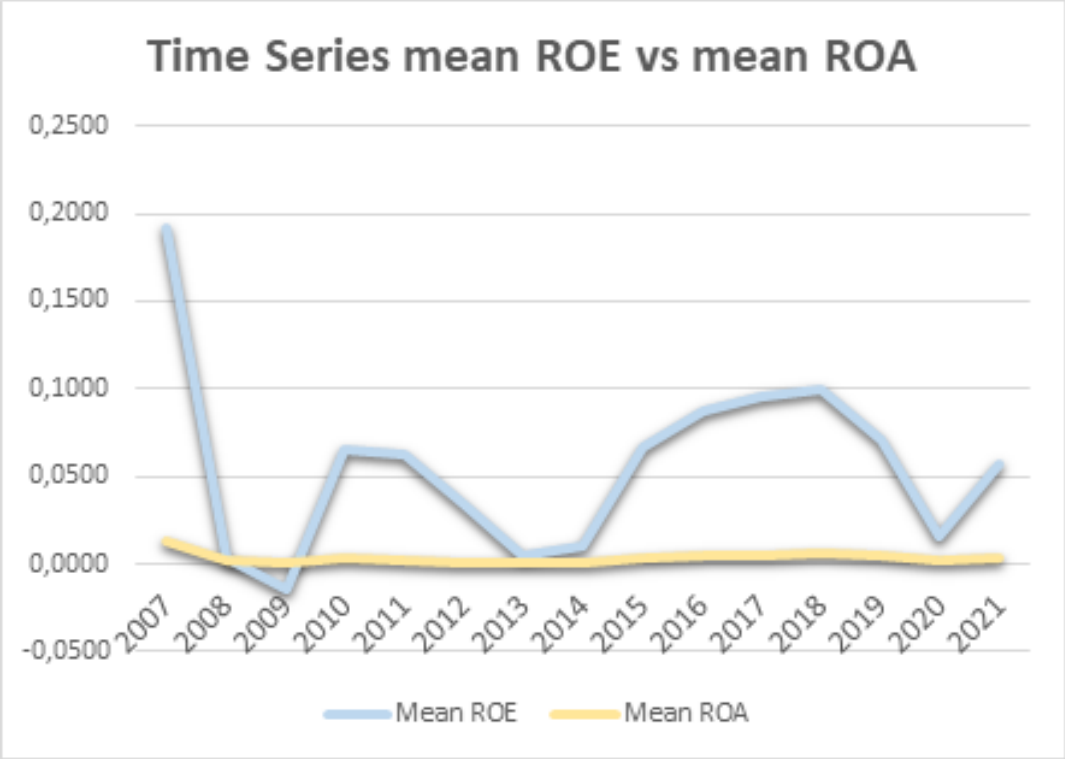
To analyze the impact of the female gender on the financial performance of banks, within the European Union (the main focus of our study), we needed to find ways to measure the wellbeing of these institutions. With this being said, we decided to calculate two possible ratios, namely Return on Equity (ROE) and Return on Assets (ROA). This was chosen, as previously debated in *2 Literature Review*, due to the number of studies that ended up using these computations in their analysis of financial performance.

Primarily, ROE is known as a metric of the profitability of a commerce related to equity. In other words, it measures how efficient the bank is at generating profits (represented by the net income) by its equity (equal to the amount of money invested by the owners of the bank). This

is calculated as the relation between the net income of the bank and its shareholders equity, as it follows: ROE $=\frac{\text{Net Income (Loss)}}{\text{Shareholders Equity}}$. On the other hand, we have ROA which has the same thought behind ROE, meaning it is a measurement of profitability of a firm related to the assets.

The computation is: ROA $=\frac{\text{Net Income (Loss)}}{\text{Total AAsets}}$. By way of explanation, it quantifies how efficient the banking institution is at generating profit with its total assets. It is important to remember that these ratios are both numerical.

In Graph 1, we have a time series between the mean of ROE and ROA. It is important to mention that for each year, we have a unique value of these financial ratios which is representative of the mean between all values of banks. It is clear that ROE has higher values than ROA throughout all years (except in the year 2009). One explanation for such an exception can be the sovereign debt crisis that happened in 2008, as previously mentioned. The performance of banks was clearly affected by it, as proven now by these ratios. It is, at last, important to mention one of the most memorable years economically, more recently, such as the years of 2019 until 2020, with the covid-19 pandemic. There was a tremendous decrease in ROE as well as in ROA. The European Union was impacted by it financially and the banks were the first to feel it. In 2021, there was a recovery of both, due to the healing of the shock in the economy, as already defended.



Graph 1 Time Series of Return on Equity and Return on Assets (2007-2021)

To conclude, it is possible to witness through Table 1, that ROA has a lower mean with lower variation (given by the standard deviation) than ROE. This means that if we use the metric of ROA to measure the financial performance of banks, it gives us a lower mean (weaker performance) than when using ROE as well as less fluctuations, due to being more constant. For this reason, we choose ROE to measure the financial performance of our banking sample, due to being able to truly reflect the changes that occur in the economy on these institutions and measure its real impact. Adding up to the fact that the main goal of any firm is to be profitable to its owners, it only made sense to use ROE, due to representing how efficient the bank is at generating profits from its equity (related to the shareholders). Also, Thomsen and Pedersen (2000) have proven that the ownership structure of the institution (whether shareholders or single owned) impacts the profitability of European companies. This study and all the other papers mentioned influenced us to follow this ratio.

3.2.2 Gender

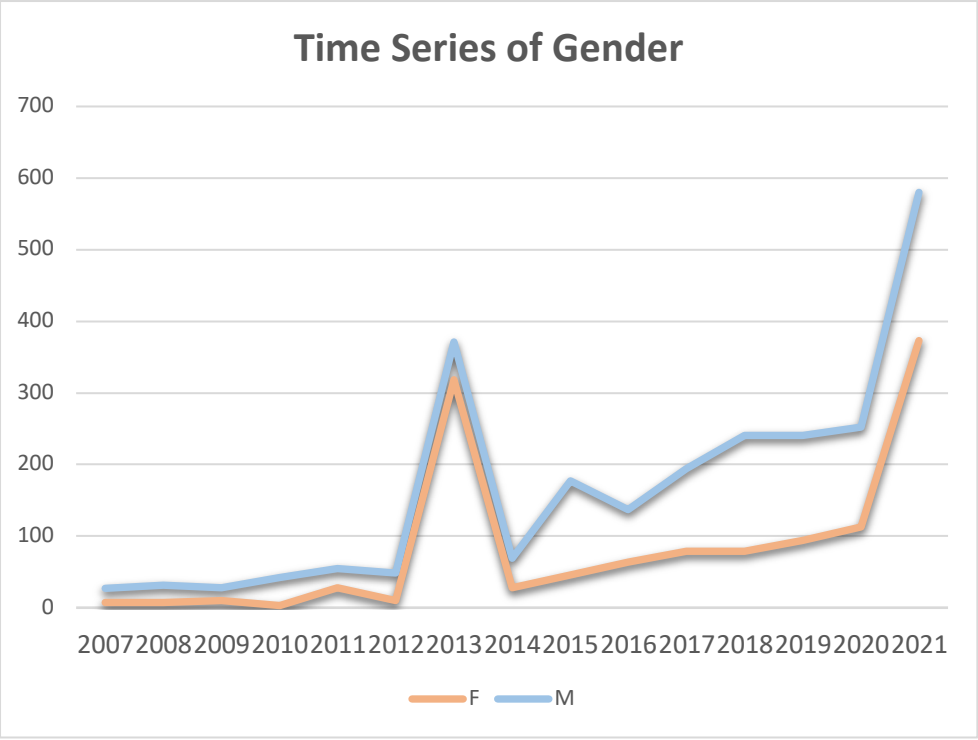
Considering that the main question of this paper is whether female gender affects the financial performance of the banking sector, it is essential to introduce this variable as one of the explanatories of the model. In our study, gender has 2 options: Female (denoted by F) or Male (represented by M). Due to what was explained before in the *3.2 Descriptive Statistics*, gender is a categorical variable which was transformed into a numerical one, through a dummy variable, called Female. Therefore, in our OLS regression, Male takes the value of 0 and Female 1.

In Table 2, we can see that out of 3752 observations, only 1259 belong to female workers (33.56% of the sample). This is less than half of the human resources in the sector, in the European Union. The remaining 2493 observations (equal to 66.44%) belong to males. Simply considering these values, we can argue that the participation of women in the banking industry is relatively low. There are a various number of justifications behind this phenomenon, such as individual preferences concerning, for example, education (in recent years women tend to focus on their studies which makes the entrance to the working market postponed), as defended by Genre, Salvador, and Lamo (2010) related to the working sector of the European Union.

Another example is related to childcare and fertility of females, meaning that if a woman is in her fertility ages and decides to have children, the impact of childcare given by the government affects whether or not she can or is willing to work. This is also defended by Bick (2016), applied to the Organization for Economic Co-operation and Development. Other rationales can come up where women tend to not follow the financial world whether because they are not particularly drawn to it due to all the characteristics of this sector or because there are no role models in it and no women to pave the way. This is studied by authors Redmond and McGuiness (2019) with respect to the way different motivations of female vs male explain the gap wage among different genders.

However, the presence of women in the banking sector had a positive evolution over the years, as seen in Graph 2. Relative to the same graph, focusing on one particular year, we can see the maximum number of women present in the banking sector was in the year of 2013, with a value of 318 females. This may be due to the fact that the Financial Inclusion Support Framework

(FISF) (The World Bank. (2014, February 26). *Expanding Women's Access to Financial Services*.) implemented mechanisms to increase the financial inclusion of women. Besides all the efforts made socially, there were also attempts made by the European Council and Union to try to achieve gender equality amongst all sectors. An example of that is the decision in 2002 by this institution to improve childcare facilities to stop all the restraints to female participation into the workforce (Plantenga, Remery, Siegel and Sementini (2008)).



Graph 2 Time Series of Gender (2007-2021)

Even though we have been witnessing an increase, there are still more male workers than female ones, as seen in Graph 2, in year 2021. Despite the childcare policies goals, this did not

contribute towards equality, due to all difficulties to implement them whether by lack of competence or resistance, as demonstrated by Masselot (2016). There are various factors towards this phenomenon of existing less women working in the banking sector than men. We have to consider that individual preferences of gender cannot be changed since they are socially and culturally implemented.

