Non-Financial Disclosure and Economic Performance of Top Italian Listed Banks

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Abstract

This study aims to analyze the relationships between the economic performance of Italian listed banks and their GRI disclosure (GRID), understood as the level of disclosure of their non-financial reports according to the GRI standards. The study selected 6 among the Italian listed banks with the highest capitalization as of 31/12/2020 and analyzed the relationships between their economic performance and their GRID by applying three models: Linear Regression, Support Vector Machines, and Decision Trees. The research highlighted the existence of positive relationships between the economic performance of banks – measured in terms of capitalization, size and leverage – and their GRID, while the relationship with profitability is negative. Unlike the analyzes that see disclosure as a factor capable of improving economic performance, this research starts from the assumption that the best economic performance favors a wider disclosure. Furthermore, the study applies machine learning which represents a non-traditional methodology, not yet fully exploited in the field of sustainability reporting.

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1. Introduction

The growing importance assumed by non-financial reporting in the last twenty years (Lai and Stacchezzini, 2021) is the result of a process of gradual involvement of stakeholders in the economic, environmental and social effects produced by the activity of companies (Gibassier and Unerman, 2007; Herzig and Schaltegger, 2006).

With the term "non-financial reporting" or "sustainability reporting" this analysis refers to the notion contained in the GRI standards 2016-2020 (applicable until 31/12/2022), in which it is defined as reporting concerning the "economic, environmental, and/or social impacts" produced by an organization "of any size, type, sector, or geographic location".

This research is aimed at verifying the relationships between the economic performance of the major Italian banks and the level of disclosure according to the GRI standards (GRID) of their non-financial reports.

In fact, it is important to underline that while on the one hand the sustainability disclosure represents a possible tool to strengthen the competitive advantage (Glass, 2012), on the other hand it implies incurring costs and making investments that absorb financial resources.

In this sense, sustainability disclosure cannot be seen only as a factor that affects economic performance, but also as a factor that is affected by this performance.

This observation can be summarized by the following relationship: companies with high economic performance have greater financial resources and are therefore better able to bear the costs involved in optimizing sustainability reporting. As Daub (2007) observes, large companies, like multinationals, "have adequate financial means at their disposal to draft detailed reports in terms of content and design" (p. 79).

Considering the numerous relationships between sustainability issues and economic performance highlighted in the literature (Maletic et al., 2015; Schaltegger and Wagner, 2017; Wagner, 2010), this study intends to verify whether economic performance can be a determinant of the GRID level. To this end, the study conducted an empirical analysis on the Italian banking sector for the year 2020, considering 6 of the top listed banks, selected for higher capitalization. In this sense, the study can offer a contribution to research on listed Italian banks, which can be analyzed under many profiles, not all of which have been explored to date.

This study is divided into six sections. Section 2 is dedicated to the analysis of the reference literature. Section 3 focuses on the research questions and theoretical background relating to the links between GRID and the economic performances. Section 4 explains the research methodology while section 5 contains the empirical results. Finally, section 6 is devoted to formulating conclusions.

2. Literature Review

The issue of the factors that influence sustainability reporting has been analyzed in the literature under multiple profiles and with very different results.

From the literature that focuses on the links between sustainability reporting and

financial variables, it emerges that these links can assume three different types of direction:

1. Sustainability reporting is a factor that affects the financial performance of banks.
2. Sustainability reporting is a factor that is affected by financial performance.
3. Sustainability reporting and financial performance mutually affect each other.

According to Dienes et al. (2016), in the studies in which sustainability reporting is considered among the consequences of financial performance, the results achieved by the literature are ambiguous and inconsistent.

Furthermore, it is relevant to note that not only the direction of relationships can be of three different types, but the sign of direction also varies according to the studies, some of which find positive relationships, others negative and still others practically insignificant.

In the study by Buallay et al. (2021) the relationships between sustainability reporting and bank performance in developed and developing countries after the 2008 financial crisis are analyzed. The environmental, social and governance (ESG) scores represent the independent variable, while the financial performance is assumed as dependent variable. In that study, the pooling regression and the instrumental variable show that ESG weakens banks' performance in both developed and developing countries.