3.2.3 Age

When it comes to the variable age, we decided to add it as an explanatory variable into our model because we wanted to understand how having an older or younger workforce, in the banking sector, in the European Union, affects their financial performance. Does having younger employees increase productivity due to the innovation, efficiency, and energy they bring to the table? Or does having older employees improve the economic well-being of banks due to the knowledge and practice they gained throughout their experience working?

This variable is considered a numerical one, due to the quantitative content attributed to it. In Table 1, we can see that the average age of the workers in our sample is around 52.42 years old. This seems like an expected value since the population of the European Union is slowly ageing, meaning the natality (proportion of births to total population) is decreasing and the expectancy of life is improving (due to all the healthcare support). This leads to an ageing population (studied by Rechel, Grundy, Robine, Cylus, Mackenbach, Knai, and McKee (2013)), consequently an ageing workforce, which applies to all different sectors (in this case the banking sector) (quoting the paper of Ilmarinen (2001)). In order to clarify the range of ages in our sample, the employee with the lowest age observed, in the banking sector, in the European Union, throughout the timeline (2005-2022) is 29 years old (as seen in Table 1). This does not surprise us because young adults are getting into the working market later on than in previous times, due to wanting to extend their education. Additionally, the worker with the

highest age represented is 96 years old. This is flabbergasting due to being beyond the retirement age, which is around 65 years old.

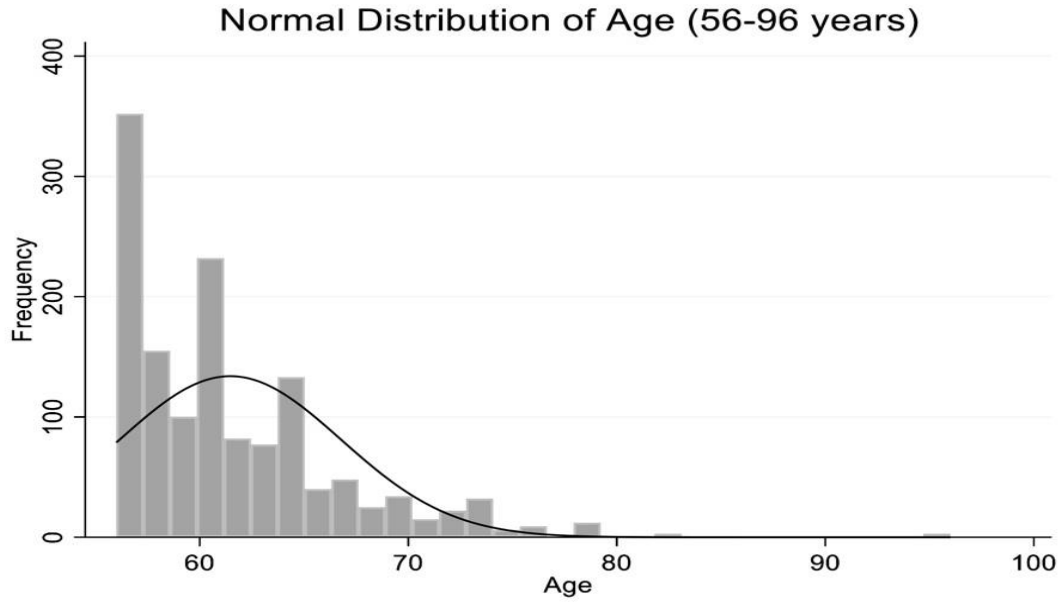
Regarding this numerical variable, the analysis will be split between the two authors: Matilde with the age below 56 years old and Sofia above 55 years old.

Let us now move into the data of the variable age between 56 and 96 years old (Sofia's part), with it being the oldest part of the working force of the banking sector. Considering the initial sample contained 3,752 observations, when dropping all the age observations below 56 years old (this is only attained through the use of the program Stata), we lose 2,372 data points, resulting in a total of 1,380 observations, as seen in Table 4. This was a mislaying of ≈ 63.22%, which gives us the indication that the majority of the workforce in the banking sector, in the European Union, is below 56 years old. This goes according to what was studied before since the mean was indeed below 56 years old (in specific of 52.42 years old, as perceived in Table 1).

Table 4 summarizes the updated descriptive statistics after letting go of the non-necessary observations. In this sense, when analyzing the reduced subsample of employees between 56 and 96 years old, we see that the average age amongst workers is of ≈ 61.47 years old, which does not look far from the mean of the original sample and is below the average retirement age of the European Union (≈ 65 years old) (as mentioned in "Retirement Ages". *Finnish Centre for Pensions*). This is proven by Graph 5, within the graphic representation of the normal distribution.

Another information is about the variation, or so-called standard deviation. In Graph 5, the curve is almost not flat but not tapering, and this represents a standard deviation of around ≈ 5.31 years (little deviation of other ages from the mean). This is proven from looking at the

same graph and seeing very few observations higher than 80 years old, being only three observations with 96 years old and another three with 83 years old.

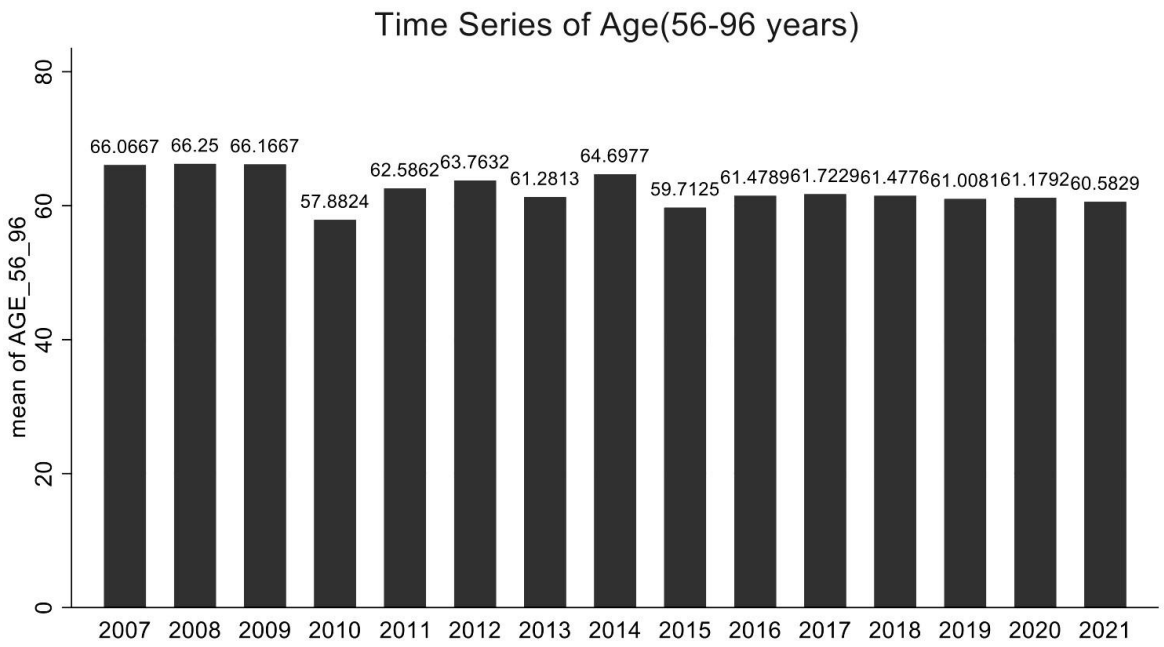


Graph 5 Normal Distribution of Age Bracket between 56 and 96 years (in the banking sector of the European Union)

This represents very few outliers, as shown by the graph box in Graph 6.

Now, moving forward into a quick analysis of the age bracket, which gives us a quick view of the conclusion on the way the observations are distributed in this subsample as well as a sum of the findings. Table 5 shows us what we already know, which is that the modal age is in between 56-65 (the mean we found was ≈ 61.47 years old in Table 4) and that it represents 81.96% of the subsample (high concentration in this age bracket, leading to testifying low variation).

For the ending, let us now do an analysis of this variable within the timeline (2007-2021). As seen in Graph 7, in the beginning years, the average was around 66 years old (between 2007 until 2009). This was marked as the period with the highest average age, meaning the older workforce of the banking sector, in the European Union, from all the timelines.



Graph 7 Time Series of Age between 56 and 96 years (2007-2021) (in the banking sector of the European Union)

On the opposite pole, in the year of 2010, it showed the lowest mean out of all the timeline, attaining a value of ≈ 58 years old, meaning the older part of the working force was decreasing its age. We know that this year was impacted by the economic crisis felt in Europe, mostly due to the collapse of the banking system of the country of Iceland in 2008 (as shown by Danielsson and Zoega in 2009) and the consequent impact on other economies (from the European Union), in the following years, as well as the Great Recession felt during the years of 2008 and 2012 (Kenton, Will (2021)*)*. This may have led to an increase in unemployment, and subsequently the older workforce was dismissed or retired from it, decreasing the average in that specific year. The years that followed until the end of the timeline (2021), the averages were always kept around 61 years old.

It is important to mention that, in the scatter plot, there are many values in the same year which are representative of the mean age of workers per bank. On the other hand, on the fitted line,

mean ages of all banks are aggregated, through an average, in order to have a unique mean per year. This is applied to all the scatter plot and fitted line graphs.

When looking at Graph 8, the scatter plot, we can see that the fitted line tells us exactly that the mean of age (between 56 and 96 years) has been decreasing, throughout the timeline, meaning the ageing is stopping. It started at ≈ 66 years old and ended with ≈ less than 60, in 2021. This may be happening due to the immigration policy in the European Union, in the last few years. Meaning, recently this economic community has been welcoming skilled immigrants all around the globe, generating controversy amongst political parties and its population. This was studied by Zimmermann (2005), stating that the ageing issue that all European continent was facing would be diminished by selective policies that would discourage unskilled foreign workers and be attractive towards skilled migrants.

3.2.4 Total Number of Employees

The decision to add this variable was due to the necessity to consider the size of the banking institutions as one of the factors that may influence financial performance. In that direction, we consider the number of employees a representation of the size of the bank. We want to be able to answer the following questions: Do bigger banks, with a higher number of employees, perform better because more people are working towards the economic well-being of the institution? Or it does not have any impact whatsoever?

With this being said, in Table 1, we can see that the mean of this variable in our data is 45272.85, which means that on average each bank of our sample has 45272 employees. The minimum number of employees observed is 41 workers and the maximum of 197070, which clearly indicates a high variation of observations.

It is necessary to mention this is a numerical variable and will be treated as such. Nonetheless, the analysis will be split between the two authors: Matilde and Sofia. Matilde will focus on the banks that have below 60000 number of employees and Sofia will study above that value.

Moving forward with the analysis of number of employees above 60000 that is written by Sofia. To make the analysis easier we decided to divide the numbers of employees between branches, in the following order, shown in Table 6. Now, we will examine the banks with a total number of employees above 60000, meaning the last three branches can be considered the bigger size banks.

In Table 7, we can see that there are only 993 observations in this subsample, which means that the bigger size companies account only for 26.47% of the sample of banks in the European Union. In other words, there are not many banks employing a huge number of employees. The banks of the biggest size (employing over 100000 workers) represent only 12.39% of this

subsample. In terms of time series analysis, based on Graph 11, we can see the highest mean was in 2015, where on average each bank was employing a total of 111057 workers. The lowest was in the year 2008, with an average of 64959 employees. This is understandable due to 2008 being the debt crisis, which would implicate the increase of unemployment rate and sub consequently decrease of number of employees in banks. After the recovery of the economic crisis felt in the European Union, employment increased and that is portrayed in the year of 2015. The fitted line of values on Graph 12, reflects that there has been an upward tendency in the total number of employees in the banking sector, meaning banks are hiring more and more workers as the years go by. This may be due to the recovery of the crisis, since in the beginning years of our timeline it was mainly the hit of the debt crisis. With the economy becoming stronger and healthier, employment rates increase, and banks can employ more people. This is proven by Graph 13, which portrays the employment rate of the European Union from 2005 until 2020.

3.2.5 Level of Responsibility

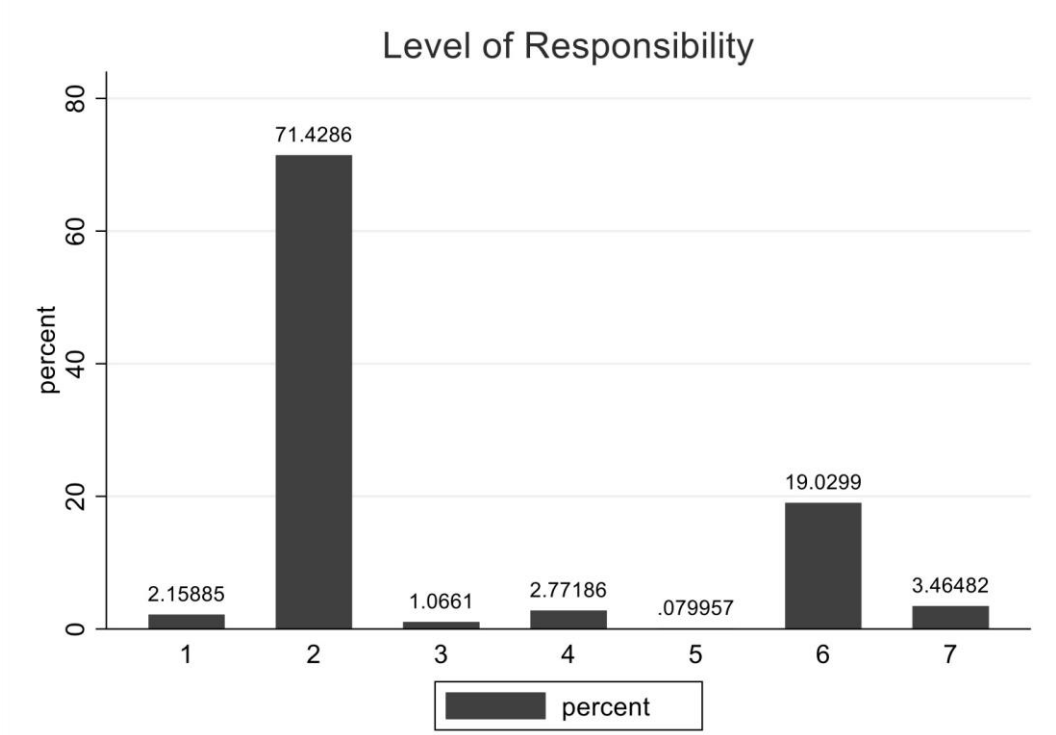
The variable Level of Responsibility was accounted for in our analysis, to answer the following question: does having more members or employees with less responsibility increase productivity and consequently, financial performance? Or does the contrary occur? Is it even correlated?

This variable is known as a categorical one due to the qualitative data it offers, such as the type of responsibility attributed to each employee. This means one employee can be considered a manager, or an executive, among others, which are equivalent to different levels of responsibility (or power). Although to be able to draw conclusions about the Level of Responsibility of employees, we had to categorize all the different types of positions and rank them into 7, meaning we transformed the categorical variable into a numerical one, due to the

need to express it into numbers for statistical purposes. This distribution of the respective roles assigned to each classification is seen in Table 8. It is important to mention that number 1 is equivalent to the highest one, such as in terms of responsibility as well as in power (the role of Chairman, for example) and number 7 equal to the lowest of them all (considered as only Employee, id est).

In Table 9, it is visible the distribution in terms of percentage as well as absolute frequency. Within the sample, the highest number of employees, precisely, 2,680, are within the 2nd highest level of responsibility (correspondent to Proxyholders or Representatives), representing

71.43% of the sample. On the other hand, the less frequent class is the 5th one (such as Managers), with only 3 employees in it, having a percentage of 0,08%. We are able to see more clearly, in Graph 14, all the information found, as well as the fact that the 1st ranking represents only 2.16% and the last ranking represents 3.46%.



Graph 14 Level of Responsibility (in the banking sector of the European Union)

3.2.6 Debt Ratio

Debt Ratio is known as the measurement of the share of assets that are funded by debt (amount of capital that is owned, in this case, that banks own). This ratio is calculated as it follows: $\frac{(Short-Term\ Debt+Long-Term\ Debt)}{Total\ Assets}$. Adding to the fact that it is an essential financial indicator for banks since it helps to monitor financial stability and is used to measure the risk of the institution. This means having a high debt ratio is unfavorable for banks since it implies that they require enormous amounts of funding to finance their assets.

It is possible to confirm the precise information in Table 1, where we can verify that the mean of the debt ratio, in the banking sector, of the European Union between 2005 and 2022 is 0.2198969, which is higher than the means of ROE and ROA. This means that on average, European Union banks present higher debt ratios than higher results from financial performance. Additionally, the standard deviation is in fact higher than Return on Equity and Return on Assets, with a number of 0.1058863, meaning there are some companies with high debt and others with low, which is understandable since this is a variable depending on the management and financial decisions of banks.

In Graph 15, we can see there has been a clear downwards tendency, from 2005 till 2021, meaning banks in the European Union have been decreasing their proportion of assets financed with owed capital throughout the years. Going from almost 0.25 in 2005 to values below 0.2 in most recent years. It is possible to see that the year of 2013 was an impactful year, since it had the maximum value of debt throughout the timeline, with a figure of ≈ 0.35. This can be due to the impact of the financial crisis of 2008, where there may have been lower investments and higher tax rates.

3.2.7 Country

Our main goal was to focus this study on the geographical area of the European Union, although, unfortunately due to the restraints of data we ended up with only 9 countries of the free-trade zone in our sample. To better analyze this variable, we converted this categorical data with 9 countries, into a numerical variable, through 9 respective dummies, one for each nation. This means each country of the sample can have 0 or 1 as a value. For example, the dummy of the country Austria will have a value of 1 when we want to observe that sovereign state, while the remaining dummies (of countries) will equal to 0.

Some initiatives and regulations were implemented by governments to increase the number of women in companies as well as in higher positions, as we have seen and analyzed before. In fact, some countries that applied those measures are included in our sample, so it is crucial to consider this variable. Another reasoning behind the addition of the Country variable is the social-cultural factor. It is known that countries have different economic situations, as well as different social norms and cultures. In this sense, it made sense to understand if banks financial performance depended on their geographical area, due to the surrounding economy.

To make it easier to analyze this huge variable we decided to divide the countries of the sample into four regions to make the analysis easier: north, south, center, and west. Matilde will analyze the northern and western nations whereas Sofia will focus on the center and southern countries.

Now we will focus the analysis on the center and southern countries of the European continent (Sofia's part). Those are, Austria (center, denoted by AT), Germany (central nation, represented as DE), Italy (signaled by IT) and Spain (characterized as ES), as representatives of the south countries.

In Table 10, as well as in Table 11, these countries represent a total of approximately 66.72% of the observation in our sample, while Germany is the biggest contributor of data for this paper, with 1297 observations.

It is important to remind that European countries are more prone in terms of disclosure of information of human resources, as evidenced by Subbarao, and Zeghal (1997), when comparing European and non-European nations. The high frequency of german data in our sample occurs due to the importance of the banking sector in the nation's economy (2021. "German banking returns to the playing field". *McKinsey&Company*), which ends up being translated into higher significance German banks give to the disclosure of information within this sector (leading to a higher number of observations). This latter one is studied by Menassa and Brodhäcker (2017).

4 Empirical Approach

It is important to remind that the main question of our study is whether the female gender, impact the financial performance of banks in the European Union, and in what way, whether positively or not.

For our question to be answered we decided to use a standard Ordinary Least Squares (OLS) regression, that allows us to see a description of the correlation between a selected dependent quantitative metric and its independents variables. In this sense, the dependent variable will be ROE, and the independent variables will be Female; Age; Total Number of Employees; Level of Responsibility; Debt Ratio and Country. We, therefore, plotted the following regression:

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0$$

$$Return\ on\ Equity = \beta o + \beta_1\ Female_i + \beta_2\ Age_i + \beta_3\ Total\ Number\ of\ Employees_i + \beta_4\ Level\ of\ Responsibility_i + \beta_5\ Debt\ Ratio_i + \sum^{@A_{BCD}} \beta_i Country_i + ui$$

Where: $Female_i$=0 or 1; $Country_i$=0 or 1

$$\sum^{@A_{BCD}} \beta_I\ Country_i = \beta_6\ Austria_i + \beta_7\ Belgium_i + \beta_8\ Denmark_i + \beta_9\ France_i + \beta_{10}\ Germany_i + \beta_{11}\ Ireland_i + \beta_{12}\ Italy_i + \beta_{13}\ Netherlands_i + \beta_{14}\ Spain_i$$

Considering the model, β is the coefficient of estimation of each explanatory independent variable and u is the residual. In a linear regression, the coefficient can present a positive or a negative value between our independent and dependent variables. Considering a positive coefficient, if the value of the independent variable increases by one unit, our dependent variable will also increase by the amount of the coefficient. The interpretation for a negative coefficient is similar but the other way around. When it comes to analyzing the R square of our sample, in general terms this value is always between 0 and 1. If this value is closer to 1, the model which we are using explains almost all the observations of the sample. If it is closer to 0, the contrary happens.