The same relationship is found by Buallay et al. (2020) with regard to MENA (Middle East and North Africa) banks, in which social performance negatively affects profitability and value.

Nobanee and Ellili (2017) also consider sustainability reporting as an explanatory variable and financial performance as a dependent variable. However, they find that sustainability disclosure has no significant effect on the financial performance of UAE (United Arab Emirates) banks, both conventional and Islamic.

In another study by Buallay (2020), sustainability reporting is still the independent variable and financial performance, expressed in terms of ROA (return on assets), ROE (return on equity) and Tobin's Q, the dependent one. The comparison between the manufacturing sector and the banking sector shows that in the manufacturing sector sustainability reporting has a positive effect on financial performance, while in the banking sector this effect is negative.

The same result is achieved by Buallay (2019) with reference to the European banking sector, always considering sustainability reporting as one of the factors that contribute to determining financial performance. However, in this case, each of the three ESG dimensions – environmental, social and governance – has different effects. While environmental disclosure has positive effects on financial performance, corporate social responsibility disclosure and corporate governance disclosure have negative effects.

Shad et al. (2019) build a conceptual framework in which sustainability reporting acts as a control variable, while the independent variables are those that incorporate

the enterprise risk management (ERM) implementation and the dependent variable is the business performance expressed in terms of economic value added (EVA). According to this conceptual framework, sustainability reporting, through the ERM, can influence organizational performance.

Unlike the studies cited above, in that of Nwobu (2015) the financial performance of the Nigerian banks, expressed in terms of profit after tax, and the shareholders fund are assumed as independent variables, but their effect on sustainability reporting, although positive, is small.

In Weber's analysis (2017), referring to Chinese banks, the relationship between sustainability performance and financial indicators is investigated, in order to verify whether the implementation of sustainability regulation can take place without damaging financial performance. The study differs from those previously mentioned in that it does not identify a single direction of the relationship between sustainability performance and financial performance, but, on the contrary, focuses on bi-directional causality, or virtuous circle, in which both influence each other.

As regards the Italian context, the studies specifically concerning the link between sustainability reporting and financial performance in the banking sector are not particularly numerous. Conversely, the amount of research that observes sustainability or social performance in broader terms than reporting seems to be higher.

The study by Agostini et al. (2022) considers the impact of Directive 2014/95/EU on the corporate financial performance of 20 listed companies in the period 2015-2018, i.e. before and after the transposition of the aforementioned Directive. In particular, the study, which distinguishes between quantity and quality of non-financial disclosure, finds the presence of a significant positive relationship between quality of sustainability reporting and economic performance, measured in terms of ROA and ROE.

Broccardo et al. (2016) analyze the co-operative banks in northern Italy and assume financial performance as a dependent variable, while Corporate Social Responsibility (CSR) and its disclosure are the independent variables. The study finds that CSR has no effect on financial performance, thus opening up new areas of research useful for understanding the reasons why a higher financial performance remains unaffected by higher social performance in co-operative banks.

Loprevite et al. (2020) analyze the link between companies' disclosure and financial performance, considering the latter as an independent variable and assuming disclosure indexes as a dependent variable. The study notes the existence of a positive relationship between the level of disclosure and financial performance, mainly due to the fact that "larger amounts of financial resources affect the propensity positively toward the development of information systems" (p. 17).

The study proposed here is in line with this latter analysis, both because it assumes economic performance as an explanatory variable, and because it attaches decisive importance to the solidity of the company as a particularly favorable factor for the preparation of higher quality non-financial reports.

3. Theoretical Background and Research Questions

3.1 Selected variables

In order to analyze the relationships between GRID and economic performance, this research has chosen as variables suitable for banking companies: a) capitalization; b) size; c) leverage; d) profitability.