Besides the points stated before, it is important to remember that each observation is the value of each variable per bank in a given year. In order for us to have an unbiased analysis, we decided to apply the year fixed effects through the help of the statistical program STATA. For example, in the dummies of the variable Country, when we will be analyzing the country of Austria, this dummy will stay “fixed” in year t, while the other variables such as Age or Debt Ratio will change throughout time.

5 Results

In general, after running our Ordinary Least Squares (OLS) model, within our sample of 3,752 observations, there is some information to be drawn in Table 12. First, it's the p-value of the model, which is known to give us the accuracy of the x variables (independent ones) in predicting the y variable (Return on Equity which is the ratio that measures the financial performance). To be statistically significant it would have to be lower than 0.05, which happens to be (0.0000). Secondly, we have the R-squared, with 0.4296, represents the amount of variance of the Return on Equity that is explained by the other variables, meaning 42.96%. However, we need to consider there are other variables we are not considering in our study that can influence the measurement of the financial performance (such as ROE).

Positively, we have the Root MSE (root mean squared error) which is the standard deviation of the model, in which the closer to zero the better and in our case, it is 0.0491.

In conclusion, our model explains almost half of the measurement of the financial performance of banks in the European Union. All the following analysis of the individual results can be seen in Table 13. In a general analysis, we can say that all variables are statistically significant, except for the female, level of responsibility, country of Belgium and France. This is due to the p-value being lower than the level of significance, denominated as alpha.

Number of obs.	**3752**
No. of Categories	**15**
F(13,3724)	**59.42**
Prob > F	**0.0000**
R-squared	**0.4296**
Adj R- squared	**0.4255**
Root MSE	**0.0491**

Table 13 Ordinary Least Squares regression model (general)

ROE	Coefficient	Std. Err.	t	P>| t |	[95% coef. interval]	
Fem	**0.0011372**	**0.0017528**	**0.65**	**0.517**	**-0.0022993**	**0.0045738**
Age	-0.0002853	0.0001045	-2.73	0.006	-0.0004902	0.0000805
Number of Employees	-5.09e-07	2.75e-08	-18.48	0.000	-5.62e-07	-4.55e-07
Level of Responsibility	-0.0009503	0.0006162	-1.54	0.123	-0.0021585	0.0002579
Debt Ratio	-0.1742391	0.0128303	-13.58	0.000	-0.1993943	-0.1490839
Austria	-0.0224833	0.0047672	-4.72	0.000	-0.0318299	-0.0131367
Belgium	0.0016381	0.0082276	0.20	0.842	-0.0144929	0.017769
Denmark	0.0293789	0.0089565	3.28	0.001	0.0118188	0.0469391
France	-0.0067776	0.0052144	-1.30	0.194	-0.0170009	0.0034457
Germany	-0.0305253	0.0042098	-7.25	0.000	-0.038779	-0.0222716
Ireland	-0.0696054	0.0067785	-10.27	0.000	-0.0828958	-0.0563154
Italy	0.0155167	0.004455	2.53	0.011	0.0025958	0.0204375
Netherlands	0.0112798	0.0042129	2.68	0.007	0.00302	0.0195396
Spain						
_Cons	0.1396594	.0081027	17.24	0.000	0.1237733	0.1555455

Table 13 Ordinary Least Squares regression model (independent variables)

5.1 Gender

When it comes to the main focus of our study, it is important to remind that we transformed the gender metric into a dummy variable, called fem, in which if a worker is female, it equals 1 and if its male it is equivalent to 0. In this sense, in Table 13, we can see the coefficient is 0.0011372, meaning for each one-point increase in fem (when the worker is female), the return on equity increases by 0.0011372. This may represent a positive relationship by our metrics. Although, to reject the hypothesis that the coefficient is different than 0, the p-value must be lower than 0.05 which does not happen here (the figure is 0.517). With this being said, gender is not statistically significant in explaining the return on equity, meaning we cannot say that

female gender is correlated to the financial performance of banks, within the European Union, as well as not being able to state that banks with higher number of females workers impact positively the financial performance of the institution.

5.2 Age

In general terms, the regression model gave us a p-value of 0.006 (as seen in Table 13), which means we can say that the age of a bank's employees is correlated with the financial performance of these institutions. The coefficient showed a value of -0.0002853, which means when there is an increase of one-point in age, the mean Return on Equity decreases by 0.0002853 units.

Since the analysis of this variable was divided, we will also proceed to a splitting of the results of age, meaning we will run an Ordinary Least Squares for each subsample, one with age of employees below 56 years (Matilde) and another above it (Sofia).

Moving forward into the analysis of the results within age above 56 years old (Sofia's part). As shown below, we believe that the older the employees, the more negative the impact is on the financial performance of banks in the European Union. This fact has been studied by Børing, and

Grøgaard, (2021) in which older employees could not perform as better as younger ones, in the KPI defined, such as the utilization of skills at work (IPP). Another paper is of Lallemand, and Rycx, (2009), where they testify that a higher proportion of older employees are harmful for companies' added value per capita. This can also be evidenced, through Graph 21, in which it is noticeable that the lower age brackets, in this case, between 56-65 and 65-75 years old, present higher means of the Return on Equity (the measurement of financial performance) than of the oldest age bracket (respectively, above 75 years old). With this being said, the model within the new subsample is the following:

$$H_0: \beta_2 = 0$$

$$H_1: \beta_2 \neq 0$$

$$Return\ on\ Equity = \beta_1\ Female_i + \beta_2\ Older\ Age + \beta_3\ Total\ Number\ of\ Employees + \beta_4\ Level\ of\ Responsibility + \beta_5\ Debt\ Ratio + \sum^{@A}{}_{BCD}\ \beta_i Country_i + u_i$$

Where: $Female_i$=0 or 1; $Country_i$=0 or 1

$$\sum^{@A}{}_{BCD}\ \beta_I\ Country_i = \beta_6\ Austria_i + \beta_7\ Belgium_i + \beta_8\ Denmark_i + \beta_9\ France_i + \beta_{10}\ Germany_i + \beta_{11}\ Ireland_i + \beta_{12}\ Italy_i + \beta_{13}\ Netherlands_i + \beta_{14}\ Spain_i$$

In general, after running our Ordinary Least Squares (OLS) model, within our new subsample, where all observations are with age between 56 and 96 years old, there is some information to be drawn in Table 16.

First, it's the p-value of the model, which is known to give us the accuracy of the x variables (independent ones) in predicting the y variable (Return on Equity). To be statistically significant it would have to be lower than 0.05, and in this case this statistic happens to be very close to 0. This means our variables are statistically significant in predicting our measurement of financial performance. Secondly, we have the R-squared, with 0.4313, which represents the amount of variance of the Return on Equity that is explained by the other variables in our model, meaning 43.13%. Positively, we have the Root MSE (root mean squared error) which is the standard deviation of the model, in which the closer to zero the better and in our case, it is 0.0475. In conclusion, our model explains much of the measurement of the financial performance of banks in the European Union and what it explains is reliable or trustworthy.

With this being said, in Table 17, the regression showed us that the coefficient of age is ≈ 0.000148, meaning that when age increases by one-point (in this case in the older part, when the observation is between 56 and 96 years old), the return on equity (our y variable, the dependent variable) decreases by ≈ 0.000148. Although, the model results showed us a p-value of 0.583. This is important because to reject the hypothesis that the coefficient is equal to 0 (H_0), the p-value must be lower than 0.05, which is not what happens. Moving forward, we now can say that these findings do not give us a relationship between age (when using only observations above 56 years old) and return on equity, since we have no evidence to reject the hypothesis that the coefficient of age is 0 and does not have influence in financial performance.

5.3 Total Number of Employees

Regarding the variable of total number of employees, in table 13, we can say that there is a statistical relationship with ROE, since the p-value is lower than alfa (precisely around 0). The coefficient beta is -5.09e-07, which means that when the number of employees increases by one unit, our measurement of financial performance decreases by 5.09e-07. This represents a negative relationship between these two variables.

Moving into the second part of the analysis, when it comes to the total number of employees (above 60000 workers), we believe that it does have a correlation with the financial performance of banks. It starts with the conviction that workers are one of the main drivers of a banks' success. This is due to the fact that this type of institution is within the service industry and the ones that deal directly with customers or clients are banks employees (Chakrabarty, K.C. (2012)). Some studies seen also share the same idea, such as Maditinos, Chatzoudes, Tsairidis and Theriou (2011), that defended there was a statistically significant connection between human capital efficiency and firms' financial performance, within Greek corporations.

More specifically, the study of Ismail and Karem (2011) stated that intellectual capital has a positive influence in the financial performance of banks, in the region of Bahrain.

With this being said, our model is the following:

$$H_0: \beta_3 = 0$$

$$H_1: \beta_3 \neq 0$$

$$Return\ on\ Equity = \beta_1 Female_i + \beta_2 Age + \beta_3 Total\ Number\ of\ Employees\ above\ 60000 + \beta_4 Level\ of\ Responsibility + \beta_5 Debt\ Ratio + \sum^{@A}{}_{BCD}\ \beta_i Country_i + u_i$$

Where: $Female_i$=0 or 1; $Country_i$=0 or 1

$$\sum^{@A}{}_{BCD}\ \beta_I\ Country_i = \beta_6\ Austria_i + \beta_7\ Belgium_i + \beta_8\ Denmark_i + \beta_9\ France_i + \beta_{10}\ Germany_i + \beta_{11}\ Ireland_i + \beta_{12}\ Italy_i + \beta_{13}\ Netherlands_i + \beta_{14}\ Spain_i$$

The general findings of the Ordinary Least Squares regression model, within this new subsample, can be shown in Table 20. Since the p-value is very close to 0, we can say that our variables are statistically significant in predicting Return on Equity. This is a good sign, because despite of the fact that the number of employees variable is only considering observations above 60000 bank workers', our model is still explaining the measurement of the financial performance, within the European Union banking sector. With an R-squared of 0.5442, we can say that 54.42% of the variance that occurs in our measurement of financial performance is explained by further variables. On a positive note, we have the Root Mean Squared Error, that gives the standard deviation of our mode, with a value of 0.0411, which means there is a low variation in the model.

On Table 21, it is demonstrated that there is indeed a statistical relationship between the number of employees banks have and their financial performance. This is because the p-value is below 0.05 (with a figure of precisely 0.008) which tells us that this variable is statistically significant in explaining the return on equity, which is our measurement of financial performance. With this being said, in order to quantify this relationship, the coefficient is -2.50e-07, which means that when employees increase by one unit, meaning one worker, the return on equity decreases by 2.50e-07. In general, taking only into account observations of banks with number of employees above 60000, the higher the number of employees or size, the worse the financial performance would be. In Graph 22, we can verify this phenomenon, since the branch with the lowest number of employees (60000-80000), in our subsample, has the biggest mean of return on equity, meaning the highest financial performance of the rest of the branches. In comparison, it shows an average of ≈ 0.052 while the branch with a size above 100000 employees present a value of ≈0.044.

Return on Equity	Coefficient	Standard Error	t	P > |t|	[95% conf. Interval]	[95% conf. Interval]
Female	-0.0037717	0.0030384	-1.24	0.215	-0.0097343	0.0021909
Age	0.0001827	0.0001863	0.98	0.327	-0.0001829	0.0005483
Total Number of Employees (above 60000 workers')	-2.50e-07	9.46e-08	-2.64	0.008	-4.35e-07	-6.38e-08
Level of Responsibility	-0.0018676	0.0010375	-1.80	0.072	-0.0039036	0.0001684
Debt Ratio	-0.1505727	0.0735705	-2.05	0.041	-0.2949486	-0.0061969
Austria	0	(omitted)				
Belgium	0	(omitted)				
Denmark	0	(omitted)				
France	-0.0351287	0.0099519	-3.53	0.000	-0.0546586	-0.0155989
Germany	-0.0982974	0.0115573	-8.51	0.000	-0.1209777	-0.0756172
Ireland	0	(omitted)				
Italy	-0.0447016	0.0134123	-3.33	0.001	-0.0710222	-0.018381
Netherlands	0.0175581	0.0129264	1.36	0.175	-0.0078089	0.0429251
Spain	0	(omitted)				
_constant	0.1341911	0.0237464	5.65	0.000	0.0875908	0.1807914

Table 21 Ordinary Least Squares Regression Model with the independent variables (Total Number of Employees above 60000 workers')

5.4 Level of Responsibility

When it comes to the level of responsibility, we know that a ranking has been made, where the increase in this variable means lower level of responsibility. With this being said, our model shows that when the variable increases, meaning a one-point rise (which equals a diminishment in responsibility), the return on equity decreases by 0.0009503. It seems there is a negative relationship between level of responsibility and return on equity, for example, if there are more employees with lower responsibility (such as employees or members), the financial performance of banks is worse. Although we cannot say this since

it is not statistically significant, meaning there is not a correlation since the p-value is below 0.05 (it shows a figure of 0.123). All this can be seen in Table 14.

5.5 Debt Ratio

Regarding the debt ratio, we decided to add this independent variable, because we only had non-financial ones and we were intrigued to see if whether having high figures of debt or not could impact the financial performance of banks. We can now say that there is indeed a relationship between the return on equity and its debt ratio since the p-value is lower than 0.05.

Also, we can say that the relationship is negative, since increasing one-point in the debt ratio (is equivalent to higher debt), leads to a decrease of the financial performance by approximately 0.1742. One example of this behavior is the year 2008, when the financial crisis occurred, as seen in Graph 23, when the debt increased, the return on equity decreased. The tactics utilized to boost ROE (frequently greater risk-taking), failed causing many banking institutions to decrease their performance inevitably. To avoid a replication of the financial crisis, regulatory measures have steadily been strengthened since 2008 (Daniëls T & Kamalodin S, 2016).

5.6 Country

In this subsection, we decided to analyze the relationship of certain nations of the European Union with the financial performance of banks separately, meaning Matilde will focus on the northern and western countries, while Sofia will do the opposite, as mentioned before.

(second part of the variable) Regarding the analysis of the results within the center and southern countries in the European Union, northern countries are known for their strong economy while in the south the otherwise happens. One example is of the event of the known acronym PIGS (Portugal, Italy, Greece, and Spain), representing each southern European country going

through a crisis. In fact, a paper by Therborn (2013), studied the relationship between social politics or patterns of southern European nations and its economical situations. In this sense, it makes sense to understand if central and southern countries can impact differently the financial performance of banks, due to their surrounding economy and geographical area. It is important to remind that when constructing the Ordinary Least Squares model, we used dummy variables for each country, meaning when the observation pertains to a certain country that country's dummy variable takes the value of 1 and the dummies for the remaining countries take the value of 0. For example, for the case of Austria, if the bank had a country ISO code from Austria its dummy variable associated with Austria would be equal to 1 while that associated with Germany would take the value of 0.

As seen in Table 24, when we run the Ordinary Least Squares regression model, using only the central and southern countries, we can see that the variables are statistically significant in predicting our measurement of financial performance (within the banking sector), since the p-value is close to 0. Regarding the R-squared, it shows us a value of 0.3397, meaning 33.97% of the variance that occurs in ROE is explained by other variables. Positively, the Root Mean Squared Error, has a value of ≈ 0.055. This value translates into low variation.

Number of Observations	2,503
Nº of categories	15
F(8, 2480)	44.58
Prob > F	0.0000
R-squared	0.3397
Adj R-squared	0.3339
Root MSE	0.0549

Table 24 Ordinary Least Squares Regression Model (variable Central and Southern Countries (Austria, Germany, Italy, and Spain))

When running the regression model, we came to face with three different types of results, as seen in Table 25. Regarding the first one, it was concentrated within central countries, such as the country of Austria and Germany. The p-value of these nations was below 0.05, which means we can say there is a correlation between these two geographical areas and the financial performance of banks. In terms of the coefficients, the country of Austria, had a value of around -0.029, meaning there is a negative relationship between this territory and the return on equity of banks. This means that if the bank presents a country code from Austria (equal to 1), then the return on equity will decrease by ≈ 0.029. In Germany, the value of the coefficient was of ≈ -0.035, translating into a negative correlation with the measurement of financial performance. When the Germany increases by one-point (when its country ISO code is Germany), then the return on equity decreases by ≈ 0.035, on average. This is clearly seen in Graph 24, since when the dummy variable of Germany is 1 (Germany is present) the mean of the return on equity is on average ≈ 0.023. On the contrary, when it is any other country except Germany, then the financial performance has a higher average of ≈ 0.054.

Return on Equity	Coefficient	Standard Error	t	P > |t|	[95% conf. Interval]	[95% conf. Interval]
Female	0.0008756	0.0024138	0.36	0.717	-0.0038576	0.0056088
Age	-0.0005515	0.0001487	-3.71	0.000	-0.000843	-0.0002599
Total Number of Employees	-5.75e-07	3.50e-08	-16.42	0.000	-6.44e-07	-5.07e-07
Level of Responsibility	-0.0006494	0.0008179	-0.79	0.427	-0.0022533	0.0009544
Debt Ratio	-0.1368579	0.0184595	-7.41	0.000	-0.1730556	-0.1006603
Austria	-0.0285896	0.0056359	-5.07	0.000	-0.039641	-0.0175381
Germany	-0.0345991	0.0050699	-6.82	0.000	-0.0445408	-0.0246574
Italy	0.0033123	0.0056625	0.58	0.559	-0.0077914	0.014416
Spain	0	(omitted)				
_constant	0.1489133	0.0109707	13.57	0.000	0.1274006	0.170426

Table 25 Ordinary Least Squares Regression Model with the independent variables (Central and Southern Countries (Austria, Germany, Italy, Spain))

When it comes to the second type of result, we have the country of Italy with a p-value above 0.05, with a value of ≈ 0.56. This means our evidence is not statistically significant to show a relationship or correlation between the country of Italian and the financial performance of banks operating in this nation.

Concerning the last type of result, in the country of Spain, it showed us a value of 0 with the standard error being omitted, this means there is collinearity in our model, in this specific subsample. This is translated into the existence of independent variables that are directly correlated with one another. This becomes a problem, since the model is made for each variable to be independent of the others, however it does make sense that this shows up since we are analyzing countries with very similar economies and social characteristics.

To conclude, all central countries present a negative relationship with the return on equity, more precisely, the financial performance of banks, which means that banks that have the

country ISO code within these countries may be affected by the economy, social or cultural characteristics in such that the financial performance is worse.

6 Conclusion

In this paper, we contributed to the analysis of one of the most trending topics in today days. We studied the impact that female workers have in the financial performance, of the banking sector, in the European Union. We knew that the topic of the female gender on the corporate world was not empty in the research world, however we quickly realized there were few studies on this specific topic within this precise sector. Additionally, this study presents a variety of countries in the European Union (Austria, Belgium, Denmark, Germany, Spain, Ireland, Italy, France, and Netherlands) and makes mention of some legislation implemented by governments in order to achieve gender equality. The variables used, as well as the geographical focus of the data, together with the specific sector selected are not the most frequently used, which means our research could include new points of view. From our research we argue with past authors that women may have an impact on the financial performance of the banking sector.

When it came to the measurement of the economic performance of banks an intense investigation was carried out, to truly understand how banks function and what would be the best suited metric to evaluate it. There were two options, Return on Equity and Return on Assets. We followed the one that we thought was most adequate: Return on Equity. The focus of every firm is to maximize the profits of its owners, which are therefore the shareholders. Using a ratio which represents how efficient the company (in this case banks) is at generating profit with its equity, it only made sense for us to use this benchmark. After, it became noticeable to us that we needed to consider other factors that could influence the economic well-being of these institutions, to reach a more complete model which would help us extend our conclusions. Those would be: 1. Age; 2. Number of Employees; 3. Level of Responsibility;

4. Debt Ratio; 5. Country. These would be the independent variables accompanying the dummy Female variable. The sample was taken out, using the Bureau van Dijk, and then worked on the program Stata. This helped us understand how each variable behaved, what they represented and what were the reasonings behind some phenomena.