3.2 Capitalization

According to previous studies, the market value expressed through capitalization represents a significant variable for the analysis of the quality of sustainability reporting. In particular, such studies have shown that "the overall tendency is that sustainability reporting is also positively perceived by the capital markets" (Kaspereit and Lopatta, 2016, p. 18).

Other scholars also reach these conclusions, according to which voluntary environmental disclosure provides investors with incremental information useful for assessing the value of the company (Clarkson et al., 2010).

In this regard, Granger's causality reveals how market capitalization can impact banks' sustainability issues (Sultana and Akter, 2017).

Based on the positive relationship found in the literature, the study formulated the following research question:

RQ1.   Does bank's capitalization affect non-financial reporting?

3.3 Size

Previous studies have shown that the size of the company affects its inclination to produce broader non-financial reporting (Kuzey and Uyar, 2017). In particular, the larger the size of the companies, the larger is also the set of stakeholders who require information on their business (Guthrie et al., 2006) and from which it is necessary to obtain trust (Oliveira et al., 2006).

In the light of this literature, the survey aimed to verify whether the size of Italian banks affects their non-financial reporting and formulated the following research question:

RQ2.   Does the bank's size affect non-financial reporting?

3.4 Leverage

Although the literature considers capital structure to be a relevant aspect for the topic of sustainability, the nature – positive or negative – of its relationship with non-financial information represents a point on which the studies are divided.

In terms of intellectual capital disclosure, the relationship identified by Terblanche and de Villiers (2019) is positive, so that as leverage increases, the levels of intellectual capital disclosure increase.

On the contrary, according to other studies (Nazari et al., 2015), the relationship is negative, or, only slightly negative, as in the analysis of Kuzey and Uyar (2017),

who assume that, as the debt increases, the likelihood that the company will publish a sustainability report decreases.

Considering the results achieved by the literature, this study aimed to verify whether leverage can affect sustainability reporting in the Italian banking sector and therefore formulated the following research question:

RQ3.   Does bank's leverage affect non-financial reporting?

3.5 Profitability

The literature on the relationships between profitability and sustainability reporting is divided between the presence of a positive relationship, the absence of relationships and the existence of a negative relationship.

From an empirical survey conducted on companies that use GRI standards, located in Europe, it appears that those with higher levels of profitability produce high quality sustainability reports (Dilling, 2010). Similarly, there is a positive relationship in non-profit organizations, as the financial resources resulting from high profitability, together with the attitude towards disclosure, favor greater investments in non-financial disclosure (Lee and Blouin, 2019).

On the other hand, very weak relationships are found in Nigerian banks, especially due to the costs that the implementation of sustainability reporting normally entails (Nwobu, 2015).

Correlations are instead strongly negative according to other scholars, who find that companies with greater profitability disclose less sustainability information, probably because they adopt cost containment policies (Bhatia and Tuli, 2017).

In consideration of the existing discussion on the topic, among the various alternatives, the study aimed to verify whether, in the Italian banking sector, profitability affects sustainability reporting. Therefore the following research question was formulated:

RQ4.   Does bank's profitability affect non-financial reporting?

4. Research Methodology

4.1 Sample selection

The sample used is made up of 6 of the largest Italian banks, by capitalization as of 31/12/2020.

Considering that at the date of this research the deadlines for the publication of the 2021 financial statements were still in progress in Italy and that not all the banks selected had published them, the study considered the year 2020, in order to have a complete set of data.

This sample was selected primarily because the banks considered are representative of the largest companies in the Italian sector. If, on the one hand, referring to only one sector limits the results of the analysis, on the other it offers clearer results, the significance of which is not altered by factors determined by the heterogeneity of the industries.

Furthermore, all the selected companies draw up the financial statements according to the same accounting standards (IFRS) and prepare the non-financial reports according to the GRI standards, in some cases used together with other indicators, such as those provided by the SASB (Sustainable Accounting Standards Board). Finally, all the companies in the sample use non-financial reporting assurance, which makes the information more reliable.