In general terms, statistically, we found that the employees' age, total number of employees and debt ratio are statistically significant for the measurement of the financial performance of banks. On the other hand, our main variable of focus, the female gender, and the level of responsibility do not present the same conclusion. They are statistically significant to return on equity.

To test the main focus of our paper, we used the Ordinary Least Squares regression model, due to the efficiency of giving us the relationships between the Return on Equity (our measurement of the financial performance) and the female gender. Our results indicated that there was not any type of correlation between having more female employees and the economic state of banking institutions, in the European Union. Despite it all, the findings in this paper helped us understand better what impacts banks and in what way, namely the other variables mentioned above.

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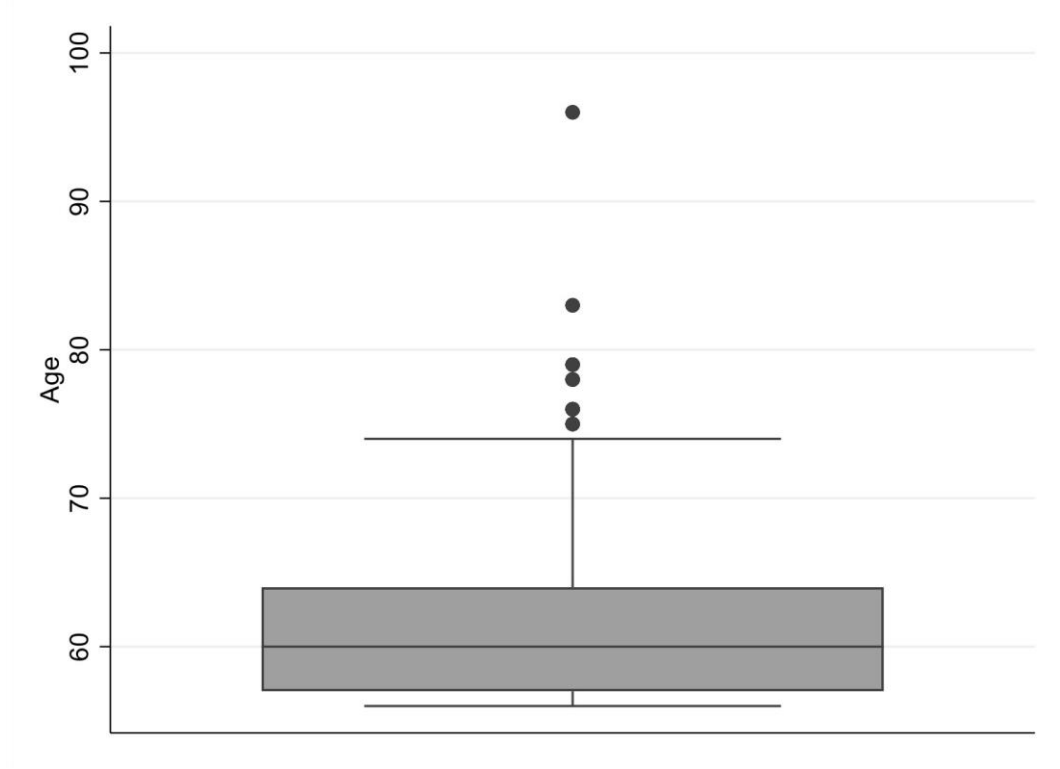
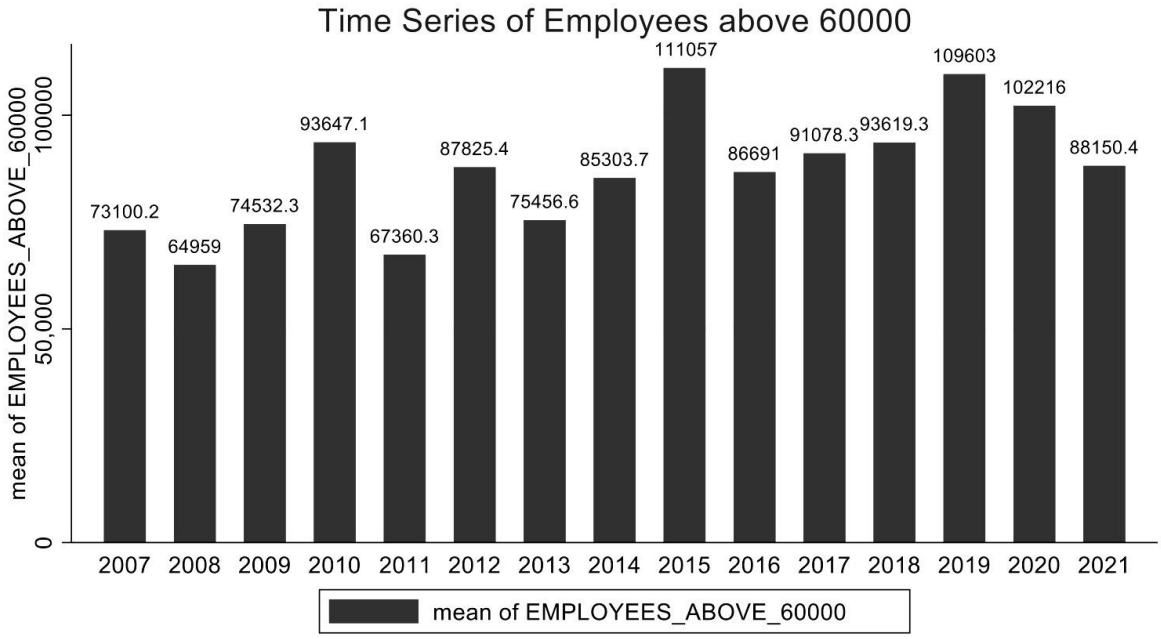
7 Appendix

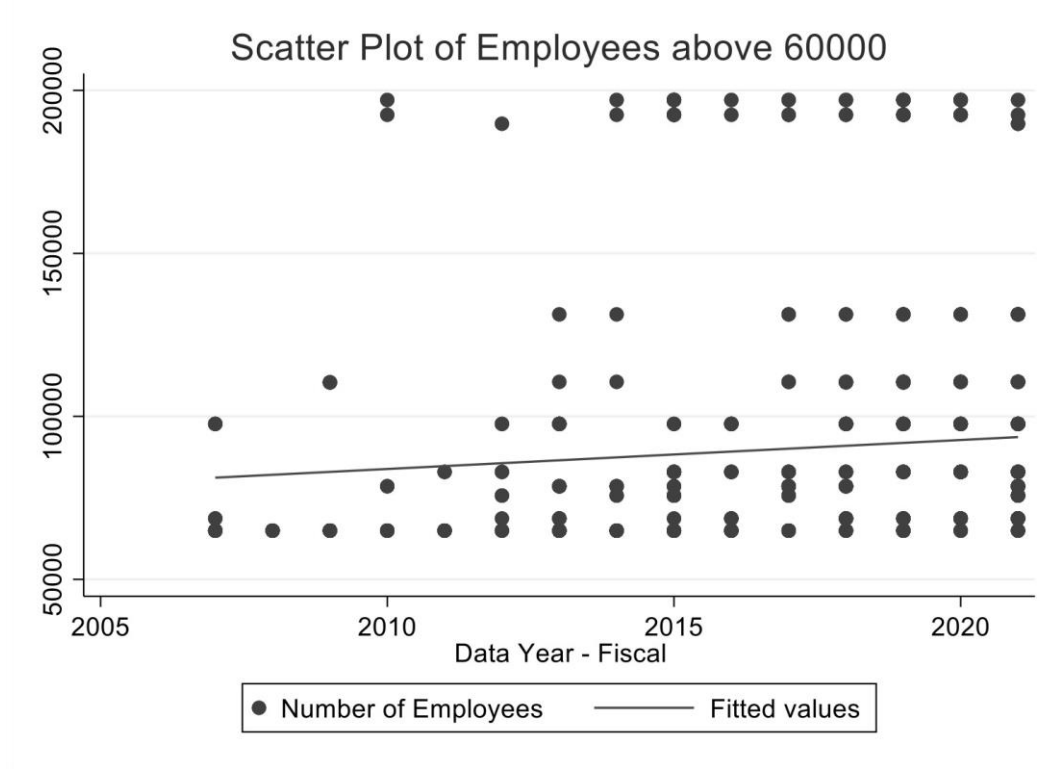


Graph 6 Graph Box of Age between 56 and 96 years old (in the banking sector of the European Union)

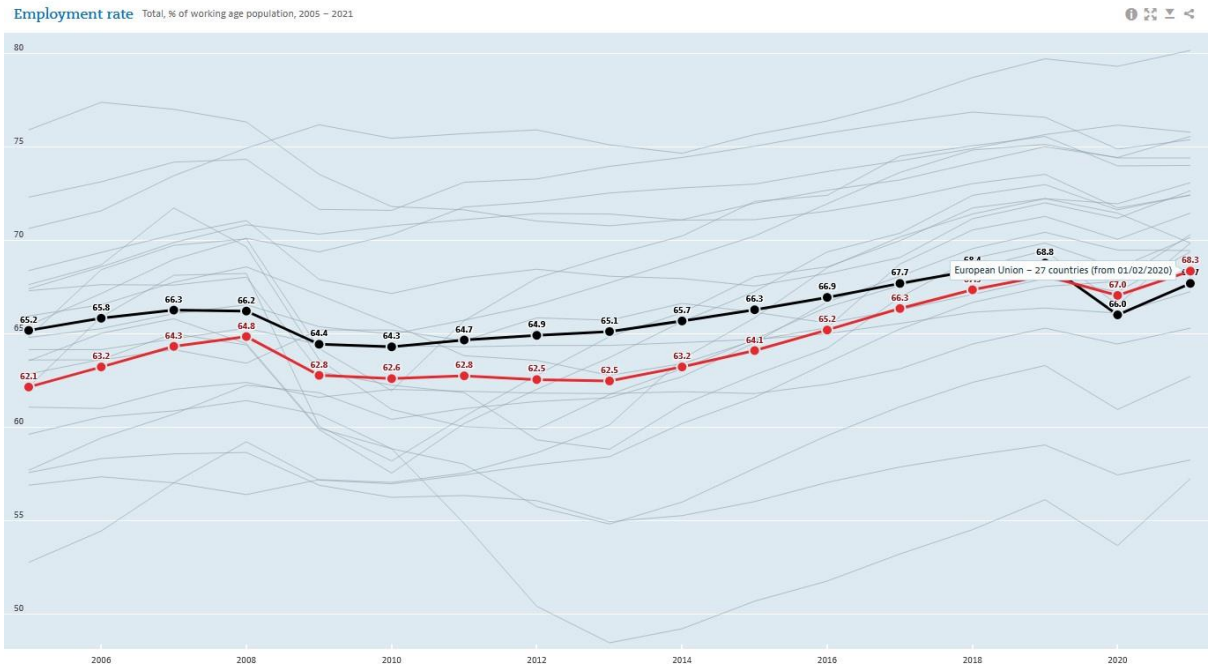
Graph 8 Scatter Plot (2005-2022) of Age between 56 and 96 years (in the banking sector of the European Union)