The information relating to the capitalization of the selected banks was taken from the *Borsa Italiana* website, while the non-financial reports were taken from the websites of the banks. The financial reports were retrieved from the AIDA Bureau van Dijk database (Computerized Analysis of Italian Companies) and the indicators relating to size, leverage and profitability were calculated on the basis of financial statements data.

4.2 Content analysis

Similar to previous research (Stacchezzini et al., 2016), the study analyzed the content of the sustainability reports of the banks belonging to the sample through a manual content analysis of reports available.

For the selection of relevant information, the study built a framework based on GRI Topic-specific Standards. In this regard, it is important to specify that the analysis did not include the indicators defined for the financial sector by the G4 Sector Disclosure. However, given the relevance and number of standards included (89 items), the set was considered sufficiently representative.

Similarly to the existent literature (Carp et al., 2019), the measurement of the GRID was carried out with a binary approach, assigning the value 1 or 0, depending on whether or not the GRI Topic-specific Standard was disclosed by the bank.

On the basis of this method, each bank in the sample received a GRID score, calculated according to the number of GRI Topic-specific Standards present in its sustainability report.

4.3 Empirical analysis

The empirical analysis assumed the GRID as a dependent variable and the performance indicators as independent variables.

For the choice of economic performance indicators, the analysis made reference both to those mainly used in literature, and to those specifically used in professional surveys of the Italian banking sector (Kpmg Advisory, 2021). In particular, the independent variables were assumed as follows:

- Capitalization = market value.
- Size = total assets.
- Leverage = equity to total assets.
- Profitability = ROA and ROE.

To answer the research questions, the study verified the relationships between each of the independent variables (capitalization, size, leverage, ROA, and ROE) and the dependent variable (GRID), as described in the following sections.

5. Main Results

5.1 Descriptive statistics and correlation analysis

Descriptive statistics for all variables are reported in Table 1, which describes the minimum, maximum, mean and standard deviations (the firm capitalization and size in Table 1 are expressed in billions of Euros).

Table 1: Descriptive statistics for all variables

Variables	Min	Max	Mean	Standard deviation
GRID	31	77	46.50	17.73
Capitalization	2.11	37.27	12.13	13.48
Size	31.76	1,002.61	383.60	455.38
Leverage	0.0464	0.0666	0.0585	0.0081
ROA	0.0001	0.0102	0.0034	0.0047
ROE	-0.0468	0.1918	0.0671	0.0915

Source: elaboration by the author

Table 2 presents the Pearson correlation matrix for dependent and independent variables.

Table 2: Correlation analysis

	GRID	Capitalization	Size	Leverage	ROA	ROE
GRID	1	0.835	0.784	0.485	-0.348	-0.415
Capitalization		1	0.871	0.486	-0.155	-0.214
Size			1	0.674	-0.584	-0.614
Leverage				1	-0.743	-0.804
ROA					1	0.993
ROE						1

Source: elaboration by the author

In particular, both capitalization and size have a significant positive correlation with the GRID. Furthermore, while leverage has a moderately positive correlation with the GRID, both ROA and ROE show a negative correlation.
The profitability indices have a positive relationship between them, but negative with all the other variables.

5.2 Predictive models

This study stands out from the prevailing literature because it uses supervised learning methods for the analysis of correlations. These methods, thanks to their generalization property, can be applied to multiple fields, and this research has

found them useful for the problem to be examined.

In particular, the predictive power of three different models was analyzed (Bishop, 2006):

- Linear Regression.
- Support Vector Machines for Regression.
- Decision Trees.

For the application of these methods, the analysis referred to the study by De Lucia et al. (2020), adapting it to the subject of the research. In particular, the authors of the study used Machine Learning (ML) for a topic that inspired this research given the similarity of the purposes. Specifically, they applied ML to European public enterprises for a number of objects, including verifying the relationship between ESG and financial performance, and found that Machine Learning is an accurate forecasting technique.

For the development of the three methods mentioned above, the study used the *Matlab* software, made available to researchers by the home university, for academic purposes.

In linear regression, the study fit a model of the form:

$$GRID_i = \beta_0 + \beta_1 \cdot Capitalization_i + \beta_2 \cdot Total\ assets_i + \beta_3 \cdot ROA_i + \beta_4 \cdot ROE_i + \beta_5 \cdot Equity/Total\ Assets_i \tag{1}$$

for each of the i-th bank considered.

Support Vector Machines (SVMs) are a set of supervised learning methods used for classification, regression and outliers detection, and this research used them for regression to estimate the GRID from the five independent variables.

SVMs are very versatile as different Kernel functions can be specified for the decision function. This research used an RBF kernel with $\gamma = \frac{1}{5 \cdot var(X)}$, where the denominator is determined based on the fact that there are 5 independent variables, and with $var(X)$ representing the sampled variance of the joint distribution as input, and a L2 regularized with $c = 1$.

Decision Trees (DTs) are a non-parametric supervised learning method used for classification and regression. The goal is to create a model that predicts the value of a target variable by learning simple decision rules inferred from the data features. This has the substantial advantage that can be visualized for transparency.

Due to the limitations of the dataset, the study resorts to the cross-validation technique for assessing the quality of the models. It is common practice when performing a (supervised) machine learning experiment to hold out part of the available data as a test set. When data is limited, as in this analysis, partitioning the available data into different sets drastically reduce the number of samples which can be used for learning the models, and the results can depend on a particular

random choice for the sets. To overcome that, this study performed k-fold cross-validation, in which the training set is split into k smaller sets. Then, for each of the k folds:

1. A model is trained using $k - 1$ of the folds as training data;
2. The resulting model is tested on the remaining part of the data using a chosen metric.

This research used $k = 3$, and considered the following two metrics in assessing the quality of the trained models:

- RMSE, the root mean squared error, the lower the better.
- R^2 metric, i.e., the proportion of the variation in the dependent variable that is predictable from the independent variables, the closer to 1 the better.

Figure 1 illustrates the results of the evaluation.
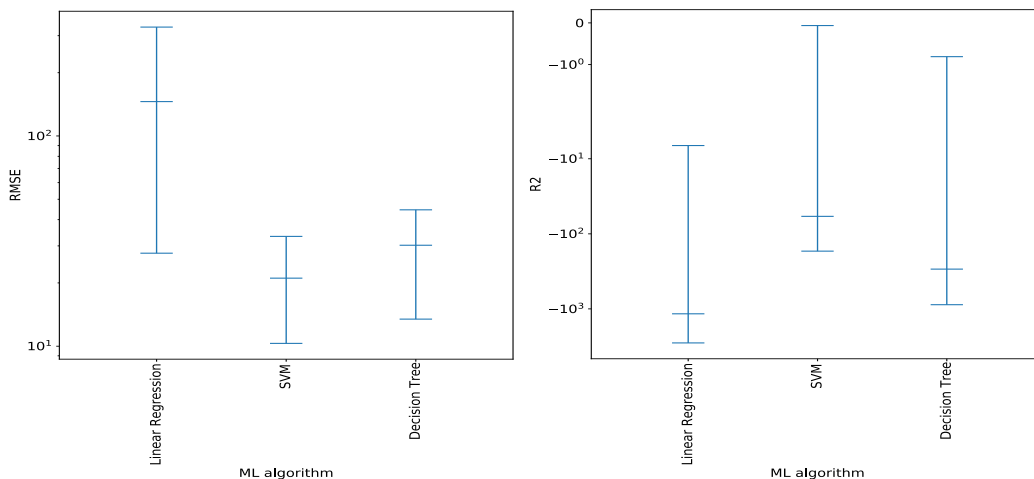
Figure 1: Violin plots of the distribution of RMSE and R^2 metrics

Figure 1 represents the Violin plots of the distribution of RMSE (left) and R^2 (right) metrics over a 3-fold cross validation using the three chosen models. The y-axes are logarithmic, and they have different scales between the left and the right figures. As the two figures refer to different metrics, they are not comparable and each figure should be considered independently.
Source: elaboration by the author

As Figure 1 shows, the linear regression model performs worst in comparison with SVMs and DTs both considering the RMSE metric. SVMs appears to be the best performing model, having the lowest RMSE. The R^2 metric is non-significative for all the models: this is due to the limited quantity of data available.