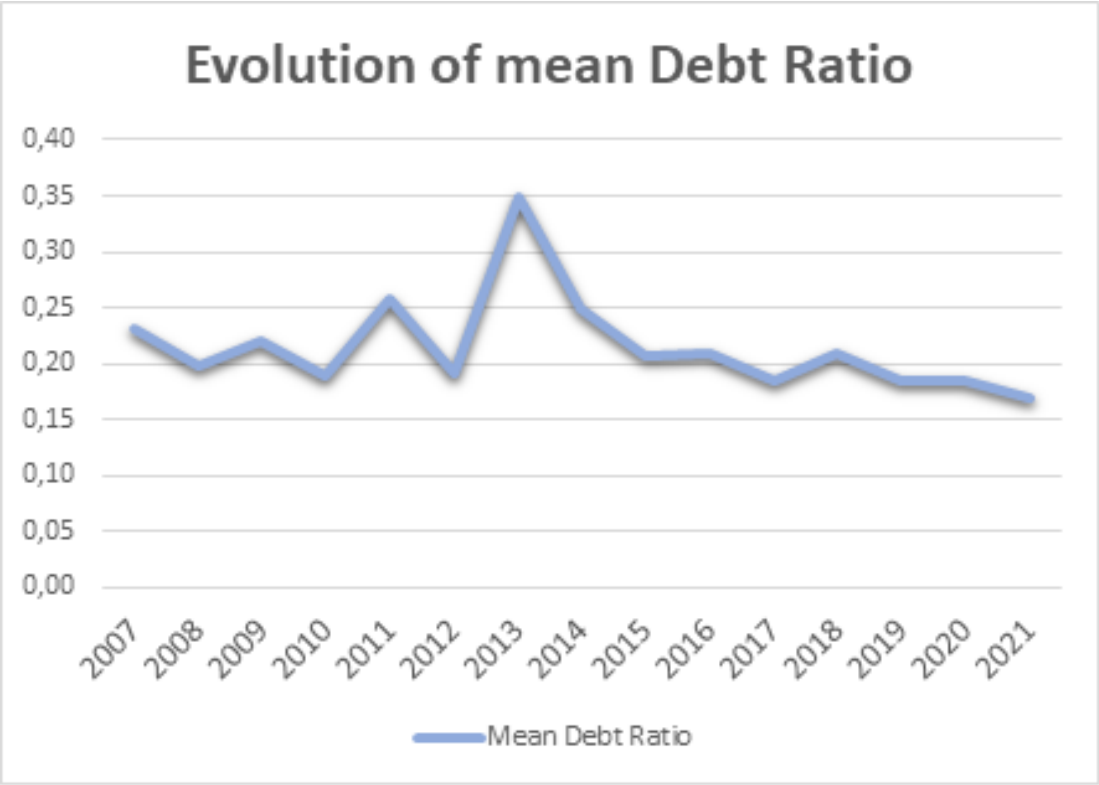
Graph 11 Time Series of Employees above 60000 (2007-2021)



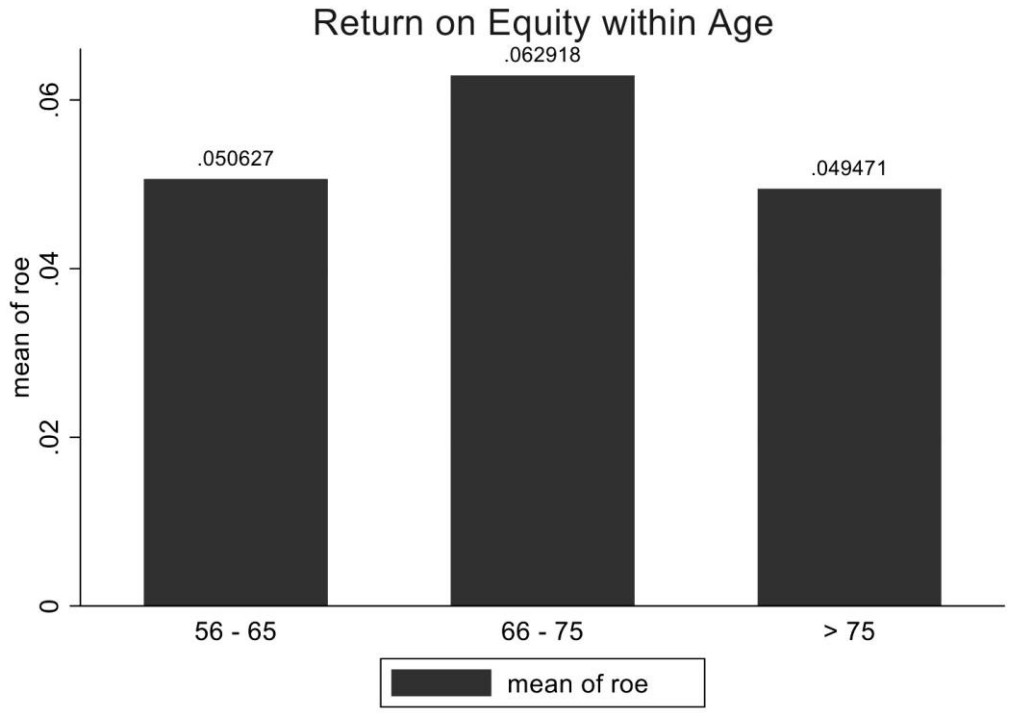
Graph 12 Scatter Plot (2005-2022) of Employees above 60000 (in the banking sector of the European Union)



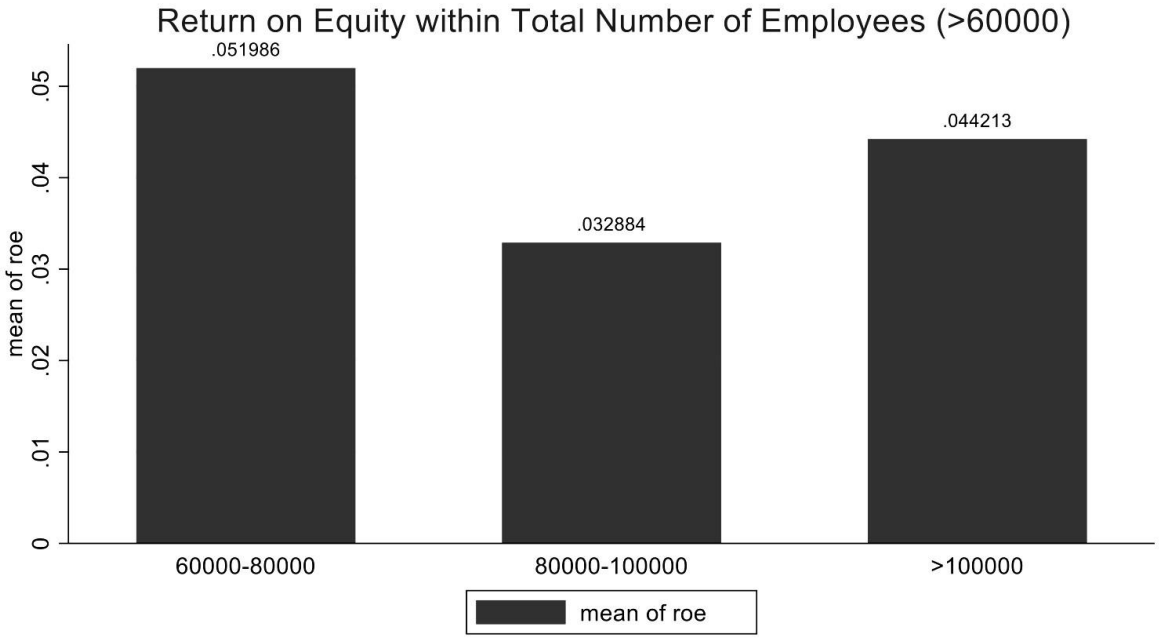
Graph 13 Employment rate of the European Union (in red color), from 2005 until 2021 (Source: OECD Data)



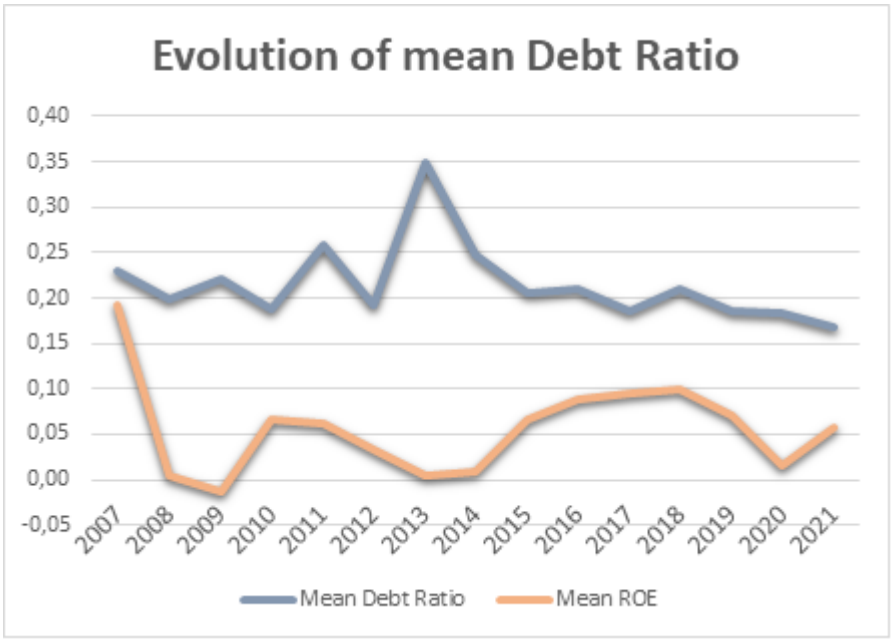
Graph 15 Evolution of mean Debt Ratio throughout the timeline (2005-2022)



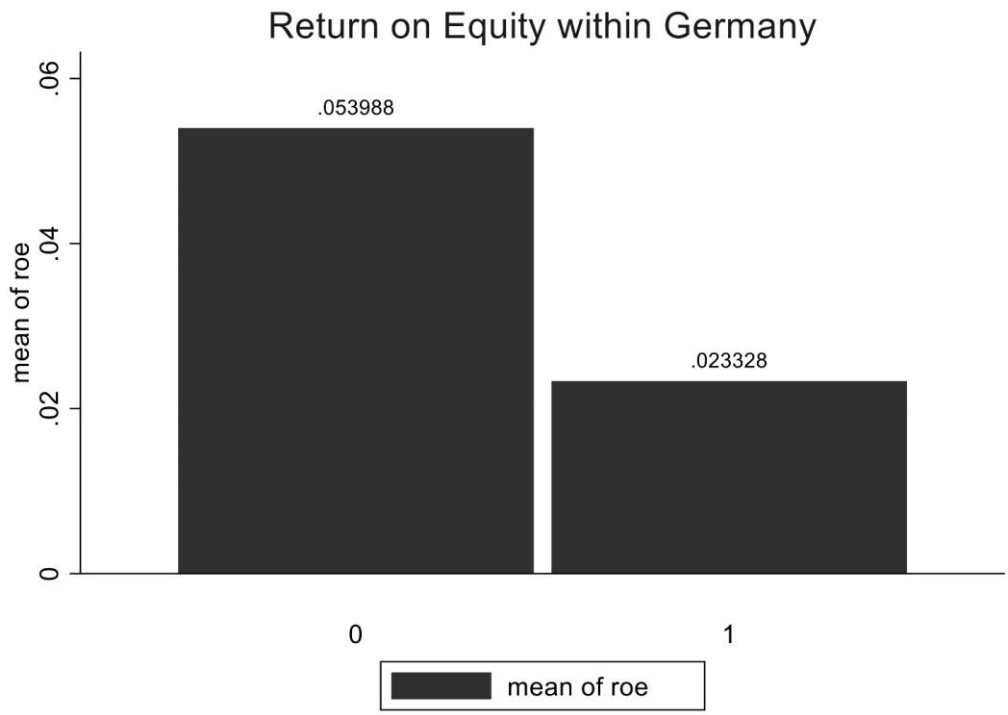
Graph 21 Return on Equity within Age between 56 and 96 years old (in the banking sector of the European Union)



Graph 22 Return on Equity within Total Number of Employees (>60000) (in the banking sector of the European Union)



Graph 23 Evolution mean Debt Ratio



Graph 24 Return on Equity within Germany (in the banking sector of the European Union)

Tables:

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Return on Equity	3752	0.0518994	0.06481959	-0.3244373	0.2873684
Return on Assets	3752	0.0029159	0.003800441	-0.02976754	0.04242473
Age	3752	52.42377	8.771974	29	96
Total Number of Employees	3752	45272.85	34820.9	41	197070
Debt Ratio	3752	0.2198969	0.1058863	0.0081256	0.6025657

Table 1 Mean, Standard Error, Maximum and Minimum of Return on Equity, Return on Assets (in the banking sector of the European Union)

Gender	Absolute Frequency	Percentage	Cumulative
F	1259	33.56	33.56
M	2493	66.44	100
Total	**3752**	**100**	

Table 2 Absolute Frequency, Percentage and Cumulative of Gender (in the banking sector of the European Union)

Age Bracket	Absolute Frequency	Percentage	Cumulative
25-35	58	1.55	1.55
36-45	823	21.93	23.48
46-55	1491	39.74	63.22
56-65	1131	30.14	93.36
66-75	222	5.92	99.28
>75	27	0.72	100
Total	3752	100	

Table 3 Absolute Frequency, Percentage and Cumulative of Age Bracket between 56 and 96 years (in the banking sector of the European Union)

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Age (between 56 and 96 years old)	1,380	61.46739	5.305567	56	96

Table 4 Mean, Standard Error, Maximum and Minimum of Age between 56 and 96 years (in the banking sector of the European Union)

Age Brackets (between 56 and 96 years old)	Absolute Frequency	Percentage	Cumulative
56 – 65	1,131	81.96	81.96
66 – 75	222	16.09	98.04
> 75	27	1.96	100.00
Total	**1,380**	**100.00**	

Table 5 Absolute Frequency, Percentage and Cumulative of Age Bracket between 56 and 96 years (in the banking sector of the European Union)

Brackets of Number of Employees
0-20000
20000-40000
40000-60000
60000-80000
80000-100000
>100000

Table 6 Brackets of Number of Employees (in the banking sector of the European Union)

Total Number of Employees	Absolute Frequency	Percentage	Cumulative
60000 – 80000	392	39.48	39.48
80000 – 100000	478	48.14	87.61
>100000	123	12.39	100.00
Total	**993**	**100.00**	

Table 7 Absolute Frequency, Percentage and Cumulative of Employees above 60000 (in the banking sector of the European Union)

Ranking	Level of Responsibility
1	"President / Chairman" “President / Chairman; Highest executive" “President / Chairman; Unspecified executive" Vice President / Vice Chairman"
2	"Proxyholders" "Proxyholders; Company secretary“ "Representative"
3	"Chief Financial Officer (CFO); Financial executive" “Chief Information Officer; IT & IS executive" "Chief Marketing Officer; Marketing executive" "Chief Officer; Executive" "Chief Operations & Production Officer; Operations & Production executive“ "Chief Product/Project/Market management; Executive Product/Project/Market management"
4	"Deputy executive" "Deputy executive; Chief Information Officer; IT & IS executive" "Executive" "Financial executive" "Financial executive; Chief Product/Project/Market management; Executive Product/Project/Market management" "Highest executive" "R&D / Engineering executive; Product/Project/Market manager" "Unspecified executive" "Unspecified executive; Deputy executive" "Unspecified executive; Financial executive"
5	"Branch manager" "Finance & Accounting manager" "Finance & Accounting manager; Executive Product/Project/Market management" "Finance & Accounting manager; Marketing manager; Executive Product/Project/Market management" "Manager" "Sales manager"
6	"Member" "Member; Chief Financial Officer (CFO); Financial executive" "Member; Chief Legal/Compliance/Risk Officer (& General Counsel, Ethics, Compliance, Audit); Legal/Compliance/Risk executive" "Member; Chief Officer; Executive" "Member; Chief Product/Project/Market management; Executive Product/Project/Market management" "Member; Employee" "Member; Finance & Accounting employee" "Member; Highest executive" "Member; Member" “Member; R&D / Engineering Chief Officer; R&D / Engineering executive; Chief Information Officer; IT & IS executive" "Member; Unspecified executive"
7	"Company secretary" "Employee" “Other & unspecified” “Unspecified position"

Table 8 Ranking of the Level of Responsibility (in the banking sector of the European Union)

Level of Responsibility	Absolute Frequency	Percentage	Cumulative
1	81	2.16	2.16
2	2680	71.43	73.59
3	40	1.07	74.65
4	104	2.77	77.43
5	3	0.08	77.51
6	714	19.03	96.54
7	130	3.46	100.00
Total	**3752**	**100.00**	

Table 9 Absolute Frequency, Percentage and Cumulative of Level of Responsibility (in the banking sector of the European Union)

Country	Absolute Frequency	Percentage	Cumulative
Austria	321	8.56	8.56
Belgium	45	1.20	9.75
Germany	1297	34.57	44.32
Denmark	42	1.12	45.44
Spain	249	6.64	52.08
France	144	3.84	55.92
Ireland	76	2.03	57.94
Italy	636	16.95	74.89
Netherlands	942	25.11	**100**
Total	**3752**	**100**	

Table 10 Absolute Frequency, Percentage and Cumulative Countries (in the banking sector of the European Union)

Country	Absolute Frequency	Percentage
Austria	321	8.56
Germany	1,297	34.57
Spain	249	6.64
Italy	636	16.95
Total	**2,503**	**66.72**

Table 11 Absolute Frequency, Percentage and Cumulative of Central and Southern Countries

(in the banking sector of the European Union)

Number of Observations	1,380
Nº of categories	15
F(13, 1352)	23.84
Prob > F	0.0000
R-squared	0.4313
Adj R-squared	0.4200
Root MSE	0.0475

Table 16 Ordinary Least Squares Regression Model (variable Age between 56 and 96 years old

Return on Equity	Coefficient	Standard Error	t	P > |t|	[95% conf. Interval]	[95% conf. Interval]
Female	-0.0020814	0.0029893	-0.70	0.486	-0.0079456	0.0037828
Age (between 56-96 years old)	-0.0001476	0.0002689	-0.55	0.583	-0.0006752	0.00038
Total Number of Employees	-4.67e-07	3.89e-08	-12.00	0.000	-5.43e-07	-3.90e-07
Level of Responsibility	0.0012166	0.0008124	1.50	0.134	-0.000377	0.0028103
Debt Ratio	-0.1155025	0.0199737	-5.78	0.000	-0.1546853	-0.0763197
Austria	-0.0051951	0.0073381	-0.71	0.479	-0.0195905	0.0092003
Belgium	0.0187798	0.0095479	1.97	0.049	0.0000494	0.0375101
Denmark	0.0279411	0.0116245	2.40	0.016	0.0051371	0.0507452
France	-0.0036018	0.0060155	-0.60	0.549	-0.0154025	0.0081989
Germany	-0.0249214	0.005401	-4.61	0.000	-0.0355166	-0.0143262
Ireland	-0.0500059	0.0087079	-5.74	0.000	-0.0670884	-0.0329234
Italy	0.0183589	0.0059163	3.10	0.002	0.0067528	0.0299651
Netherlands	0.0217064	0.0051448	4.22	0.000	0.0116138	0.031799
Spain	0	(omitted)				
_constant	0.1030038	0.0184576	5.58	0.000	0.0667952	0.1392124

Table 17 Ordinary Least Squares Regression Model with the independent variables (Age between 56 and 96 years old)

Number of Observations	993
Nº of categories	15
F(9, 969)	57.23
Prob > F	0.0000
R-squared	0.5442
Adj R-squared	0.5334
Root MSE	0.0411

Table 20 Ordinary Least Squares Regression Model (variable Total Number of Employees above 60000 workers')