To assess the importance of the different independent variables in each of the models, the study used the *permutation feature importance*. The permutation feature importance is the decrease in a model score when a single feature value is randomly shuffled. By breaking the relationship between the independent and the dependent

variable, the drop in the model score is indicative of how much the model depends on the independent variable. This analysis permuted variables 30 times.

Figure 2 illustrates the results of the analysis using the permutation feature importance.
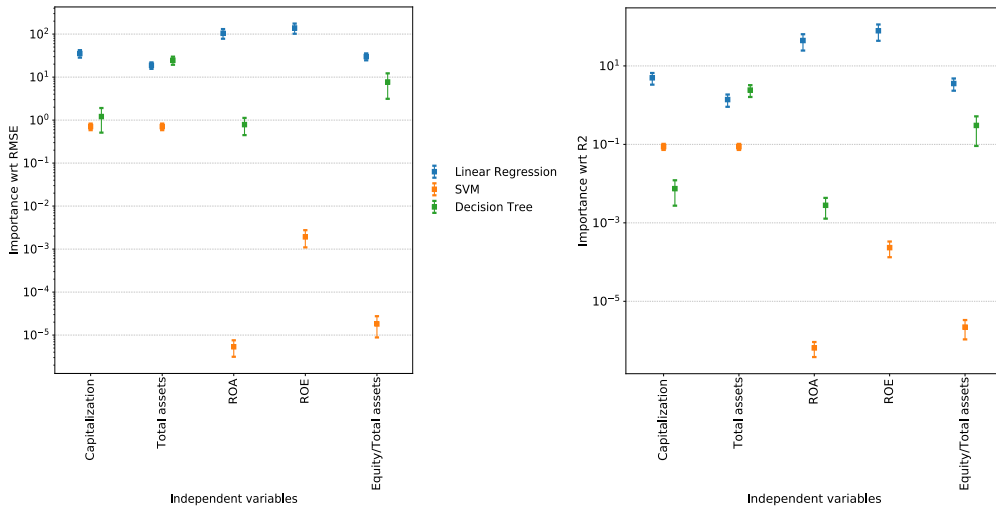
Figure 2: Error bars of the measure of importance of each of the independent variables

Missing values – for the decision tree model only – illustrates how the associated independent variable was not featuring in it. The y-axes are logarithmic, and they have different scales between the left and the right figures. As the two figures refer to different metrics, they are not comparable and each figure should be considered independently.

Source: elaboration by the author

It is relevant to consider the case of SVMs and Decision Tree: as observed by commenting on Figure 1, they display the best results in terms of RMSE and R^2. Independently of the score and the model, the two most important features identified are capitalization and size.

From the set of analyzes presented, some significant correlations emerge that are useful for answering the research questions.

5.3 Answers to research questions

As regards RQ1, the capitalization of the major Italian banks shows a significant positive correlation with the GRID.

The relationship highlighted confirms the assumption of this research, because the GRID is positively affected by the investments made by banks to improve their non-financial disclosure. In fact, these investments require a considerable commitment of economic resources and, probably, banks with higher market value also have greater financial strength that allows them to bear the costs associated with better sustainability reporting. Understood in these terms, financial strength measured by capitalization can be considered the root cause, rather than the effect, of high quality non-financial reports.

Starting from this circumstance, it is also likely that a virtuous circle will be activated: financial strength makes it possible to invest in disclosure and, in turn, greater transparency is rewarded by the market through the attraction of investors. Attracting investors in turn contributes to increasing the market value of the company and the circle starts all over again.

Regarding RQ2, this study confirms, in line with the literature (Buallay and Alajmi, 2020; Buallay et al., 2022), that the size of the major Italian banks has a positive relationship with the GRID.

Since in this research the size was expressed as total assets, this indicator also very effectively confirms that the solidity and economic strength of the company, shown by the size of the invested capital, can allow for the making of significant investments in non-financial reporting. In fact, larger companies can more easily exploit economies of scale and are generally endowed with high human and financial resources (Kuzey and Uyar, 2017).

As regards the RQ3, the relationship between GRID and leverage (equity to total assets) is not slightly positive. This relationship can be interpreted as a result of the behavior observed by some studies, according to which the increase in debt – which in this research is equivalent to a decrease in equity – reduces the level of sustainability reporting (Kuzey and Uyar, 2017). This effect derives from the financial weakening of the bank caused by the dependence on third party capital.

Furthermore, the result is in line with the correlation analysis, in which the correlation of the GRID with leverage (0.485) is almost identical to that between capitalization and leverage (0.486).

Finally, as regards RQ4, both profitability indices – ROA and ROE – are negatively correlated with the GRID.

Unlike studies that have highlighted the presence of positive relationships between sustainability reporting and profitability (Buallay, 2019), according to Jennifer Ho and Taylor (2007), the relationship is negative. This result could be explained by the fact that companies with lower profitability seek to recover profits through the disclosure of extensive information on their social commitment, with the aim of gaining the trust of stakeholders. From this observation it could also derive that the higher the profitability of the company, the lower its need to acquire social consensus.

Furthermore, with reference to the year 2020 analyzed here, it is necessary to consider an additional factor, linked to the SARS-CoV-2 pandemic (in short "COVID-19"). In this regard, it is relevant to state that one of the limitations of this study consists in having analyzed only one year, while any consideration relating to the pandemic would have required at least a comparison with the year 2019.

However, it is known that the pandemic has sharply reduced the profitability of almost all economic sectors worldwide, including the banking sector. On the contrary, it is reasonable to assume that the reporting systems, as they are structured and not extemporaneous, have longer reaction times than profitability. It is therefore quite probable that in 2020 the reporting systems have not undergone changes, while profitability has dropped immediately. This *inertia factor* shows another limitation

of this study, since a more significant analysis should be conducted over a longer period of time. In the long term, in fact, it would be possible to verify whether a protracted decline in profitability induces banks to downsize their non-financial information processing systems.

6. Conclusion

This study identified some relationships between economic performance and GRI standards disclosure concerning 6 of the main Italian banks. In particular, capitalization, size and leverage have a positive relationship with the GRID, while profitability, both of the invested capital (ROA) and of the equity (ROE), shows a negative relationship. Although the identified connections are generally in line with the literature, the studies currently existing have come to divergent results, so the theoretical background admits that the connections can be positive, negative or null. Compared to existing theories, this study can offer three types of contribution.

First of all, given that the analysis concerned some of the major banks in Italy by capitalization, the relationships identified can be considered representative of the upper segment of the Italian banking sector. In this sense, the analysis can offer research insights useful for understanding Italian non-financial reporting, also considering that specific studies on the subject are currently not particularly numerous.

Secondly, a novel aspect of the survey concerns the overturning of the perspective according to which the quality and breadth of sustainability reporting are determinants of economic performance, given that this study proposes an opposite approach. In particular, the fundamental assumption is to consider the economic performance of banks as a factor capable of influencing the information effectiveness of non-financial reports. This is the reason why the representative indicators of the economic performance of banks have been considered as independent variables and the GRID as a dependent variable.

In fact, if the analysis, instead of starting from the non-financial reporting system as a datum of the problem, starts from the examination of the factors that determined it, that is the material and human investments in sustainability, it is easier to understand that these factors are largely dependent on economic performance. The better the economic performance, the higher the financial capacity of the company to carry out the projects and to bear the costs necessary for the implementation of adequate non-financial reports.

Through this approach, it is possible to highlight the reasons why the structurally more solid banks, namely those with the highest capitalization, size and equity, are able to dedicate to sustainability greater economic resources.

Finally, thanks to the application of machine learning, this study can stimulate a wider use of relatively new techniques, which, despite having a strong potential, have not yet been fully explored.

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